

LIGHT ALLOYS

DIRECTORY AND DATABOOK

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Preface

The overall aim of this book is to aid the selection and sourcing of Aluminium, Magnesium, Titanium and Beryllium alloys – known collectively, for the purposes of this book, as “Light Alloys”. Concise, relevant technical data is provided for these. Also included are commercially available metal matrix composites (using light alloy matrices) and hybrid polymer-metal laminates. World-wide commercial sources for these metals and alloys are given together with detailed information on the suppliers.

THE STRUCTURE OF THIS BOOK

The book is divided into four main parts:

- **Part 1 – Review:**
 - A broad introduction to light metal alloys and their applications.
 - Effects of alloying additions and impurities.
 - Alloy and Temper Designation Systems – explanation of the various systems cited in the book, both nationally-based designation systems and those international systems which have been adopted within industry.
 - Processing methods.
 - Reading list.
- **Part 2 – Directory:** Contains a comprehensive listing of manufacturers and suppliers, their product ranges, tradenames and contact details for all those included in this edition.
 - Suppliers Product Types - a table showing the product forms, processing methods and alloy types for each supplier.
 - Tradenames - A listing of trade names for each supplier.
 - Suppliers by Country - Supplier names organised by country.
 - Group Affiliations - A listing of companies organised by group company name (where known) and country.
 - Supplier Details - The entry for each company, or division, describes their activities and the alloys and forms available. It also summarises other related activities, along with Quality Approvals and any other information of interest.
 - Other useful address and data sources.
- **Part 3 – Alloy Information:** Divided into sections for each base metal. Information on MMC's is included, although the data available is more proprietary in nature. The information within this section is a combination of that contained in various applicable standards and specifications, with that provided by contributors to the book (commercial or proprietary data). Under no circumstances should the data given in this book be used for design purposes. It is there to provide an indication of the capabilities of particular materials for general comparison purposes and as an aid to general materials selection. The following data (where available) is presented for each alloy designation:
 - Chemical composition.
 - Identified product forms.
 - Similar/Equivalent alloys.
 - Notes on characteristics, applications, etc.
 - Typical mechanical properties, for specific tempers, conditions and product forms.
- **Part 4 – Appendices:**
 - Standards – provides a listing of standards and specifications which are applicable to light alloy grades. For each base metal, the list is divided into national and international standards organisations, e.g. CEN, AA, ISO, BS, SAE, NF, etc.
 - Primary aluminium producers – listed by country.
 - Glossary – a compilation of technical terms appropriate to light alloys and their use.
 - Multilingual vocabulary – Technical keywords are given in English, French, German, Italian and Spanish.
 - Conversion Factors & Units – Metric units are used throughout this book.
- **Indexes:**
 - Alloy designation cross-reference index.
 - Alloy designations/names index.

Note:

The information presented in this book has been compiled from a variety of sources: manufacturers, agents and suppliers; trade associations; official bodies and standards organisations. Great care has been taken to ensure that all of the information is accurately represented here, but no responsibility can be taken for errors or omissions. For this first edition, we have tried to include the largest possible number of manufacturers, suppliers and products. Inevitably some will have been missed, so any comments on alterations or additions would be very useful. The final page of the book shows how to contact the authors.

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Thanks are also due to the many others who replied promptly to our requests for information. If only all organisations were the same.

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Part 1 : Review

INTRODUCTION

Within the context of this book, a "Light Alloy" is a metallic system based on aluminium, magnesium, titanium or beryllium. This definition includes metal matrix composites (MMC's), where the matrix is one of the light alloys, and the growing family of hybrid metal/polymer laminated materials.

This book concentrates on the availability and basic properties of commercial alloys. A great deal has already been written on the metallurgy, characteristics and applications of these, and there is no real need to repeat it here. What follows is a brief review of characteristics, for more detailed technical and scientific information see the extensive reading list at the end of this section.

ALLOY CHARACTERISTICS

The particular characteristics which tend to encourage the use of light alloys are:

- ❑ High specific strengths (strength/specific gravity ratio) Light alloys are used in many weight-critical applications, e.g. high speed components, light-weight constructions, automotive and aerospace structures. Table 1 shows a comparison of some basic material properties with those of steel.
- ❑ Very good processability by a wide range of mechanical working and casting techniques. Processing temperatures are much lower than for example steel, but their service temperatures are limited similarly.
- ❑ Atmospheric corrosion resistance is generally very good and the high chemical resistance of titanium makes it widely used for chemical plant with aggressive media.
- ❑ All light alloys are enthusiastically recycled. Initial extraction costs are quite high, but, because of the low melting points, reprocessing costs are relatively low.

Alloys	Specific Gravity	Modulus (GPa)	UTS (MPa)	Specific Strength (MPa)
Steel	7.9	160 - 220	250 - 2400	30 - 310
Aluminium	2.7	65 - 75	50 - 600	25 - 230
Magnesium	1.75	40 - 50	75 - 400	80 - 225
Titanium	4.5	95 - 135	240 - 1450	80 - 380
Beryllium	1.85	290 - 305	240 - 800	130 - 430

Table 1 - Comparison of basic properties.

The metals and their numerous alloys are very well characterised and, with the exception of Beryllium, widely accepted as engineering materials. Some alloy and processing development continues to occur, but generally these are mature materials with a wide knowledge base. Innovations tend to be in the field of materials processing and in the development of reinforced and laminated alloys.

Aluminium Alloys

Aluminium has excellent corrosion resistance and electrical conductivity. It is easily formed or cast and a very large number of commercial alloys are available.

There are a vast number of applications, ranging from packaging (e.g. beverage cans, household foil) to whole aircraft structures. Architectural uses are very widespread. Vehicle manufacturers, increasingly conscious of weight, are moving towards maximising aluminium-based engines and whole body structures.

General Properties of Aluminium

The beneficial characteristics of aluminium include:

- ❑ high electrical conductivity,
- ❑ high thermal conductivity,
- ❑ excellent resistance to oxidation ,
- ❑ excellent resistance to corrosion ,
- ❑ nonmagnetic (paramagnetic) behaviour.

Aluminium reacts with oxygen, even at room temperature, to produce an extremely thin, coherent aluminium oxide (Al_2O_3) layer that protects the underlying metal from corrosion. This characteristic is exploited and enhanced in anodising, whereby a wide range of protective or decorative finishes are possible.

Limitations on the use of aluminium alloys are:

- ❑ no fatigue limit, so failure by fatigue can eventually occur even at low stresses.
- ❑ poor elevated temperature performance leading to the loss of mechanical properties as a result of over-ageing or recrystallization.
- ❑ low hardness; poor wear resistance.
- ❑ some alloys and environments may give poor corrosion resistance.

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Aluminium alloy compositions are initially grouped as either 'casting' or 'wrought', (very few alloys can be processed by both methods):

- ❑ **Casting alloys** can be tailored for specific casting methods; e.g. sand, permanent mould, die-casting. The alloy composition and casting method affects the final metal structure. Some may be modified by subsequent heat-treatments to improve properties.
- ❑ **Wrought alloys** are shaped by plastic deformation (hot and/or cold working). They have compositions and microstructures significantly different from casting alloys owing to the different requirements of the manufacturing process.

Within each major group the alloys can be divided into two subgroups: heat-treatable and non heat-treatable alloys. Commercial alloys are strengthened either by strain (work) hardening or by heat treatment (age hardening); this can produce strengths in excess of 30 times that of pure, soft aluminium. The degree of strengthening is known as condition or temper and is generally indicated by a suffix to the alloy code. The most widely found system uses the following letters to indicate the nature of the treatment:

- ❑ O = Annealed (soft)
- ❑ T = Heat-treated
- ❑ H = Strain hardened
- ❑ F = As-finished (no specific treatment - the properties obtained depend on the forming method used)

Numbers following the T or H indicate the amount of strain hardening and the exact type of heat treatment or other special aspects of the processing of the alloy. Variations may exist within Nationally-based systems. [See: Alloy Designation Systems].

Casting Alloys

Commercially available aluminium casting alloys fall into several compositional groups. These groupings indicate whether subsequent hardening heat treatments are possible. As is shown in Table 2, they are also reflected in the Aluminum Association codes for these alloys [See: Alloy Designation Systems].

Composition	Strengthening	AA Alloys
CP Al	Not age hardenable	1xx
Al-Cu	Age hardenable	2xx
Al-Si-Cu; Al-Mg-Si	Some age hardenable	3xx
Al-Si	Not age hardenable	4xx
Al-Mg	Not age hardenable	5xx
Al-Mg-Zn	Age hardenable	7xx
Al-Sn	Age hardenable	8xx

Table 2 – Aluminium Casting Alloy Types

The majority of commercially used aluminium casting alloys come from the groups containing sufficient silicon to cause the eutectic reaction. This gives alloys with particularly low melting points, good fluidity (flow in the mould without premature solidification), and good castability.

The properties of the Al-Si alloys are controlled by:

- ❑ solid solution strengthening of the alpha aluminium matrix.
- ❑ dispersion strengthening by the beta-phase.
- ❑ solidification characteristics (control of the primary grain size, shape plus the nature of the eutectic microconstituent).

Fast cooling, obtained in die casting or permanent mould casting, increases strength by refining grain size and the eutectic microconstituent.

Grain refinement by alloying is also used to improve the microstructure, hence the level of dispersion strengthening. Depending on the alloy, this may be achieved by additions of:

- ❑ boron and titanium.
- ❑ sodium or strontium - to change the eutectic structure.
- ❑ phosphorus - hardening and refining primary silicon.

[See: Effects of Alloying Elements and Impurities]

Wrought Alloys

As with cast aluminium alloys, commercial compositions fall into a number of broad groups. This is again reflected in the AA alloy designation system, which is now almost universally used to describe these alloys - [See Alloy Designation Systems]. Table 3 shows these compositional categories.

Composition	Strengthening	AA Alloys
CP Al >99%	Not age hardenable	1xxx
Al-Cu; Al-Cu-Li	Age hardenable	2xxx
Al-Mn	Not age hardenable	3xxx
Al-Si; Al-Mg-Si	Age hardenable (Mg)	4xxx
Al-Mg	Not age hardenable	5xxx
Al-Mg-Si	Age hardenable	6xxx
Al-Mg-Zn	Age hardenable	7xxx
Al-Li, Sn, Zr, B, Fe or Cu	Mostly age hardenable	8xxx

Table 3 – Aluminium Wrought Alloy Types

The 1xxx and 3xxx series are single-phase alloys, except for minor inclusions or intermetallic compounds. Their properties are determined by strain hardening, limited solid solution strengthening and grain-size control.

The 2xxx, 6xxx, and 7xxx series are age-hardenable alloys and can be heat treated to produce excellent strengths. They cannot be used at temperatures above ~175°C in the aged condition.

4xxx series are two phase alloys:

- ❑ Alpha
- ❑ Beta - nearly pure silicon.

The alloys containing both Si and Mg can be age-hardened by precipitation of Mg₂Si.

5xxx alloys are two phase at RT:

- ❑ Alpha, a solid solution of magnesium in aluminium,
- ❑ Mg₂Al₃, a hard, brittle intermetallic compound.

Al-Mg alloys are strengthened by a fine dispersion of Mg₂Al₃ as well as by strain hardening, solid solution strengthening and grain-size control. Age-hardening treatments are not possible because the Mg₂Al₃ is not coherent.

Aluminium-Lithium Alloys

Alloys containing lithium have been introduced, particularly for the aerospace industry. As Li additions are lower than the other main alloying elements they are dispersed amongst the 2xxx, 7xxx and 8xxx wrought aluminium series.

The addition of lithium can give significant improvements in mechanical properties, but may compromise other characteristics:

- The low density of lithium gives a reduction in alloy density (can be 10% less).
- Increased elastic moduli.
- Strength equals or exceeds conventional alloys.
- Improved fatigue resistance (slow fatigue crack growth rate).
- Good toughness at cryogenic temperatures.
- Can be superplastically formed into complex shapes.
- Can be prone to stress corrosion cracking (SCC); varies with other alloying elements and levels. The SCC resistance can be improved by specific heat-treatments, although the strength may be compromised.

The high specific strength and specific stiffness makes these alloys useful for aerospace structural applications, e.g. floors, skins, and frames in military and commercial aircraft.

The high strength of Al-Li alloys results from age-hardening. Alloys containing up to 2.5% Li can be heat-treated by conventional methods. Additional Li (up to 4%) can be introduced by rapid solidification processing; further enhancing light weight and maximum strength.

Magnesium Alloys

Magnesium is often extracted electrolytically from concentrated magnesium chloride in seawater. It melts at a slightly lower temperature than aluminium.

- Good specific strength.
- Corrosion resistance (many environments) similar to aluminium.
- Very low density.
- Very good casting characteristics.
- Low modulus.
- Low level of strengthening mechanisms.
- Poor elevated temperature properties.
- Poor fatigue resistance.
- Poor creep resistance.
- Poor wear resistance.
- Poor tolerance of salt-containing environments.
- Poses a hazard during casting and machining (combines readily with oxygen and burns).

Magnesium alloys are used in aerospace applications, high-speed components, transportation and materials handling equipment, portable equipment (mobile phones), car components.

Structure and Properties

Pure magnesium is generally less ductile than aluminium, but this may be increased by alloying. Some deformation and strain hardening is possible at room temperature, and the alloys can be readily deformed at elevated temperatures. Strain hardening produces a relatively small effect in pure magnesium because of the low strain-hardening coefficient.

The solubility of alloying elements in magnesium at room temperature is limited; only a small degree of solid solution

strengthening is possible. However the solubility increases with temperature allowing many alloys to be strengthened by either dispersion strengthening or age hardening.

Age-hardened magnesium alloys (containing Zr, Th, Ag, or Ce) can have good resistance to over-ageing at temperatures as high as 300°C.

Alloys containing up to 9% lithium have exceptionally low densities.

To improve the generally poor corrosion performance, some magnesium alloys have very low levels of impurities or contain large amounts (>5%) of rare earth (RE) elements. These alloys form a protective MgO film.

Titanium Alloys

Titanium alloys have intermediate densities and temperature resistance, along with excellent corrosion resistance. They are widely used for applications in aerospace and chemical processing. Many of the alloys show a powerful response to strengthening by age hardening and quench and temper heat treatments.

Titanium alloys have:

- high specific strength
- high specific stiffness
- good high-temperature properties
- excellent resistance to corrosion and contamination below 535°C owing to an adherent, protective TiO₂ film. Above 535°C, the oxide film breaks down and small atoms such as carbon, oxygen, nitrogen, and hydrogen embrittle the metal.

The excellent corrosion resistance provides applications in chemical processing equipment, marine components, and biomedical implants. It is an important aerospace material and is used for airframe and jet engine components.

Owing to its high affinity for oxygen and other gases, any melting and casting processes must be carried out under vacuum.

Pure titanium is allotropic, with an HCP crystal structure (alpha) at low temperatures and a BCC structure (beta) above 882°C. Alloying elements provide solid solution strengthening and change the allotropic transformation temperature (alpha-beta transition) [See also: Effects of Alloying Elements and Impurities]. The effects include:

- solid solution strengthening without affecting the transformation temperature (Sn, Zr).
- increase in alpha to beta transformation temperature by alpha stabilising elements, (e.g. Al, O, H).
- decrease in transformation temperature; causing beta to be stable at RT, (beta stabilisers, e.g. V, Ta, Mo Nb).
- providing a eutectoid reaction which gives a two-phase alpha-beta structure at RT (Mn, Cr, Fe).

In addition to the range of commercially pure grades and conventional alloys, specialist titanium-based materials include:

- Titanium-Niobium - a superconductive intermetallic compound.
- Titanium-Nickel - shows a shape-memory effect.
- Titanium-Aluminium intermetallics (titanium aluminides) which are being considered for some applications requiring excellent high temperature characteristics; mainly aerospace related.

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Commercially Pure Titanium

Applications include heat exchangers, piping, reactors, pumps, and valves for the chemical and petrochemical industries.

- ❑ Superior corrosion resistance.
- ❑ Impurities, such as oxygen, increase the strength of the titanium (but reduce corrosion resistance).

Alpha Titanium Alloys

This group commonly contain either 2.5% Cu or 5% Al + 2.5% Sn which provide solid solution strengthening to the alpha phase. Alpha alloys are annealed at high temperature (beta), subsequent cooling determines the microstructure:

- ❑ rapid cooling gives an acicular (Widmanstätten) alpha grain structure with good fatigue resistance.
- ❑ furnace cooling gives a plate-like alpha structure with improved creep resistance.

Copper containing alloys may also show some precipitation hardening.

Near-Alpha Alloys

A complex group of compositions where the microstructural constituents are determined by heat treatment. Alloys may be alpha or alpha + beta. Processing adjustments can be used to improve particular properties, e.g. high temperature properties for engine applications.

Alpha-Beta Titanium Alloys

A balance of alpha and beta stabilisers produces a mixture of alpha and beta phases at RT. The most alloy common of this type is Ti-6Al-4V. Because the alloys contain two phases, heat treatments can be used to control and modify the microstructure and properties.

Annealing provides a combination of high ductility, uniform properties, and good strength. The cooling rate then determines the final microstructure, and has different effects on the two phases present:

- ❑ **Alpha:** the alloy is heated just below the beta-transus temperature, permitting a small amount of alpha to remain and prevent grain growth:
 - Slow cooling causes equiaxed alpha grains to form; good ductility and formability while inhibiting fatigue cracks from nucleating.
 - Faster cooling, particularly from above the alpha-beta transus temperature, produces an acicular or 'basket-weave' alpha phase. Fatigue cracks can nucleate more easily in this, but crack growth is slower because of the complex structure (following the boundaries between alpha and beta phases); good fracture toughness and creep resistance.
- ❑ **Beta:** two possible microstructures may be produced when beta phase is quenched from high temperature:
 - Quenched - the beta transforms to titanium martensite (alpha') in an alloy that crosses the Ms line on cooling. The titanium martensite is a relatively soft, supersaturated phase.
 - Tempered - When alpha' is reheated beta is precipitated from the supersaturated alpha' phase. Fine beta precipitates initially increase the strength compared with the alpha' (the opposite of a tempered steel martensite). Softening occurs when tempering is at too high a temperature.

Highly alloyed alpha-beta alloys are age-hardened.

- ❑ Quenched – the beta phase is retained as beta_{ss} (supersaturated in Ti).
- ❑ Ageing – the beta_{ss} precipitates alpha (Widmanstätten structure) which improves the strength and fracture toughness.

Some typical applications for the heat-treated alpha-beta alloys are aerospace components (airframes, rockets, jet engines, landing gear). Some alloys, including Ti-6Al-4V, can be superplastically formed.

Beta Titanium Alloys

None of the so-called beta alloys (usually containing V or Mo additions) are entirely beta at RT. Instead, they are rich in beta stabilisers, such that rapid cooling produces a metastable all-beta RT structure. Strengthening is obtained both from:

- ❑ large amounts of solid-solution-strengthening alloying elements.
- ❑ ageing the metastable beta structure to allow alpha to precipitate.

Applications include high-strength fasteners, beams, and other fittings for aerospace applications.

Beryllium Alloys

Beryllium has an exceptional strength-to-weight ratio, maintains its strength at high temperatures and is very stiff. Properties of commercial alloys are highly anisotropic.

It is extracted from bertrandite (low-grade) and beryl (high grade) ores by wet chemical techniques to give beryllium hydroxide. This is then converted into primary metallic beryllium 'pebbles' by reduction using magnesium. These are then vacuum melted to form ingots which are subsequently processed into pure (98-99%) powders.

These powders (BeO <2%) are vacuum hot-pressed into shapes and subsequently processed to semi-finished product forms. Recommended processing temperatures are 538-760°C; below 371°C brittleness is a problem.

The main characteristics of beryllium are:

- ❑ Lower density than aluminium.
- ❑ Higher modulus (stiffer) than steel.
- ❑ High specific strength.
- ❑ Low ductility (brittle).
- ❑ Maintains both strength and stiffness to high temperatures (>600°C). Useful mechanical properties are retained at elevated temperature to >800°C and down to cryogenic temperatures.
- ❑ Transparency to electromagnetic radiation.
- ❑ Reactive.
- ❑ Expensive.
- ❑ Beryllium oxide is toxic.

Beryllium has an HCP crystal structure giving limited ductility at room temperature. When exposed to the atmosphere at elevated temperatures, it rapidly oxidises to form BeO. These problems require the use of sophisticated manufacturing techniques, such as vacuum casting, vacuum forging, and powder metallurgy. Consequently the majority of beryllium components and structures are produced by companies dedicated to working with the materials.

Beryllium tends to be used for particular applications exploiting a particular property rather than as a general engineering material, e.g.:

- ❑ High specific stiffness (inertial guidance systems).
- ❑ Structural properties in weight-critical applications; aerospace applications, e.g. windshield components on the Space Shuttle.
- ❑ High-temperature stability, conductivity and low thermal expansion are attractive for use in space.
- ❑ Specialist uses (X-ray windows in medical and analytical equipment, nuclear industry: neutron reflectors and moderators, etc.).

Rigorous safety procedures are required when working with beryllium to avoid inhalation of metal particles and compounds, including the oxide, which are toxic.

Owing to the specialist uses of beryllium, material specifications, where they exist, tend to be defence standards, e.g. MIL-B-8964 Sheet & plate, MIL-B-21531 Bar, rod & shape.

Forms and Processing Methods

- ❑ Forging - possible.
- ❑ Rolling - possible.
- ❑ Extrusion - possible.
- ❑ Drawing - possible.
- ❑ Sheet - (cross-rolled) poor short-transverse properties prevent forming at low temperatures. Processing is normally carried out between 700-730°C; not >790°C or original properties will be affected.
- ❑ Plate and foil - possible
- ❑ Wire - possible
- ❑ Machining - using carbide tools. Surface damage from machining operations (which act as stress-raisers in load-bearing parts) require removal by etching. Chemical milling, electro-chemical machining and Electro-discharge machining (EDM) avoid such mechanical damage. Drilling may cause delamination and break-out in sheet unless special precautions are taken.
- ❑ Mechanical Joining - by rivets (squeeze-rivets only); bolting and threading. Press-fits need careful design to avoid damage.
- ❑ Brazing - with Zn-, Al-Si, Ag-based filler materials. Cu containing braze fillers may embrittle beryllium. Special techniques have been developed. Furnace brazing is done under vacuum to prevent oxidation. Dip-brazing is also successful.
- ❑ Braze-welding - possible by TIG or MIG but requires a high level of welding skill.
- ❑ Diffusion bonding - possible
- ❑ Soldering - possible.
- ❑ Welding (fusion) - not recommended, owing to cast grain structure in weld-zone.
- ❑ Electron beam welding - successful for applications without structural requirements (instrument assemblies).
- ❑ Adhesive bonding - with proper surface preparation (acid cleaning and neutralising), reliable bonds have been produced for spacecraft assemblies.

- ❑ Various protective coatings are possible to provide protection in hostile environments:
 - Proprietary 'Berylcoat' passivation coating; Chromate conversion for salt-spray and high temperature oxidation resistance.
 - Anodising (chromic acid) - for corrosion protection, increase emissivity and reduce light reflection (optical equipment).
 - Plating - not widely used, except for electroless nickel plating (polished surface of beryllium mirrors).
- ❑ Recycling - Clean scrap is recycled into new products by the major producer.

Metal Matrix Composites (MMC's)

In MMC's a reinforcement phase is incorporated into a metal alloy. The reinforcement phase may be a particulate, whisker or continuous fibre. The aim is to produce a material which retains some of the characteristics of the matrix (such as ductility, formability, etc.) but has improved properties (such as strength and stiffness) provided by the reinforcement. All light metals, with the exception of beryllium, have been considered as matrix phases for MMC's. Many alloy variants have been investigated with the aim of improving mechanical properties, thermal stability and wear characteristics. A number of combinations are now commercially available and have found applications such as: engine components, pistons, braking system parts, etc.

In general the size of particulate used for MMC's is much larger than that used in oxide dispersion strengthened (ODS) alloys.

Characteristics and processing parameters are determined mainly by:

- ❑ Matrix alloy.
- ❑ Reinforcement content.
- ❑ Chemical compatibility between a matrix and the reinforcement.
- ❑ Reinforcement/matrix bonding.

Manufacturing methods are usually adaptations of standard metal processing techniques. These are generally powder metallurgical or casting in nature. Many of the techniques are patented and proprietary.

Aluminium-based MMC's

Within the light-alloy matrix materials, aluminium-based MMC's are probably the most advanced. The reinforcement is normally silicon carbide (particulate) for 'general engineering' applications, with some continuous fibre-reinforced MMC's for specialist aerospace applications. Aluminium-based MMC's are now used in load-bearing applications in the aerospace, automotive and leisure industries. Within the electronics industry, MMC's are finding applications in electronic packaging. Here, characteristics such as combined high-thermal conductivity and low thermal expansion are of interest for thermal management uses (mainly high-power circuits; GaAs microwave devices). In general, the reinforcement content is higher than for engineering applications. Net-shape manufacturing, where the MMC is formed at the same time as the product is useful for intricate components.

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Magnesium-based MMC's

Those investigated so far use silicon carbide, alumina, alumina-silica or boron carbide particulate reinforcement. Some of these are of interest for automotive piston applications because of their improved wear properties. Continuous fibre reinforcements have included carbon, alumina, boron, silicon carbide and steel 'fibres'; with carbon and silicon carbide fibres being the most promising options.

Titanium-based MMC's

Boron carbide, titanium diboride and titanium carbide particulate reinforcements have been incorporated using powder metallurgy. Molten metal processing tends to result in unacceptable chemical reactions between reinforcement and matrix. Reinforcement levels are fairly low to avoid excessive loss of ductility.

Continuous fibre-reinforced MMC's have been studied using silicon carbide, boron with boron carbide coating and 'borisic' (boron/silicon carbide). Large diameter fibres or filaments are generally required, as smaller ones tend to be degraded during processing. Commercially available options, destined for very specific purposes, tend to have SiC filaments.

Hybrid Metal-Polymer Laminates

These materials form two types:

- **Fibre Metal Laminates (FML)** (from Structural Laminates company) – bonded arrangements of thin metal sheets with alternating plies of strong fibre (aramid, glass or carbon) impregnated with a thermosetting adhesive. These materials have anisotropic properties which can be modified depending on the precise laminate construction (i.e. fibre direction). Commercially available material systems are:
 - ARALL™ – aluminium alloy/aramid fibre.
 - GLARE™ – aluminium alloy/glass fibre.

These materials were developed for fatigue-critical applications requiring thin-gauge sheet. Some versions have been evaluated for aircraft structures. A body of approved design data and fabrication practices now exists.

- **Metal-Thermoplastic** – thin metal sheets bonded with a thermoplastic. These materials have very good sound and vibration deadening properties and are finding uses in vehicle applications.

EFFECTS OF ALLOYING ELEMENTS & IMPURITIES

Aluminium - Al

Magnesium Alloys - up to ~10%. Increases strength and produces precipitation hardening. Can produce porosity in castings. Alloys with less than 4% Al may have noticeably reduced salt-water corrosion resistance. Long-term holding of casting melts may result in a slight loss in Al to the oxide surface layer.

Titanium Alloys - the major alpha phase stabiliser. In solid solution it increases tensile strength, creep strength and elastic moduli. Limited to ~6% because above this Ti_3Al forms and can cause embrittlement.

Beryllium Alloys - a very small number of specialist alloys contain large amounts of aluminium (e.g. ~40%).

Antimony - Sb

Aluminium Alloys - can replace bismuth in some Al-Mg alloys to reduce hot cracking.

Arsenic - As

Aluminium Alloys - highly toxic, must be strictly controlled to low limits in alloys for use in contact with food.

Beryllium - Be

Aluminium Alloys - in casting alloys, reduces oxidation in the melt. Small quantities in Al-Mg wrought alloys reduces oxidation and surface discolouration. Generally limited to ~8ppm in weld filler metals, and should be held to similar levels in wrought alloys to be welded.

Magnesium Alloys - added to casting melts (5 to 15ppm) to reduce the rate of surface oxidation, may also improve castability and refine the grain structure.

Bismuth - Bi

Aluminium Alloys - added to improve machinability. Bismuth expands slightly on solidification and is used in combination to counteract the contraction of lead. Small quantities (20 - 30ppm) may be added to Al-Mg alloys to reduce the detrimental effects of sodium on hot cracking.

Boron - B

Aluminium Alloys - grain refiner, alone at levels of 0.005 to 0.1%, but more effective when combined with titanium, B:Ti ~1:5. Improves electrical conductivity by precipitating V, Ti, Cr and Mo.

Titanium Alloys - Can be used in surface hardening (boronizing) treatments.

Cadmium - Cd

Aluminium Alloys - 0.005 to 0.5% can accelerate age hardening, increase strength and improve corrosion resistance (except for "pure" Al). >0.1% may cause hot shortness. At low levels can also improve machinability. Cadmium fumes from melting operations are hazardous.

Calcium - Ca

Aluminium Alloys - grain refiner. May increase electrical conductivity of "pure" Al by precipitating Si. Decreases the age hardening of Al-Mg-Si alloys. In Al-Si alloys it increases strength and reduces ductility. Very small quantities (~10ppm) increases hydrogen pick up in molten alloys.

Magnesium Alloys - grain refiner.

Carbon - C

Aluminium Alloys - may be occasionally be present at low levels and form carbides with Al or other elements. Al_4C_3 can decompose in the presence of water or water vapour causing surface pitting. Normal processing methods generally restrict carbon content to ppm levels.

Titanium Alloys - alpha stabiliser which also increases the temperature difference between the alpha transus and beta transus providing a wider heat-treatment temperature band for some alloys. Usually kept to a practical minimum because of embrittlement. Can be used in surface hardening (carburizing) treatments.

Cerium - Ce

See: Rare Earths.

Chromium - Cr

Aluminium Alloys - additions of ~0.3% act as a grain refiner and can improve the corrosion resistance of some high strength alloys. Detrimental to electrical conductivity. Widely added (up to 0.35%) to Al-Mg, Al-Mg-Si and Al-Mg-Zn alloys. Can help to control grain growth but may interfere with precipitation hardening. May impart yellow colouration to anodised films.

Titanium Alloys - 2 to 12%, beta phase stabiliser.

Cobalt - Co

Aluminium Alloys - little used. May be added to some Al-Si alloys containing Fe to modify microstructure.

Columbium - Cb

See: Niobium - Nb

Copper - Cu

Aluminium Alloys - 2 to 10%. The formation of CuAl_2 phase produces precipitation (age) hardening for both wrought and cast alloys, one of the major hardening combinations in heat-treatable aluminium alloys. Strengthening is at a maximum between 4 and 6%. Most commercial alloys also contain other alloying elements to improve properties. Improves strength at ambient and elevated temperatures. Reduces corrosion resistance if present above ~0.2%. Binary AlCu alloys are difficult to cast because of the large solidification temperature range. The basic alloying addition in series 2xxx wrought alloys and, together with zinc and magnesium, some series 7xxx wrought alloys.

Magnesium Alloys - generally controlled at low levels to avoid impairment of corrosion resistance.

Titanium Alloys - 2 to 6%, beta stabiliser, alpha and beta strengthener, provides precipitation hardening.

Germanium - Ge

Aluminium Alloys - increases strength and improves hot-working properties of AlCu alloys.

Gallium - Ga

Aluminium Alloys - usually present as impurity at levels of 0.001 to 0.02%. May affect corrosion/etching behaviour at higher levels. In sacrificial anodes, 0.01 to 0.1% prevents passivation.

Magnesium Alloys - reported to markedly improve corrosion resistance.

Titanium Alloys - alpha stabiliser.

Hydrogen - H

Aluminium Alloys - controlled to prevent porosity during casting (H_2 can be formed by reduction of atmospheric moisture by the Al).

Magnesium Alloys - can be used in hydride hardening of Mg-Zn-RE alloys.

Titanium Alloys - strongly absorbed ($>130^\circ\text{C}$) and diffuses rapidly causing embrittlement. ELI (extra low interstitial) grades minimise N, O and H to improve fracture toughness.

Iron - Fe

Aluminium Alloys - usually present as an impurity but can also be added to assist in precipitation (age) hardening with the production of FeAl_3 precipitates. Improves electrical conductivity of conductors and provides a slight increase in strength and creep performance. Reduces grain size in wrought products. Improves elevated temperature strength in Al-Cu-Ni alloys. For castings, can reduce corrosion resistance in amounts greater than 0.6%. Reduces ductility and, in die casting, reduces tendency to stick (0.4 to 0.8%).

Magnesium Alloys - controlled at low levels (usually by additions of Mn) to avoid impairment of corrosion resistance.

Titanium Alloys - beta stabiliser which tends to reduce creep resistance.

Lead - Pb

Aluminium Alloys - ~0.5% improves machinability, but reduces ductility. Usually combined with a similar level of bismuth. Tends to segregate during casting.

Lithium - Li

Aluminium Alloys - reduces density and increases elastic modulus. Up to 2.5% Li alloys can be heat treated by conventional means, up to 4% Li alloys require rapid solidification processing (RSP). At impurity levels ($<5\text{ppm}$) may cause moisture corrosion problems in foils.

Magnesium Alloys - (up to 9%) reduces density. In smaller quantities, may improve corrosion resistance.

Magnesium - Mg

Aluminium Alloys - can be used in combination with silicon, copper or zinc to produce precipitation (age) hardening. With manganese provides good work-hardening characteristics. Additions of up to 1% improve the hot-workability for extrusions and forgings and increases cold-work strength. Increases the strength of 'pure' aluminium (up to 3.5%). Improves corrosion properties, but increases the tendency to pick up hydrogen. Alloys with up to 8% Mg have very good corrosion resistance. AlMg binary alloys are difficult to cast because of the large solidification temperature range. Series 5000 wrought alloys and, together with Si, series 6000 wrought alloys.

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Manganese - Mn

Aluminium Alloys - grain refiner. Slightly increases strength of 'pure' aluminium (up to 1.25%), but markedly increases the alloy's ability to work harden. Gives a slight decrease in corrosion resistance. In castings it can compensate for some of the detrimental effects of iron. Series 3000 wrought alloys.

Magnesium Alloys - added to control iron content (1 to 2%), should be at least 30 times the iron level. Improves corrosion resistance but has little effect on tensile strength. May reduce fatigue strength.

Titanium Alloys - 2 to 4%, no longer commercially available.

Molybdenum - Mo

Titanium Alloys - 2 to 20% important beta phase stabiliser. Increases hardenability and short-term, high-temperature strength. Reduces weldability and long-term, high-temperature strength. Molybdenum (0.2 to 0.4%) in conjunction with nickel (0.6 to 0.9%) improves the corrosion resistance of commercially pure alloys (lower cost alternative to palladium containing alloys).

Nickel - Ni

Aluminium Alloys - can assist in precipitation (age) hardening with the production of NiAl₃ precipitates. Enhances high temperature properties, particularly in Al-Cu and Al-Si alloys. Improves hot strength of castings.

Magnesium Alloys - very detrimental to the corrosion resistance of Mg alloys - controlled at very low levels (0.001 - 0.002%) to avoid this.

Titanium Alloys - 0.6 to 0.9% in conjunction with molybdenum 0.2 to 0.4% improves the corrosion resistance of commercially pure alloys (lower cost alternative to palladium containing alloys).

Niobium - Nb (Columbium - Cb, USA)

Aluminium Alloys - up to ~0.2% refines grain structure and increases strength.

Titanium Alloys - beta stabiliser which also improves oxidation resistance at high temperatures.

Nitrogen - N

Titanium Alloys - strongly absorbed (>800°C) causing embrittlement. Interstitial element which increases strength and reduces ductility, usually keep to a practical minimum. Alpha stabiliser. ELI (extra low interstitial) grades minimise N, O and H to improve fracture toughness. Can be used in surface hardening (nitriding) treatments.

Oxygen - O

Titanium Alloys - oxygen content is the main determinant of strength between the various commercial purity grades. Strongly absorbed at temperatures >700°C causing embrittlement. Interstitial element which increases strength and reduces ductility, usually keep to a practical minimum. Alpha stabiliser. Some alloy grades use deliberate additions of oxygen and iron as a strengthening mechanism. ELI (extra low interstitial) grades minimise N, O and H to improve fracture toughness.

Beryllium Alloys - present as beryllium oxide (~0.5 to 4%) in commercial alloys.

Palladium - Pd

Titanium Alloys - additions of ~0.2% Pd to commercial purity grades significantly increases their corrosion resistance in mildly reducing or fluctuating reducing/oxidising conditions.

Rare Earths - RE

Cerium, Lanthanum, Praseodymium and Neodymium

Aluminium Alloys - can improve high temperature properties, fatigue strength and creep performance. In cast alloys, may improve fluidity of melts and reduce die sticking.

Magnesium Alloys - important as grain refiners. Increase strength whilst retaining ductility and gives improved creep resistance and fatigue strength. Improves castability and reduces porosity (particularly Ce). Reduces cracking tendency in Mg-Zn-Zr alloys. All are highly soluble in molten alloys and the concentration remains fairly stable throughout melting and handling operations.

Silicon - Si

Aluminium Alloys - Improves fluidity and casting properties, reduces the melting point. Can also be used in precipitation (age) hardening with the production of Mg₂Si precipitates. May cause embrittlement in AlCu alloys and a grey colouration, especially on anodising.

Magnesium Alloys - highly soluble in molten alloys and the concentration remains fairly stable throughout melting and handling operations.

Titanium Alloys - 0.05 to 1% improves creep resistance.

Silver - Ag

Aluminium Alloys - 0.25 to 0.6% used in conjunction with 2.5 to 5% Cu in some Al-Li wrought alloys and some casting alloys. 0.1 to 0.6% improves strength and stress corrosion properties of Al-Zn-Mg alloys.

Magnesium Alloys - up to 3% provides precipitation hardening of Mg-Zr-RE alloys to produce very high strengths.

Sodium - Na

Aluminium Alloys - ~0.01% used in "Modification"; the refinement of the microstructure of cast near-eutectic (9 - 14%) silicon alloys. This increases strength and ductility.

Strontium - Sr

Aluminium Alloys - used in "Modification"; the refinement of the microstructure of cast silicon alloys. This increases strength and ductility.

Thorium - Th

Magnesium Alloys - up to 3%. Increases creep and fatigue strength at higher temperatures. Improves castability and reduces porosity. Used with zinc and zirconium to restore weldability. Generally being phased out.

Tin - Sn

Aluminium Alloys - a grain refiner. ~0.05% can improve the response of Al-Cu alloys to artificial ageing. Some bearing alloys are based on Al-Sn with Cu, Ni and Si.

Titanium Alloys - 2 to 6%, less powerful alpha phase stabiliser than Al, but is used in combination with this to increase tensile strength while avoiding embrittlement. Also extensive solubility in beta phase.

Titanium - Ti

Aluminium Alloys - grain refiner for casting alloys, usually in combination with boron.

Vanadium - V

Aluminium Alloys - in age-hardening casting alloys, V can act as a grain refiner and improve the response of the alloy to heat treatment. Reduces electrical conductivity - can be controlled by addition of boron.

Titanium Alloys - 2 to 20% beta phase stabiliser.

Yttrium - Y

Magnesium Alloys - up to 5.5%. Improves corrosion resistance.

Titanium Alloys - controlled to low levels (0.005%) in some high performance alloys.

Zinc - Zn

Aluminium Alloys - improves strength but may compromise corrosion resistance. Often combined with magnesium (and copper) to improve strengthening characteristics. Series 7000 wrought alloys together with magnesium and sometimes copper.

Magnesium Alloys - up to 6%. Increases strength. Provides precipitation hardening in conjunction with Al and Mn. With Zr can give very fine grained materials with very good hot strength. Improves workability of wrought alloys. Unless rare earth or thorium additions are made, reduces weldability. Highly soluble in molten alloys and the concentration remains fairly stable throughout melting and handling operations.

Zirconium - Zr

Aluminium Alloys - up to 0.5%. Inhibits recrystallization and controls grain structure. Used to retain fine grain structure in some superplastic alloys and reduce as-cast grain size. May interfere with grain refining effect of titanium/boron.

Magnesium Alloys - usually up to 0.8%. Increases strength through grain refinement. Improves high-temperature strength. Provides precipitation hardening in conjunction with Al and Mn. Improves hot workability of wrought materials.

Titanium Alloys - forms a continuous solid solution with titanium and increases strength at low to intermediate temperatures. A weak beta phase stabiliser. If used above 5 - 6% it may reduce ductility and creep resistance.

ALLOY DESIGNATION SYSTEMS

Until recently most countries used their own alloy designation systems, although several (i.e. those for magnesium and wrought aluminium) were quite widely understood and accepted throughout the world:

- Aluminum Association (AA) four-digit wrought aluminium codes.
- Magnesium Elektron designations for magnesium alloys, based largely on the ASTM system.
- IMI designations for titanium alloys were internationally accepted, as were the ASTM commercial purity grades.

With the single European market came agreement that all material standards would be replaced by European Standards and that national standards would be phased out. For light alloys this process is now well on the way to completion in the countries of the European community.

So, currently the major USA and European designation systems for light alloys are shown in Table 4.

Alloys	USA	Europe
Al wrought	AA	CEN
Al cast	AA/ASTM	CEN/National
Mg	ASTM	CEN
Ti	Commercial (Ti)	CEN

Table 4 – Major Light Alloy Designation Systems

The main features of these are summarised here. For a full explanation, refer to the current version of the appropriate standards, [See also: Appendix A].

Aluminium Alloys

Wrought

The Aluminium Association (AA) four digit system has now been almost universally adopted for these alloys. Even where other national or industry standards are the official designation, the AA system is well understood and tends to run along side any other. The developing European CEN system has been almost entirely based on this.

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The broad classifications within the AA system are as follows:

Alloys	Major alloying elements
1xxx	Commercial purity (low alloy)
2xxx	Copper
3xxx	Manganese
4xxx	Silicon
5xxx	Magnesium
6xxx	Silicon, magnesium
7xxx	Zinc
8xxx	Other elements
9xxx	[Unused series]

Some of the continental European designation systems are still widely quoted, and have been adopted to some extent as the descriptive part of the new CEN designations. A name is generated using the chemical symbols for constituents together with figures for approximate content. Examples can be seen in the DIN, ISO and NF systems (in France the chemical symbol is replaced by a single letter code). Hence:

AA 2014 = NF A-U4SG = DIN AlCuSiMg = ISO AlCu4SiMg

Under the CEN designation for wrought aluminium alloys compositional limits are all contained within a single standard: EN 573 (prefixed for any particular country by the national designation code, e.g. NF EN573).

Characteristics and properties are contained in several other standards, depending on the material form:

EN485	Sheet and plate
EN754	Drawn bar and tube
EN755	Extruded bar, tube and profile
EN1301	Wire
EN1386	Tread plate
EN1396	Coiled sheet and strip
EN11715	Wire (electrical)

The characteristics of aerospace grade materials are covered by a large number of individual EN standards each detailing a specific composition, condition, form and size. See Appendix A for details of these.

The alloy condition, or temper, is denoted by a suffix to the alloy code:

- O - annealed.
- F - as fabricated.
- T - **heat treatment**, followed by a one or more numbers indicating the specific sequence of treatments.
 - First digit: 1 to 9 describes a precise standard sequence of events.
 - Subsequent digits: indicate a variation in treatment which significantly alters the characteristics of the product with respect to the original temper. These, for example, may be a modified temper to improve the corrosion resistance of a certain alloy and form.
- H - **strain hardening**, followed by one or more numbers:
 - First digit: type of treatment.
 - Second digit: the final degree of strain-hardening, where 8 is normally the hardest (e.g. 4 = half hard).
 - Third digit: (when used) a variation of a two-digit temper.

Cast

There is no truly internationally accepted standardisation method for casting alloys. Each national organisation has its own method based on chemical composition. The Aluminium Association (USA) has a three-digit registration system for casting alloys:

1xx	Al 99.0% min.
2xx	Cu
3xx	Si, with Cu and/or Mg
4xx	Si
5xx	Mg
6xx	[Unused series]
7xx	Zn
8xx	Sn
9xx	Other elements

With product form indicated by a suffix:

.0	castings
.1	ingot
.2	ingot

The British Standard "LM" system merely has alloys numbered sequentially from LM0 to LM31 (although some of the series have now been withdrawn). A suffix denotes the condition of the casting:

M	As cast.
TB	Solution heat treated and naturally aged.
TB7	Solution heat treated and stabilised.
TE	Artificially aged.
TF	Solution heat treated and artificially aged.
TF7	Solution heat treated, artificially aged and stabilised.
TS	Thermally stress relieved.

Within the French NF system, the prefix 'A' is used for aluminium. Each significant alloying element then being designated by a letter code:

Be	Beryllium
C	Chromium
G	Magnesium
K	Cobalt
M	Manganese
N	Nickel
S	Silicon
T	Titanium
U	Copper
Z	Zinc

These are listed in descending order of content. Each letter is followed by a number that shows the nominal percentage; if <1%, the number is preceded by a zero, e.g. A-S7G03 has 7%Si and 0.3%Mg; A-G3T has 3%Mg and a small amount of Ti.

The condition is shown as a 'Y' suffix followed by two digits:

- First digit - **casting process**:
 - 2 Sand
 - 3 Chill
 - 4 Pressure die
- Second digit - **heat treatment**:
 - 0 Untreated
 - 3 Quenched & aged.
 - 5 Stabilised
 - 9 Treated to specification

The German alloy designation system is described under DIN 1725 in which Part 2 covers castings and Part 5 covers ingot metal.

Alloy compositions are shown as "Al" followed by the element codes, e.g. Cu = copper; Fe = iron, etc. with a nominal content. These are prefixed by either G-, GK-, GD- for castings or GB- or GBD- for ingot metal.

In Part 2 and Part 5, alloys are assigned a unique four-digit code, prefixed by "3."

The European CEN casting alloy designation system is described under EN1706. Alloys have a prefix AB- or AC- followed by a five-digit code + a composition (shown as element codes followed by nominal content), i.e. similar to that used elsewhere in Europe by DIN, ISO etc.

Magnesium Alloys

The ASTM designation system consists of four parts:

- First Part – indicates the two main alloying elements. It consists of a two letter code representing the main alloying elements. They are arranged in order of decreasing percentage (or alphabetically if the percentages are equal).

<u>Letter</u>	<u>Alloying Element</u>
A	Aluminium
B	Bismuth
C	Copper
D	Cadmium
E	Rare Earth
F	Iron
G	Magnesium
H	Thorium
K	Zirconium
L	Lithium
M	Manganese
N	Nickel
P	Lead
Q	Silver
R	Chromium
S	Silicon
T	Tin
W	Yttrium
Y	Antimony
Z	Zinc

- Second Part – indicates the amount of the two principal alloying elements. It consists of two whole numbers which correspond to the rounded-off percentages of the two main alloying elements; arranged in the same order as in the first part.
- Third Part – Distinguishes between different alloys with the same percentages of the two principal alloying elements. It consists of a letter (not using I or O) assigned in order as the compositions become standard.

- Fourth Part – denotes the condition or temper. It is separated from the previous parts by a hyphen. It consists of a letter followed by one or more numbers. The numbers detail the precise processes used, e.g. T8 = solution treated, cold worked & artificially aged; H11 = slightly strain hardened.

<u>Code</u>	<u>Condition</u>
F	As-fabricated
O	Annealed
H	Strain hardened
T	Heat-treated

The CEN system for magnesium and its alloys is yet to be completed. Alloys are denoted by the prefix MG.

Titanium Alloys

The ASTM system is widely used for commercially pure titanium. Metals are designated as Grades 1 to 4 depending on their yield strength values.

<u>Grade</u>	<u>YS (in ksi)</u>
1	25
2	40
3	55
4	70

The more common alloys are also expressed as Grades and are included under ASTM. For example:

5	Ti-6Al-4V
6	Ti-5Al-2.5Sn
7	Ti-Pd
9	Ti-3Al-2.5V
11	Ti-Pd
12	Ti-3Mo-8N

Within the European CEN system, titanium and its alloys are denoted by TI-P followed by a series of numbers. This system has been adopted from AECMA; with some modifications to the numeric codes.

For many years, the commonly recognised system within the industry was the IMI company commercial alloy codes. Many reference books state IMI designations. These have been incorporated into the existing Titanium Metals Corporation (Timet) alloy codes.

Alloy condition is normally expressed in metallurgical terms, e.g. Solution treated (ST); Aged (A). These are often accompanied by the details of the heat treatment, e.g. hours at temperature, quench media, etc.

Beryllium Alloys

Unlike the other light alloys, beryllium is commonly used in the pure form (with a small amount of BeO). The limited specialist uses do not warrant the specifications and standards afforded to other material systems. Consequently, most documentation exists under aerospace or defence standards, e.g. American MIL-B-standards for various forms.

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PROCESSING METHODS

Conventional Techniques

Light alloys can be processed using the majority of traditional methods, e.g. casting (various techniques), forging and mechanical methods (producing a wide variety of wrought forms). In some cases, special care is required to avoid detrimental effects, e.g. oxygen pick-up and hydrogen embrittlement in titanium; ignition during magnesium casting or machining; explosive aluminium-water reaction during casting; beryllium oxide exposure. These are well recognised and appropriate controlling methods are applied.

The traditional processing techniques are well described in many other sources [See: Further Reading] and will not be described here. However, a number of methods have been developed to improve properties, increase production rates and reduce energy consumption. These newer methods can be particularly effective in increasing temperature resistance.

Rapid Solidification Processing (RSP)

Molten alloy is broken into small droplets that solidify very quickly to produce a powder. This is then processed using standard powder metallurgical techniques. The rapid solidification allows microstructural refinement not possible by conventional methods.

In addition to property improvements in existing alloys, using RSP, new alloys can be developed with compositions beyond those normally possible (e.g. high lithium aluminium alloys). The effect can be achieved in several ways:

- atomisation.
- splat cooling.
- melt-spinning.

RSP provides:

- Smaller grain size (fast cooling).
- Strengthening and toughening by microstructural grain refinement.
- Increases in possible alloy addition content (avoiding segregation problems in ingots).
- Fine dispersions of alloying elements.

The technique has been applied to both aluminium and magnesium alloys:

- A group of aluminium alloys containing elements such as iron and chromium, present as intermetallic compounds (dispersoids) e.g. Al₆Fe. At room temperature the properties of these alloys are similar to those of conventional ones. However, the dispersoids are stable at higher temperatures, providing good properties where recrystallization or over-ageing would normally occur. Potential applications include various structural aerospace parts.
- Al-Li alloys containing >4% Li can be produced, giving greater weight savings.
- For magnesium alloys, greater amounts of alloying elements can be present in solid solution, further improving corrosion resistance.

The term Rapid Solidification Processing is also applied to some surface processing techniques involving very rapid heating of a thin surface layer and subsequent rapid quenching by the bulk of the material.

Thixocasting / Rheocasting

In this the alloy is vigorously stirred during solidification to break up the forming dendritic structure.

In aluminium this produces small, rounded primary aluminium grains surrounded by a eutectic microconstituent. The billet produced during this process is later reheated between the liquidus and eutectic temperatures to produce a semi-solid material. When pressure is applied, this will flow into a mould or die, producing a finished part with a uniform microstructure and a minimum of casting defects. Automotive parts, including pistons and wheels, can be produced by this method.

Superplastic Forming (SPF)

Superplasticity can be achieved with most metals. The alloy is heated to around 50% of the melting temperature and deformed at low strain rates up to many hundred percent strain. An essential characteristic of an SPF material is a fine, uniform grain size with limited texturing. Whilst the process is slow, complex, thin-walled shapes are possible which would not be achievable by conventional forming processes.

It has been applied successfully to some titanium and aluminium alloys to produce near-finished components.

Titanium alloy SPF is often combined with diffusion bonding (DB) as a single process. This has produced complicated integrally stiffened skin structures for aerospace applications, e.g. Airbus fuselage inspection door. Diffusion bonding of aluminium is more complicated owing to the tenacity of the oxide film (titanium absorbs its surface oxide film at the processing temperature).

Advantages include:

- simple forms of starting material (sheet, billet).
- combined forming and joining (reduces cost, part counts and subsequent machining or other operations).
- useful for moderate production runs.

Powder Metallurgy (PM)

Usually used for metals with high melting temperatures, PM techniques can also be applied to light alloys to produce particular materials or avoid certain processing problems.

- Beryllium – standard production method for billet and components to avoid oxygen contamination and BeO toxicity.
- Aluminium and Magnesium – production of oxide dispersion strengthened (ODS) alloys which contain a very fine (2-10nm), ceramic oxide content. ODS alloys have higher thermal stability and improved hardness (wear resistance).

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Temper for Aluminium & Aluminium Alloy Products

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Metallurgy & Properties

Advances in Corrosion Science & Technology

Plenum Press, USA, 1972

Aluminium Alloys, Structures & Properties

L.F. Mondolfo
Butterworths, 1976

Aluminium & Aluminium Alloys: ASM Speciality Handbook

ASM International, USA. Available from Aluminium Association, USA

Aluminium Design Manual: Specifications & Guidelines for Aluminium Structures

Aluminium Association, USA, 1994

Aluminium: Properties & Physical Metallurgy

ASM International, 1984. Available from Aluminium Association, USA

Aluminium-Taschenbuch

Aluminium-Zentrale, Düsseldorf, D

Basic Corrosion Technology for Scientists & Engineers

Institute of Materials, UK, 2nd Edition

Concise Inorganic Chemistry

J.D. Lee
Blackie Academic & Professional, 5th Edition, 1997
ISBN/ISSN: 0-412-78820-9

Corrosion Atlas: A Collection of Illustrated Case Histories

E.D.D. During
Elsevier, 3rd Edition, 1997
ISBN: 0-444-82616-5
Includes 679 case histories divided over 135 materials in 13 material groups, 25 systems (installations) and 44 different phenomena. Case histories have been supplied by 20 companies and a number of private individuals.

14 Review

Corrosion Control

S. A. Bradford,
Chapman & Hall, 1993
ISBN/ISSN: 0-442-01088-5

Creep and Fracture of Engineering Materials & Structures Institute of Materials, UK

Creep in Metallic Materials

J. Cadek
Elsevier, 1988 ISBN: 0-444-98916-1
Covers all aspects of high-temperature creep behaviour of metals & alloys

Cryochemical Technology of Advanced Materials

Y.D. Tretyakov, O.A. Shlyakhtin, N.N. Oleynikov
Chapman & Hall, 1998
ISBN/ISSN: 0-412-63980-7

Databook on Fatigue Strength of Metallic Materials

Ed. K. Shiozawa & T. Sakai,
North-Holland (Elsevier), 1996
ISBN: 0-444-82514-2 (3-volume set)
Compilation of the experimental data on fatigue strength of various metallic materials and related information obtained over the last 30 years by many researchers working in universities, technical colleges, public research institutes and the technical laboratories of industrial companies in Japan; >3000 case studies of S-N type fatigue data of ferrous and non ferrous metals

Fatigue Data Book: Light Structural Alloys

Ed. S. D. Henry & F. Reidenbach (Editor)
ASM International, 1995
ISBN: 0871705079

Fracture of Engineering Materials & Structures

S.H. Teoh, K.H. Lee
Chapman & Hall, 1992
ISBN/ISSN: 1-85166-672-9

Fundamental Aspects of Stress Mechanisms in Aluminium Alloys

Ohio State University, 1967

General Guidelines for Corrosion Testing of Materials for Marine Applications

Institute of Materials, UK

Guide to Engineering Materials Producers

Ed. J.C. Bittence
ASM Publication, 1993
ISBN: 0-87170-486-2

Guide for the Design of Aluminium Pipe for Internal Pressure

Aluminium Association, USA, 1982

High-temperature Structural Materials

R. Cahn et al
Chapman & Hall, 1996
ISBN/ISSN: 0-412-75010-4

High Temperature Alloys: their exploitable potential

J.B. Marriott et al
Chapman & Hall, 1988
ISBN/ISSN: 1-85166-174-3

Illustrated Case Histories of Marine Corrosion

Institute of Materials, UK

Interfaces in New Materials

P. Grange, B. Delmon
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-693-1

Introduction to Creep

Institute of Materials, UK

Introduction to Fatigue in Metals & Composites

R. Carlson, G.A. Kardomateas
Chapman & Hall, 1996
ISBN/ISSN: 0-412-57200-1

Introduction to Metallurgy

Institute of Materials, UK, 2nd Edition

Introduction to Powder Metallurgy

Institute of Materials, UK

Light Alloys: Metallurgy of the Light Metals

I.J. Polmear
Halsted Press, 3rd Edition, 1995
ISBN: 0470235659 (3rd Ed.)
ISBN: 0340491752 (2nd Ed.)

Magnesium Technology

Institute of Materials, UK

Materials Science

J.C. Anderson et al
Chapman & Hall, 4th Edition, 1990
ISBN/ISSN: 0-412-34150-6

Metal Matrix Composites

J.N. Fridlyander
Chapman & Hall, 1995
ISBN/ISSN: 0-412-58260-0

Metal Matrix Composites 4: Design & Innovation

Institute of Materials, UK
Materials Science and Technology Special Issue

Metal Matrix Composites: A study of patents, patent applications and other literature

S.A. Gieskes, M. Terpstra
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-629-X

Metallography'95

Cambridge International Science Publishing, UK

Metallurgy of Arc Welding

Cambridge International Science Publishing, UK

Metallurgy of Welding

J.F. Lancaster
Chapman & Hall, 5th Edition, 1993
ISBN/ISSN: 0-412-47810-2

Phase Diagrams of Binary Beryllium Alloys

ASM International, 1987
ISBN: 0871703033
Monograph Series

Phase Diagrams of Binary Titanium Alloys

ASM International

Phase Transformations in Metals and Alloys

D.A. Porter, K. Easterling
Chapman & Hall, 2nd Edition, 1992
ISBN/ISSN: 0-412-45030-5

Practical Corrosion Principles

Institute of Materials, UK

Resistance of Aluminium-based Alloys to 20-year Atmospheric Exposure

C.J. Walton & W. King,
STP-174, ASTM, 1956

Rutley's Elements of Mineralogy

C. Gribble
Chapman & Hall, 27th Edition, 1989
ISBN/ISSN: 0-04-549011-2 (paperback)
ISBN/ISSN: 0-04-549010-4 (hardback)

Selection and Use of Titanium

Institute of Materials, UK
Design Guide

Structural Design with Aluminium

Aluminium Association, USA, 1992

Techniques de l'Ingenieur:

- M230: Ecrouissage et recuit
- M240: Durcissement par précipitation des alliages d'aluminium
- M440: Propriétés de l'aluminium et ses alliages
- M443/1 - 9: Données numériques sur l'aluminium et les alliages d'aluminium de transformation
- M1290: Traitements thermiques des alliages d'aluminium

Titanium & Its Alloys: ASM Independent Study Course

International Titanium Association, USA
 A course helpful in furthering the knowledge of personnel who are engaged in production, fabrication and metallurgy, as well as technicians, designers, quality control personnel, salespersons and purchasing agents who are users of titanium to make finished parts.

Titanium: A Technical Guide

Ed. M.J. Donachie, Jr.,
 A working guide to the field of titanium metallurgy. The appendices provide a substantial source of information. Chapters include Understanding the Metallurgy, Heat Treating, Machining, Castings, Joining and the Relationships of Properties and Processes.

Titanium the Choice...

International Titanium Association, USA
 A basic primer about titanium. It covers physical metallurgy considerations, alloy classifications, why titanium should be used, fabrications, and applications. Appendix 1 includes the physical and mechanical properties of titanium grades currently in use. Appendix 2 provides titanium corrosion rate data.

Titanium Technology: Present Status & Future Trends

Ed. F.H. Froes, Howard B. Bomberger & D. Eylon
 A compendium of technical articles on the most recent developments in titanium and titanium alloys technology. The introductory chapter offers a new historical perspective on the metal and the industry.

Theory of Interaction of Metals & Alloys with a Corrosive Environment

Cambridge International Science Publishing, UK

Applications & Usage

Aerospace Materials and Structures

Institute of Materials, UK
 ISBN 1 86125 049 5

Aluminium Alloy Structures

F. Mazzolani
 E&FN Spon, 2nd Edition, 1995
 ISBN/ISSN: 0-419-17770-1

Aluminium for Automotive Body Sheet Panels

Aluminium Association, USA, 1980

Aluminium Building Wire Installation Manual & Design Guide

Aluminium Association, USA, 1992

Aluminium Electrical Conductor Handbook

Aluminium Association, USA, 1989

Aluminium-pigmented Coatings for Industrial Maintenance Applications

Aluminium Association, USA, 1996

Aluminium Structures: A Guide to their Specifications & Design

J. Randolph Kissel & Robert Ferry
 Wiley & Sons. Available from Aluminium Association, USA

Aluminium Structures: Recent research & developments

S.L. Lee, N.E. Shanmugan
 Chapman & Hall, 1991
 ISBN/ISSN: 1-85166-641-9

Aluminium Underground Distribution Reference Book

Aluminium Association, USA, 1982

Behaviour & Design of Aluminium Structures

M.L. Sharp
 McGraw Hill, 1992. Available from Aluminium Association, USA

Boat Building with Aluminium

TAB Books/McGraw Hill. Available from Aluminium Association, USA

Building the Future: Innovation in design, materials & construction

F.K. Garas, G.S.T. Armer, J.L. Clarke
 E&FN Spon, 1994
 ISBN/ISSN: 0-419-18380-9

Construction Materials: their nature & behaviour

J.M. Illston
 E&FN Spon, 2nd Edition, 1994
 ISBN/ISSN: 0-419-15470-1

Design for Aluminium: A Guide for Automotive Engineers

Aluminium Association, USA, 1980

Dubois and Pribble's Plastics Mold Engineering Handbook

E.L. Buckleitner
 Chapman & Hall, 5th Edition, 1995
 ISBN/ISSN: 0-412-98951-4

Guidelines for the Use of Aluminium with Food & Chemicals

Aluminium Association, USA

Guide to Specifications of Electrical installations Employing Aluminium Conductors

Aluminium Association, USA, 1989

Light-weight Alloys for Aerospace Applications

Ed. E.W. Lee
 Minerals Metals & Materials Society, 1991
 ISBN: 0873390946; 0873391357

Repair of Aluminium Automotive Sheet

Aluminium Association, USA, 1982

Structural Failure: Technical, Legal & Insurance Aspects

H.P. Rossmannith
 E&FN Spon, 1996
 ISBN/ISSN: 0-419-20710-4

Processing

Aluminium Casting Technology

Aluminium Association, USA, 2nd Edition, 1992

Aluminium Extrusion Manual

Aluminium Association, USA, 2nd Edition, 1995

Aluminium Forging Design Manual

Aluminium Association, USA, 1995

Aluminium Impacts Design Manual & Applications Guide

Aluminium Association, USA, 2nd Edition, 1988

Aluminium Precision Forging Design Manual

Aluminium Association, USA, 1989

Forming & Machining Aluminium

Aluminium Association, USA, 1988

Foundry Directory And Register Of Forges - Europe

Metal Bulletin, 17th Edition, October 1993
 Provides the buyer of casting and forgings with information on where to source products in Europe, including former eastern bloc nations. Companies (~2500) are listed alphabetically by country, with details of products, and size and weight capacities.

International Scrap Directory

Metal Bulletin, 3rd Edition, December 1996
 Lists companies whose main activity is the international scrap metals - including both ferrous and non-ferrous metals.

16 Review

Machining Fundamentals

Mike Fitzpatrick
Delmar Publishers, 1999
ISBN/ISSN: 0-8273-5820-2

Manufacturing of Polymer Composites

T. Astrom
Chapman & Hall, 1997
ISBN/ISSN: 0-412-81960-0
Includes fibre-metal-laminates.

Materials Recycling Handbook

Recycler's World Publications Directory

Metallurgical Plantmakers Of The World

Metal Bulletin, 4th Edition, May 1996
Provides detailed information on sources of equipment and technology for iron and steel works and non-ferrous metal works world wide.

Non-Ferrous Metal Works Of The World

Metal Bulletin, 7th Edition, December 1995
Lists ~2050 of the world's producers of non-ferrous metals, from smelters through refiners to semi-fabricators. It also lists mines operated by metal producers.

Rapidly solidified material: processing, new developments, applications & market opportunities

Thomas Abraham
Business Communications Co.
ISBN: 0893366676

Semi-solid Processing

K.P. Young
Chapman & Hall
ISBN/ISSN: 0-412-61980-6

Standards for Aluminium Sand & Permanent Mould Castings

Aluminium Association, USA, 1992

Superplastic Forming

Ed. S.P. Agrawal
ASM International, 1995
ISBN: 0871701952

Surface Treatment & Finishing of Aluminium & its Alloys

Finishing Publications/ASM International, 1987. Available from Aluminium Association, USA
Two-volume set

Joining

Aluminium Brazing Handbook

Aluminium Association, USA, 1990

Aluminium Welding: Theory & Practice

Aluminium Association, USA, 1991

Aluminium Soldering Handbook

Aluminium Association, USA, 1996

Aluminium Structural Welding Code

American Welding Society, 1990. Available from Aluminium Association, USA

Diffusion Bonding 2

D.J. Stephenson
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-591-9

Handbook of Aluminium Bonding Technology & Data

Marcel Dekker Inc, USA, 1993. Available from Aluminium Association, USA

Guide for Aluminium Hull Welding

American Welding Society, 1990. Available from Aluminium Association, USA

Guidelines to Resistance Spot Welding Aluminium Automotive Sheet

Aluminium Association, USA, 1982

MIG Spot Welding of Aluminium

Aluminium Association, USA, 1975

Specification for Bare Aluminium & aluminium Alloy Welding Rods & Electrodes

American Welding Society, 1988. Available from Aluminium Association, USA

Recommended Practices for Gas Shielded Arc Welding of Aluminium & Aluminium Alloy Pipe

American Welding Society, 1992. Available from Aluminium Association, USA

Specifications for Aluminium Brazing

American Welding Society, 1993. Available from Aluminium Association, USA

Specification for Magnesium-Alloy Welding Rods & Bare Electrodes : A5.19-69

American Welding Society, 1976
ISBN: 0685689801; ISBN: 0871712075

Structural Adhesives Directory & Databook

R.J. Hussey & J. Wilson
Chapman & Hall, UK, 1st Edition, 1996
ISBN 0 412 71470 0
Contains details of adhesive suppliers, their products and typical data for bonding light alloys and many other materials.

Welding Aluminium: Theory & Practice

Aluminium Association, USA

Welding and Brazing in Space

Cambridge International Science Publishing, UK

Safety

Aluminium & Health: A Review of the Issues & the Efforts

Aluminium Association, USA, 1996

Guidelines for Handling Aluminium Fines Generated during Various Aluminium Fabricating Operations

Aluminium Association, USA, 1992

Guidelines for Handling Molten Aluminium

Aluminium Association, USA, 2nd Edition, 1990
(Spanish translation available)

Recommendations For Storage & Handling Of Aluminium Powder & Paste

Aluminium Association, USA, 1996

Safety, Health & Recycling Aspects Of Aluminium-Lithium Alloys

Aluminium Association, USA, 1988

Conference Proceedings

Advances in Joining Newer Structural Materials

Ed. International Institute of Welding, TWI-UK
Elsevier, 1990 ISBN: 0-08-040736-6
Proceedings of the International Conference held in Montreal, Canada, 23-25 July 1990. Examines many aspects of joining from welding and brazing to bonding, and covers ceramics, plastics, composites and new metallic materials.

Advances in Solidification Processes

Ed. H. Fredriksson/H. Jones/H. Lesoult
Elsevier, 1993 ISBN: 0-444-81821-9
Proceedings of the 1993 E-MRS Spring Conference, Strasbourg, France, 4-7 May 1993. Main topics include crystallization kinetics, nucleation and thermodynamics during solidification processes, metastable solidification processing and stimulation of different solidification processes.

Anisotropy and Localization of Plastic Deformation.

Ed. J.G.P. Boehler, A.S. Khan
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-688-5
Proceedings of PLASTICITY 91: The 3rd international symposium on plasticity and its current applications

Composite Structures & Materials

Ed. S.V. Hoa, R. Gauvin
Chapman & Hall, 1992
ISBN/ISSN: 1-85166-897-7
Proceedings of CANCOM 91: 1st Canadian International Composites Conference, Montreal, Quebec, Canada, 4-6 September 1991.

Developments in Structural Engineering

B.H.V. Topping
E&FN Spon, 1990
ISBN/ISSN: 0-419-15240-7
Proceedings of the Forth Rail Bridge Centenary Conference (2-volume set)

ECCM3: Developments in the Science and Technology of Composite Materials

Ed. A.R. Bunsell, P. Lamicq, A. Massiah
Chapman & Hall, 1989
ISBN/ISSN: 1-85166-359-2
Conference proceedings.

ECCM4: Developments in the Science and Technology of Composite Materials

Ed. J. Fuller, G. Gruninger, K. Schulte, A.R. Bunsell, A. Massiah
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-562-5
Conference proceedings

Extraction, Refining & Fabrication of Light Metals

Ed. M. Sahoo (CANMET, Canada)
P. Pinfeld (Norsk Hydro Canada Inc.)
Elsevier, 1991 ISBN: 0-08-041444-3
Proceedings of the International Symposium on Extraction, Refining and Fabrication of Light Metals, Ottawa, Ontario, August 18-21, 1991. Topics such as magnesium casting technology, metal matrix composites, mathematical modelling, solidification and reduction of light metals. MMC recent advances on the fabrication and characterisation of their microstructures and mechanical properties.

MICC 90: Moscow International Composites Conference

Ed. J.N. Fridlyander, V.I. Kostikov
Chapman & Hall, 1991
ISBN/ISSN: 1-85166-648-6

Production and Electrolysis of Light Metals

Ed. Bernard Closset (Timminco Metals, Canada)
Elsevier, 1989
ISBN: 0-08-037295-3
Proceedings of the International Symposium on Production and Electrolysis of Light Metals, Halifax, Nova Scotia, 20-24 August 1989. Production and electrolysis of light metals - smelter operations, aluminium casting, aluminium melt treatment and control, electrolysis of light metals: magnesium and aluminium. Electrolysis of light metals: lithium, titanium and gallium. Reduction and production of light metals.

Titanium Products and Applications

Proceedings of the 1994, 10th anniversary conference: Contains state-of-the-art information about Aerospace, Medical Applications, New Powder Metallurgy, High Speed Machining, Processing and Heat Treating, Industrial Applications, Corrosion Technology & Applications and Raw Materials (Melting, Casting and Recycling).

Commerce**Metal Powders: Global Survey of Production, Applications & Markets 1992-2001**

Joseph M. Capus
Pergamon, 2nd Edition, 1996
ISBN: 1-85617-287-2
Provides a detailed global survey of the markets, applications and manufacturing processes for metal powders. Coverage is given to both ferrous and non-ferrous metal powders, while current and future markets are reviewed from a global perspective.

Metal Traders Of The World

Metal Bulletin, 6th Edition, June 1997
Details about the companies, including location, ownership, management, and the metals traded. Over 1,500 trading concerns in almost 100 countries are covered.

Rapidly solidified material: processing, new developments, applications & market opportunities

Thomas Abraham
Business Communications Co.
ISBN: 0893366676

Titanium 1995: A Statistical Review 1983-1995

International Titanium Association, USA
A compilation of titanium statistics, organised by the ITA Statistics Committee from government and trade association data. Publication includes a full range of Japanese industry statistics including imports and exports. Published yearly, the publication includes information from the new Harmonised System (1989 forward).

World Aluminium Databook

Metal Bulletin, September 1996
Details the key people, ownership profile, plant locations and capabilities on both the producing and trading fronts.

Journals**Advanced Materials News**

Metal Bulletin
An international newsletter on advanced materials and their markets, with reports from around the world on composites, hi-tech plastics, advanced ceramics, new structural materials and engineered coatings.

Aluminium Products Monthly

Metal Bulletin
Provides the industry with market intelligence on the extrusions and flat rolled products sectors. With markets for these products becoming increasingly volatile, it monitors and comments upon the latest price developments - focusing on North America and Europe, together with commentary and statistics on Asian markets.

Aluminium Situation

Aluminium Association, USA. Monthly newsletter on US markets & trade.

British Corrosion Journal

All aspects of the theory and practice of corrosion processes and corrosion control.

Canadian Journal of Chemical Engineering

Includes corrosion effects of non-ferrous metals.

International Materials Reviews

Institute of Materials, UK
Critical and comprehensive reviews covering all aspects of the processing and use of materials.

Journal of Advanced Materials

Cambridge International Science Publishing, UK
Published jointly by the Russian Ministry of Science, High Education and Technical Policy and Cambridge International Science Publishing.

Journal of Alloys and Compounds

Elsevier ISSN: 0925-8388
Formerly 'Journal of the Less-Common Metals'. An interdisciplinary journal of materials science and solid-state chemistry and physics

Journal of Materials

The Minerals, Metals & Materials Society

Journal of Materials Science

Chapman & Hall, UK

Journal of Materials Science Letters

Chapman & Hall, UK

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Light Metal Age

Light Metal Age, USA

A magazine dedicated to the processing and manufacturing of Aluminium, Magnesium, Titanium, Beryllium and their alloys, as well as the non-ferrous metals Cu and Zn.

Magnesium Monthly Review

Recycler's World Publications Directory

Materials Science and Technology

Institute of Materials, UK

Concerned with the production, processing, structure, properties and the application of structural and engineering materials and their future development.

Materials World

Institute of Materials, UK

Covering the whole range of engineering materials. Includes: UK and international updates, conferences, courses, exhibitions, books, products, equipment and Institute news.

MBM - Metal Bulletin Monthly

Metal Bulletin

Metal Bulletin

Metal Bulletin

Published twice weekly. Global news and price movements in the world's steel and non-ferrous industries, along with charting and analysis of the international markets

Metals Finance

Metal Bulletin

A monthly newsletter focussed on the mining, metals and steel sectors

Metals Industry News

Recycler's World Publications Directory

Metals & Minerals - Latin America

Metal Bulletin

Incorporating 'Latin American Mining Letter'. Provides extensive news coverage and background context regarding developments in the metals and minerals industries of Latin America and the Caribbean.

Metallurgical and Materials Transactions A

The Minerals, Metals & Materials Society/ASM International

Metallurgical and Materials Transactions B

The Minerals, Metals & Materials Society/ASM International

Modern Metals

Recycler's World Publications Directory

Powder Metallurgy

Institute of Materials, UK

International coverage of the science and practice of powder metallurgy, plus industrial news, feature articles on commercial and technical developments, research papers and forthcoming events.

Science & Technology of Welding and Joining

Institute of Materials, UK

An interdisciplinary journal reviewed papers covering all materials and processes; with innovative data and software section.

Recycler's World

Publications Directory

Revue de l'Aluminium

French technical Journal

Revue de Métallurgie

French technical Journal

Electronic/Audio-Visual Products

Aluminium: An element of change (Video)

Aluminium Association, USA

Covers mining, refining, fabricating & recycling.

Aluminium: Automotive Recycling (Video)

Aluminium Association, USA

Describes the recycling infrastructure.

Aluminium: Foil (Video)

Aluminium Association, USA

Covers mechanical & chemical properties & conversion techniques.

Aluminium: Forgings (Video)

Aluminium Association, USA

Covers manufacture and advantages.

Aluminium in Perspective (Video)

Aluminium Federation, UK

Covers key health & environmental issues.

Aluminium on the Move (Video)

Aluminium Federation, UK

Covers manufacture & distribution in the UK.

ALUSELECT

Aluminium Federation, UK

A materials database of wrought aluminium and aluminium alloys.

Fundamentals of Aluminum Production (Video)

The Minerals, Metals & Materials Society

Promotes the understanding of state-of-the-art technology for materials scientists and engineers.

Guidelines in Handling Molten Aluminium

Aluminium Association, USA

Safety-training aid.

How to Weld Titanium (Video)

International Titanium Association

Includes instructions on the correct welding equipment and work area needed for a successful titanium weld, proper joint design, anti-contamination procedures, how to evaluate procedures and techniques and a sample exercise. A laminated card and a workbook are included with the videotape. The workbook is a teaching aide and can be used by the welder for self-instructions or as a classroom manual. The laminated card contains short, concise rules for welding titanium.

Mat.DB

ASM International

Collected and evaluated materials property data contained in 12 Mat.DB databases which are sold separately. These databases contain properties for over 6,000 engineering alloys and polymers.

Materials Science: An interactive learning tool for students

MATTER project team

Chapman & Hall, 1997 CD-ROM

ISBN/ISSN: 0-412-80080-2

An interactive CD-ROM for materials science undergraduates (also paperback)

Materials Science: A Multimedia Approach

John C. Russ

PWS Publishing, 1996 CD ROM

ISBN/ISSN: 0-534-95736-6 (Windows only)

ISBN/ISSN: 0-534-95052-3 (Macintosh)

Offers numerous animations of materials concepts, active text with hyperlinks, and Theorist-based interactive problems; with equation-solving software included.

Molten Metal Explosions (Video)

Aluminium Association, USA

Safety-training aid.

Nomenclature & Characteristics of Aluminium (Video)

Aluminium Association, USA

Covers alloy & temper designation systems for wrought & mill products.

Preventing Explosions in Aluminium Melting Operations (Video)

Aluminium Association, USA

Safety-training aid.

Structural Design with Aluminium (Video)

Aluminium Association, USA

Describes main properties & advantages of aluminium in structural uses.

Titanium (Video Set - 8hrs)

Professor Sam Froes

Comprehensive review of the current understanding of titanium alloys and their composites. It is intended for use in industry, academia and research institutions. Major topics include: Fundamentals and structure, Alloys and composites, Phase transformations and heat treatment, Microstructure-property relations, Processing and Applications.

Titanium & Its Alloys (Diskette)

A database of information on over 30 commonly used titanium alloys. The data included touches on nearly all aspects of the use of titanium; i.e. how to design, material properties, applications, precautions, construction, welding, machining, fabricating, etc. Many of the topics are augmented with illustrative graphs and tables.

Training Seminar Videos (4 Video Set)

Aluminium Association, USA

Covers: Tempers, alloys, standards, data guide; Sheet & plate; Rod, wire & bar; Extrusion.

Safe Handling of Powder & Paste (Video)

Aluminium Association, USA

Safety-training aid.

Part 2 : Directory

MANUFACTURERS' PRODUCT RANGES

This cross-reference table summarises the type of products available from each manufacturer or supplier, giving the page number for the company entry in the directory section of this book.

Key:

Product forms: *P* = powder.

C = cast; *i* = ingot; *c* = castings.

W = wrought; *r* = rolled product forms; *e* = extrusions; *d* = drawn products; *b* = billet;

f = forging-stock/forgings; *w* = wire.

Symbols: ○ = provide a number of alloys of a particular type;

● = provide a wide range of those alloys;

MMC = metal matrix composite;

FML = fibre-metal-laminate.

For aluminium wrought products: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ indicates the international four-digit series for alloys.

Companies therefore offer one or more alloys within the stated series, e.g. ⑤ = provides alloys from the 5xxx series.

Company Name	[Product Forms]	Aluminium			Magnesium			Titanium	Beryllium	Composites	Page Number
		cast	wrought	powder	cast	wrought	powder				
AAA Weber	[Al]	●	●	-	●	●	-	●	-	-	40
aalco - Slough (Stockist)	[Wre]	-	●	-	-	-	-	-	-	-	40
Aavid Thermal Technologies, Inc.	[Cc]	-	-	-	-	-	-	-	-	MMC	40
The Aberly Group	[Wb]	-	-	-	-	-	-	○	-	-	40
Advanced Metals International	[Wd]	-	○	-	-	-	-	○	-	-	40
Aerodyne Ulbrich Alloys	[Wrabw]	-	-	-	-	-	-	●	-	-	40
Affibassin	[C]	●	-	-	-	-	-	-	-	-	40
Afficiuire	[C]	●	-	-	-	-	-	-	-	-	41
Affimet - Aluminium Pechiney	[C]	●	-	-	-	-	-	-	-	-	41
Affinerie d'Anjou	[C]	●	-	-	-	-	-	-	-	-	41
Agents Aluminium Co Pvt Ltd	[Wr]	-	●	-	-	-	-	-	-	-	41
Airex AG	[W]	-	○	-	-	-	-	-	-	-	41
A.L. (Affinage de Lorraine)	[C]	●	-	-	-	-	-	-	-	-	41
Alba A/S	[Cc]	-	-	-	-	-	-	●	-	-	42
Alcan Alluminio SpA - Bresso	[Wr]	-	●	-	-	-	-	-	-	-	42
Alcan Alluminio SpA - Borgofranco C'lvrea	[C]	○	-	-	-	-	-	-	-	-	42
Alcan Alluminio SpA - Pieve Emanuele	[WreC]	○	●	-	-	-	-	-	-	-	42
Alcan Deutschland GmbH & Co. - Berlin	[Wr]	-	○	-	-	-	-	-	-	-	42
Alcan Deutschland GmbH - Göttingen	[Wre]	-	○	-	-	-	-	-	-	-	43
Alcan Deutschland GmbH - Nacherstedt	[Wr]	-	○	-	-	-	-	-	-	-	43
Alcan Deutschland GmbH - Nürnberg	[Cc]	○	-	-	-	-	-	-	-	-	43
Alcan Deutschland GmbH - Plettenberg-Ohle	[Wr]	-	○	-	-	-	-	-	-	-	43
Alcan France	[We]	-	○	-	-	-	-	-	-	-	43
Alcan Laminés France SA	[Wr]	-	○	-	-	-	-	-	-	-	43
Alcan Recycling	[Wr]	-	○	-	-	-	-	-	-	-	44
Alcan Rolled Products UK - Falkirk	[Wr]	-	①⑤	-	-	-	-	-	-	-	44
Alcan Rolled Products UK - Rogerstone	[Wr]	-	①③⑤⑧	-	-	-	-	-	-	-	44
Alcan Rorschach AG	[Wr]	-	○	-	-	-	-	-	-	-	44
Alcan Smelting & Power UK - Kinlochleven	[C]	○	-	-	-	-	-	-	-	-	44
Alcan Smelting & Power UK - Lochaber	[C]	●	-	-	-	-	-	-	-	-	44

24 Manufacturers' Product Ranges

Company Name	[Product Forms]	Aluminium			Magnesium			Titanium	Beryllium	Composites	Page Number
		cast	wrought	powder	cast	wrought	powder				
Hoogovens Aluminium NV - Sweden	[Wr]	-	●	-	-	-	-	-	-	-	75
Hoogovens Aluminium Portugal Lda.	[Wre]	-	●	-	-	-	-	-	-	-	75
Hoogovens Aluminium Profiltechnik GmbH	[We]	-	●	-	-	-	-	-	-	-	75
Hoogovens Aluminium UK Ltd. - Birmingham	[Wr]	-	●	-	-	-	-	-	-	-	76
Hoogovens Aluminium UK Ltd. - Herts.	[Wre]	-	●	-	-	-	-	-	-	-	76
Hoogovens Aluminium USA Corp.	[Wr]	-	●	-	-	-	-	-	-	-	76
Hoogovens Aluminium Waltzprodukte	[We]	-	○	-	-	-	-	-	-	-	76
Hoogovens Aluminium Waltzprodukten - Koblenz	[Wr]	-	②⑤⑥⑦	-	-	-	-	-	-	-	76
Howmet Corporation	[CicWfb]	-	-	-	-	-	-	●	-	-	77
Hydro Alluminio Atessa S.p.A.	[CWeb]	○	○	-	-	-	-	-	-	-	77
Hydro Alluminio Omago SpA	[CWeb]	○	○	-	-	-	-	-	-	-	78
Hydro Aluminio Portalex S.A.	[We]	-	○	-	-	-	-	-	-	-	78
Hydro Aluminium A/S - AluCoat	[Wr]	-	-	-	-	-	-	-	-	-	78
Hydro Aluminium A/S - Holmestrand Mill	[Wr]	-	①③⑤⑧	-	-	-	-	-	-	-	79
Hydro Aluminium A/S - Karmøy Mill	[Wr]	-	①③⑤⑧	-	-	-	-	-	-	-	79
Hydro Aluminium Alupres Ltd.	[We]	-	○	-	-	-	-	-	-	-	78
Hydro Aluminium Bellenberg GmbH	[We]	-	○	-	-	-	-	-	-	-	79
Hydro Aluminium Century Ltd. - Co. Durham	[We]	-	⑥	-	-	-	-	-	-	-	80
Hydro Aluminium Century Ltd. - Dumfriesshire	[We]	-	⑥	-	-	-	-	-	-	-	79
Hydro Aluminium Châteauroux s.n.c.	[We]	-	○	-	-	-	-	-	-	-	80
Hydro Aluminium EXPA S.A (Remelt) - Belgium	[CiWe]	-	○	-	-	-	-	-	-	-	80
Hydro Aluminium Extrusion Service - Lucé	[CWb]	○	○	-	-	-	-	-	-	-	80
Hydro Aluminium Fundo a.s	[Cc]	○	-	-	-	-	-	-	-	-	81
Hydro Aluminium Metals Ltd. - Gwent	[CWb]	-	○	-	-	-	-	-	-	-	81
Hydro Aluminium Nenzing GmbH - Austria	[We]	-	○	-	-	-	-	-	-	-	81
Hydro Aluminium Profiler Karmøy a.s	[We]	-	○	-	-	-	-	-	-	-	82
Hydro Aluminium Profiler a.s - Raufoss	[We]	-	○	-	-	-	-	-	-	-	82
Hydro Aluminium Raufoss Automotive	[W]	-	○	-	-	-	-	-	-	-	82
Hydro Aluminium Raeren SA NV - Belgium	[We]	-	○	-	-	-	-	-	-	-	82
Hydro Aluminium Rolled Products - Denmark	[Wr]	-	○	-	-	-	-	-	-	-	82
Hydro Aluminium Rolled Products Ltd. - UK	[Wr]	-	①③⑤⑧	-	-	-	-	-	-	-	83
Hydro Aluminium Seneffe SA - Belgium	[Wedw]	-	○	-	-	-	-	-	-	-	83
Hydro Aluminium Sverige AB	[We]	-	○	-	-	-	-	-	-	-	83
Hydro Aluminium Tønder a.s.	[We]	-	○	-	-	-	-	-	-	-	83
Hydro Aluminium Uphusen GmbH	[We]	-	○	-	-	-	-	-	-	-	83
Hydro Estab. Manuel Ferreira, Lda.	[We]	-	○	-	-	-	-	-	-	-	69
Hydro Alumino La Roca SA	[We]	-	○	-	-	-	-	-	-	-	83
Hydro Fundo AB - Sweden	[Cc]	-	-	-	○	-	-	-	-	-	70
Hydro Magnesium - Brussels	[CiP]	-	-	-	●	-	○	-	-	-	84
Hydro Magnesium Norway - Porsgrunn	[CiP]	-	-	-	●	-	○	-	-	-	85
Hyspeed Norway a.s	[Cc]	-	-	-	○	-	-	-	-	-	85
Hyspeed S.p.a. - Venezia	[Cc]	○	-	-	○	-	-	-	-	-	85
IMCO Recycling Inc.	[Ci]	○	-	-	○	-	-	-	-	-	85
INASA-Reynolds	[We]	-	○	-	-	-	-	-	-	-	85
Indalex Ltd.	[We]	-	○	-	-	-	-	-	-	-	85
INDAL - Indian Aluminium Company	[Wre]	-	○	-	-	-	-	-	-	-	86
Indian Smelting & Refining Co. Ltd.	[Ci]	○	-	-	-	-	-	-	-	-	86
Inespal Laminacion SA	[Wr]	-	○	-	-	-	-	-	-	-	86
Inometa France sarl	[CcWed]	-	○	-	-	-	-	-	-	-	86
Interlink Metals & Chemicals	[CiWr]	-	-	-	○	○	-	-	-	-	86
Intermetal S.A. (Compagnie des Métaux), CH	[CiP]	-	-	-	○	-	○	-	-	-	87
Intermétaux SA - France	[Wr]	-	○	-	-	-	-	-	-	-	87
International Extrusions	[We]	-	○	-	-	-	-	-	-	-	87
Intexalu Systèmes Puget SA	[We]	-	⑥	-	-	-	-	-	-	-	87
Ireland Alloys Inc.	[Ci]	-	-	-	-	-	-	○	-	-	87
Itochu Non-Ferrous Materials Co., Ltd.	[CiWrwbw]	-	-	-	-	-	-	●	-	-	87
G. James Australia Pty. Ltd.	[We]	-	○	-	-	-	-	-	-	-	87
Japan Metals & Chemicals Co.	[Ci]	-	-	-	○	-	-	-	-	-	88
Industrias R. Jimenez SA	[C]	○	-	-	-	-	-	-	-	-	86
Kaye Aluminium plc	[We]	-	⑥	-	-	-	-	-	-	-	88
Krupp Hoesch Steel Ltd.	[CiW]	-	-	-	-	-	-	●	-	-	88
Lachenal Industries	[Cc]	○	-	-	○	-	-	-	-	-	88
Lawson Mardon Star Ltd.	[Wr]	-	①③⑧	-	-	-	-	-	-	-	89
London & Scandinavian Metallurgical Co. Ltd	[CiP]	○	-	-	-	-	-	-	-	MMC	89
Luxfer Gas Cylinders	[We]	-	○	-	-	-	-	-	-	-	89
MagCorp - Magnesium Corp. of America	[Ci]	-	-	-	●	-	-	-	-	-	90
Magnesium Elektron - UK	[CiWrtp]	-	-	-	●	○	○	-	-	MMC	90
Mark Metals Inc.	[CicWrebw]	-	-	-	○	○	-	-	-	-	90
Marle	[Wr]	-	-	-	-	-	-	○	-	-	90
M & C Métaux et Chimie	[P]	-	-	○	-	-	-	-	-	-	90
Metal Agencies Ltd.	[Wr]	-	○	-	-	-	-	-	-	-	90
Metal Casting Technology, Inc.	[Cc]	-	-	-	-	-	-	-	-	MMC	91
Metallurg Inc.	[CiP]	○	-	○	○	-	○	○	-	-	91

TRADE NAMES & STANDARD PRODUCT CODES

This section lists tradenames and product codes either registered to, or used by, companies supplying products. The product type is shown in brackets, e.g. (MMC = metal matrix composite). The majority of companies use standard product codes which are based upon, or correspond to, national or international alloy designation systems. However, some companies use named product series, and others have product codes that, for example, appear similar to the four-digit wrought aluminium designation series. These may have different compositions and therefore are not necessarily equivalent or similar alloys.

Aavid Thermal Technologies Inc.

Quick-Cast (pressure-assisted infiltration of molten aluminium)
Quick-Set (low pressure, low viscosity injection moulding of SiC particles)

AEA Technology (UK)

HIVOL (MMC)

Affimet - Aluminium Pechiney

ALPUR (ladles)
ALTHIX (thixotropic billets)
CALYPSO (aluminium casting alloys)
MINIMAG (ladles)

Alcan

LITAL (aluminium-lithium alloy)

Alcan Alluminio SpA

Abithal (hard-alloy bars)
Lamcolor (sheet)

Alcan Laminés France SA

Falzonal (roofing & wall-cladding products)

ALCOA – Aluminium Company of America

Deltalloy (aluminium alloy)
Toolrite (aluminium alloy)
Alithalite (aluminium-lithium alloy)

Alumasc Building Products Ltd

Aqualine (building products)
Aquarius (building products)
Guardian (building products)
Skyline (building products)

Alu Menziken Industrie AG

Aluman (aluminium alloys)
Anticorodal (aluminium alloys)
Avional (aluminium alloys)
Decoltal (aluminium alloys)
Extrudal (aluminium alloys)
Peraluman (aluminium alloys)
Perunal (aluminium alloys)
Unidur (aluminium alloys)

Aluminium Rheinfelden GmbH

VACONO (slugs)

Alusingen GmbH

Peraluman (aluminium alloys)
Reflectal (aluminium alloys)
Relital (aluminium alloys)
Remiral (aluminium alloys)

Alusuisse - Aluminium Suisse (Sierre)

Alplan (aluminium alloys)
Aluman (aluminium alloys)
Anticorodal (aluminium alloys)
Avional (aluminium alloys)
Certal (aluminium alloys)
Contal (aluminium alloys)
Peraluman (aluminium alloys)
Perunal (aluminium alloys)
Unidal (aluminium alloys)
Unidur (aluminium alloys)

Alyn Corporation

Boralyn (MMC)

AMAG

Titalan (aluminium alloys)

AMETEK Speciality Products Division

HIVOL (MMC)

British Aluminium (Plate)

Alumec (tool plate)

British Aluminium (Wire)

Duralcan 90/10 (MMC)

Brush Wellman Inc.

AlBeMet (Beryllium-aluminium alloy)

Comalco

SILVERAL (aluminium pigment/paste)

CYCO International Pty Ltd.

ULTALITE (low cost aluminium MMC)

Deutsche Titan GmbH

Tikrutan (titanium alloys)

28 Tradenames & Standard Product Codes

Dow

Galvamag (magnesium alloy)
Galvorod (magnesium alloy)

Dynamet Technology Inc.

Cermeti (MMC)

Gleich GmbH

Certal (tool plate)
Toplate (tool plate)

Haynes International

Haynes (alloys)

Hoogovens Aluminium GmbH

KAL-BAU (building products)
KAL-ZIP (building products)

Hydro Aluminium

Domal (extrusion/systems)
HYCOT (nylon coated aluminium tubes)

IMCO Recycling Inc.

Amp-Pak (anodes)

Inometa

F&G-HT (roller tubes)
F&G-TOP (roller tubes)
ISQ (roller tubes)

G. James Australia Pty. Ltd.

ArmaGrille (security grill)

Lanxide Electronic Components Inc.

Lanxide (MMC process)

MagCorp - Magnesium Corp. of America

MagMax (anodes)

Magnesium Elektron

MELMAG (MMC)
MELRAM (MMC)

Osprey Metals Ltd.

OSPREY (rapid solidification powder process)

Pechiney High Purity (PHP)

Gigalloys-97

Pechiney Rhenalu

Jumbo 3 CM (thin-gauge continuous casting process)

Reynolds Metals Company

R-2000 (tool plate)
Reynobond (aluminium-thermoplastic laminate)
Reynolds Wrap (aluminium foil)
Tread-Brite (treadplate)
Weldalite (aluminium-lithium alloy)

Structural Laminates Co.

ARALL (aramid fibre-metal-laminates)
Care (carbon fibre-metal-laminates)
Glare (glass fibre-metal-laminates)

Sun Microsystems

Dymalloy (MMC)

Teledyne-Allvac

Allvac (titanium alloys)

Textron Systems

Hy-Bor
SCS-6 (silicon carbide continuous reinforcement)
SCS-9A (silicon carbide continuous reinforcement)
SCS-Ultra (silicon carbide continuous reinforcement)

TIMET

Timet
Timetal (titanium alloys)

Timminco Metals

MAG-CAL (magnesium-calcium alloy)

TYK Corporation

METACS (MMC)
Ti-METACS (MMC)

VAW AG

Autodur (cast aluminium alloys)
Ertal (primary aluminium)
Kryal (primary aluminium)
Pantal (cast aluminium alloys)
Raffinal (primary aluminium)
Reflectal (primary aluminium)
Silumin (cast aluminium alloys)
Silumin Beta (cast aluminium alloys)
Silumin Delta (cast aluminium alloys)
Silumin Gamma (cast aluminium alloys)
Silumin Kappa (cast aluminium alloys)
Veral (cast aluminium alloys)

Wah Chang

Tiadyne (titanium alloys)

WICONA

Wicona (building systems)

MANUFACTURERS & SUPPLIERS – COUNTRIES

Australia

Alucor Australia Pty Ltd.
 APS Chemicals
 Australian Magnesium Corporation
 Comalco Smelting
 CYCO International Pty Ltd.
 G. James Australia Pty. Ltd.
 Queensland Metals Corporation Limited
 Timminco Pty. Ltd.
 UBE Sydney Office

Austria

Alcan Austria GmbH
 Alusuisse Austria GmbH
 AMAG Ranshofen Walzwerk GesmbH
 Hoogovens Aluminium Verkauf GESMBH
 Hydro Aluminium Nenzing GmbH

Belgium

S.A. Aciers Marathon Staal N.V.
 SA Alusuisse Guy Geisler NV
 Alutrade SA
 Dufalco NV
 Hoogovens Aluminium Building Systems
 Hoogovens Aluminium International NV
 Hoogovens Aluminium NV
 Hoogovens Aluminium NV Profiel Centrum
 Hoogovens Aluminium Service Center NV
 Hydro Aluminium EXPA S.A.
 Hydro Aluminium EXPA S.A. - Remelt
 Hydro Aluminium Raeren SA NV
 Hydro Aluminium Seneffe SA
 Hydro Magnesium
 Phenix Aluminium S.A.
 Raufoss Automotive Belgium NV
 Speciality Metals Company SA
 WICONA Benelux N.V.

Brazil

BRASMAG
 Dow Quimica S.A.
 Empradas Dow
 Hoogovens Technical Service do Brasil
 K-Trade Ltda
 Metallurg do Brasil Ltda
 Mineração Rio do Norte S.A.
 RIMA Electrometalurgia SA
 RIMA Industrial SA
 RIMA SA
 VAW Aluminium AG
 Verlap Quimica Ltda.

Canada

Alcan Aluminium Ltd.
 Amalgamet Canada Ltd.
 D.B.S. Metals, Inc.
 Dow Canada
 Hoogovens Aluminium Quebec & Co Ltd.
 Hoogovens Technical Services
 Hydro Magnesium Marketing
 Lawson Mardon Packaging Inc.
 Metallurg (Canada)
 Noranda Metallurgy Inc
 Norsk Hydro Canada Inc.
 TERRA 4 Titanium Inc.
 Timminco Metals
 Titanium Industries, Inc.
 TYK Corporation

China

Gredmann China Ltd.
 Hoogovens Technical Services China
 Shanghai Repr. Office of Norsk Hydro
 Shenwei Corporation
 UBE Beijing Office
 United Magnesium Company Ltd.

Czech Republic

Aluminium Decin spol. sr.o.
 Hydro Czech Republic s.r.o.
 Neumeyer CR, spol. sr.o
 Tatrarex Precision Castings spol. sr.o.

Denmark

Aage Christensen AS
 Alcan Deutschland GmbH
 Heat Transfer Tønder a/s
 Hoogovens Aluminium Danmark A/S
 Hoogovens Aluminium Waltzprodukte
 Hydro Aluminium Automotive Structures
 Hydro Aluminium HYCOT a.s
 Hydro Aluminium Nordisk Aviation
 Products a/s
 Hydro Aluminium Rolled Products
 Hydro Aluminium Tønder a.s.
 Rolltech A/S
 SAPA Danmark A/S
 VAW Skandinavia A/S
 WICONA Scandinavia AB (Danmark)

Egypt

Alumisr

Finland

Alcan Deutschland GmbH
 Oy Algol AB
 Hydro Aluminium Suomi Oy
 Oy SAPA Colt Ab

France

AAA Weber
 ACI
 Affibassin
 Afficuvre
 Affimet - Aluminium Pechiney
 Affinerie d'Anjou
 Affineries de Picardie
 A.L. (Affinage de Lorraine)
 Alcan France
 Alcan Laminés France SA
 Alcan Toyo Europe
 Aldevienne Aluminium SA
 Sté Alsacienne d'Aluminium
 Aluminium Pechiney
 Alunord snc.
 Alusuisse CMIC SA
 Alusuisse France SA
 AMAG France Sarl
 Apollo Metal SA
 Armco Sarl
 A.T.M. (Aluminium Technique Moselle)
 Aviatube
 P. Balloffet-Technicome
 Cegedur
 Cezus
 Châteauroux Fonderies
 CLAL-MSX
 Comeca
 Concentric sarl
 Ets Robert Creuzet
 Dorlec France
 EA Erbslöh Aluminium
 Est-Alu
 Europalu
 Fabrications Lémaniques d'Outils
 Flandria Aluminium
 Fonderie Fine de Précision
 Fonderies de Léman
 Fonlem Centre
 Fonlem Industries
 Forge Eclair
 Genecos SA
 GM Metal

Goodfellow SARL
 Ets Griset
 Ets. Georges D'Halluin
 Haynes International
 Hoogovens Aluminium France SA
 Hydro Aluminium Châteauroux s.n.c.
 Hydro Aluminium Expal
 Hydro Aluminium Expal (Pinon) s.n.c.
 Hydro Aluminium Extrusion Service sarl
 Hydro Aluminium France s.n.c.
 Hydro Aluminium I.T.C. s.n.c.
 Hydro Aluminium Sales & Trading Snc.
 Inometa France sarl
 Intermetaux SA
 Intexalu Systèmes Puget SA
 Lacal SNC
 Lachenal Industries
 Lawson Mardon Packaging SA
 L. M. P.
 Marle
 M & C Métaux et Chimie
 MIFA Bureau Commercial
 M. I. O.
 Pechiney
 Pechiney Electrometallurgie
 Pechiney Hermillon
 Pechiney Rhenalu
 Pechiney Rhenalu d'Anney
 Perrière International
 PHP - Pechiney High Purity
 PREDIMAG
 Reynolds Aluminium France
 Sapa Aluminium France SNC
 SENPOF Girebronze
 SMG - Sté. Metallurgique de Gerzat
 SMH
 SOFAB
 Sofogir
 Softal
 TARAMM S.A.
 Tecla Industries
 Teledyne-Allvac S. A.
 Timet France
 Timet Savoie
 Toyal Europe SA
 TYK Corporation
 Vanalp Industry
 VAW France S.A.
 Wicon S.A.

Germany

Alcan Deutschland GmbH
 Alcan Deutschland GmbH & Co.
 Alimex GmbH
 Almamet GmbH
 Aluminium Norf
 Aluminium Rheinfelden GmbH
 Alusingen GmbH
 Alusuisse Singen GmbH
 AMAG Aluminiumwerk Unna AG
 Apollo Metall GmbH
 BDW GmbH & Ko KG
 Bergische Pulverbeschichtungs-Technik
 Deutsche Titan GmbH
 Dow Europe
 Eckart-Werke
 Gesellschaft für Elektrometallurgie mbH
 Drahtwerk Elisental - W. Erdmann GmbH
 Ekonal Bausysteme GmbH & Co. KG
 Erbslöh Aluminium AG
 Otto Fuchs Metallwerke GmbH
 Josef Gartner & Co.
 Gleich GmbH
 Goodfellow GmbH
 Hoogovens Aluminium - Sidal GmbH

30 Manufacturers & Suppliers - Countries

Germany (continued)

Hoogovens Aluminium Bausysteme GmbH
Hoogovens Aluminium GmbH
Hoogovens Aluminium Hüttenwerk GmbH
Hoogovens Aluminium Metall GmbH
Hoogovens Aluminium Profiltechnik GmbH
Hoogovens Aluminium Profiltechnik
Bitterfeld GmbH
Hoogovens Aluminium Walzprodukten
Hydro Aluminium Bellenberg GmbH
Hydro Aluminium Deutschland GmbH
Hydro Aluminium Uphusen GmbH
Hydro Magnesium GmbH
Inometa
Kapa GmbH
Montangessellschaft GmbH
Neumeyer Fließpressen GmbH
Peak Werkstoff GmbH
Pechiney Aluminium Presswerk GmbH
RADI - Reynolds Aluminium Deutschland
SAPA Aluminium Profile GmbH
Carl Schreiber GmbH
Teledyne-Allvac
Tepro Metall
Titanium Industries GmbH
TYK Corporation
UBE Europe GmbH
VAW AG
VAW Aluminium AG
VAW IMCO Guß und Recycling GmbH
WICONA Bausysteme GmbH

Greece

Aluminium de Grèce SAIC
Elval - Hellenic Aluminium Industry SA
Hydro Aluminium Systems Hellas S.A.
VIEXAL S.A.

Guinea

Friguia Guinea

Hong Kong

Dow Pacific
Nordisk Aviation Products Asia Ltd.
Norsk Hydro Far East Ltd.
UBE (Hong Kong) Ltd.

Hungary

Alcan Deutschland GmbH
Alusuisse-Lonza Hungaria Kft.

India

Agents Aluminium Co Pvt Ltd
Ambica Aluminium Company
Bihar Extrusion Co Ltd
Bright Metals
Conzinc Asia India
D M Company
Heera Metals Ltd
Hoogovens Technical Services India,
Indal Hydro Extrusion Ltd.
INDAL - Indian Aluminium Company
Indian Smelting & Refining Co. Ltd.
Orissa Extrusions Ltd.
Plas-Met Chem Corporation
Saraf Metal Works
Sudal Industries Ltd.

Indonesia

P.T. Altrindo Yasa Niagatama
P.T. Justus Kimiaraya

Ireland

Baco Metal Centres (Dublin) Ltd.
High Tech Tubes Ltd.
Thyssen Garfield Ltd.

Israel

Dead Sea Magnesium Ltd.
Zinkal Ltd.

Italy

Alcan Alluminio SpA
Alusuisse Costa srl
Alusuisse Italia SpA
Ekonal Italia srl
Eural Gnutti S.p.A.
Hoogovens Aluminium Europe Srl.
Hoogovens Aluminium Italia SpA
Hydro Alluminio Atessa S.p.A.
Hydro Alluminio Ornago SpA
Hydro Aluminium Milano
Hydro Aluminium Systems S.p.A.
Hyspeed S.p.a.
Italma
Metalchimica Srl
Pandolfo Alluminio SRL
Pianimpianti International S.R.L.
Reynolds Italy Slim SPA
Titania S.p.A.
VAW Aluminium Italia S.r.l.

Jamaica

Hydro Aluminium Jamaica

Japan

Dow Japan Ltd.
Hoogovens Aluminium Japan Ltd.
Hydro Magnesium Japan Office
Itochu Non-Ferrous Materials Co., Ltd.
Japan Metals & Chemicals Co.
Metallurg (Far East) Ltd.
Morimura Brothers
Norsk Hydro ASA
Pechiney Japon
Rio Tinto Japan
Sumitomo Sitemap Corp.
Teledyne-Allvac
Timminco Metals
Toyo Aluminium KK
TYK Corporation
Ube Chemical Industries, Ltd.
UBE Industries - Light Metal
UBE Trading Co. Ltd.
UTSC

Luxembourg

Eurofoil S.A.
Gottschol Alucuilux S.A.
Hydro Aluminium Clervaux S.A.

Malaysia

Conzinc (Malaysia) Sdn Bhd.
Harrisons Trading (Peninsular) Sdn Bhd.
G. James Industries (Malaysia) Sdn. Bhd.

Malta

Aluminium Extrusions Ltd.

Mexico

Comercial e Industrial Minero Metallurgica

Netherlands

Alcan Aluminium Products N.V. SA
Aluminium Delfzijl
Alusuisse Nederland B.V.
AMAG Benelux B.V.
Amefo BV- Advanced Metal Forming
Brabant Alucast International BV
Gerard de Bruyn BV
Cirex BV
Comhan Holland BV
De Globe/Globon BV
Goedlicht BV
Hoogovens Aluminium BV
Hoogovens Aluminium Primary Products
Hoogovens Aluminium Sales BV
Hoogovens Beheermaatschappij
Industriële Producten BV
Hoogovens Corporate Services BV
Hoogovens Hylite BV

Hoogovens Research & Development
Hoogovens Technical Services BV
HTS Energy & Environment BV
HTS Technological & Operational
Assistance BV
Hydro Aluminium
Hydro Aluminium Rolled Products Benelux
Koninklijke Hoogovens
Mifa Aluminium BV
Reynolds Aluminium Holland B.V.
Sapa Aluminium BV
Sapa Nederland BV
CV Scheuer Verzekeringen
Structural Laminates BV
Ube International (Netherlands) B.V.
VSG Nederland B.V.
CV Willis Corroon Scheuer

New Zealand

APS Chemicals
Comalco New Zealand Limited

Norway

Alba A/S
Hycast
Hydeq
Hydro Aluminium
Hydro Aluminium AluCoat
Hydro Aluminium Alupluss
Hydro Aluminium Aluserv
Hydro Aluminium Auto Accessories
Hydro Aluminium Conductors
Hydro Aluminium Extrusion Tools
Hydro Aluminium Formtech
Hydro Aluminium Fundo
Hydro Aluminium Fundo, Sales Vækerø
Hydro Aluminium Holmestrand Mill
Hydro Aluminium Hydral
Hydro Aluminium Hydro Trans
Hydro Aluminium Hydro Utvikling Sogn
Hydro Aluminium Karmøy Metallverk
Hydro Aluminium Karmøy Mill
Hydro Aluminium Maritime
Hydro Aluminium Maritime, Karmøy
Hydro Aluminium Nordisk Aviation Prod.
Hydro Aluminium Profiler
Hydro Aluminium Profiler Karmøy
Hydro Aluminium Profiler, avd. Gran
Hydro Aluminium Profiler, avd. Magnor
Hydro Aluminium Raufoss Automotive
Hydro Aluminium Rolled Products
Hydro Aluminium Sunndal
Hydro Aluminium Vekst
Hydro Aluminium Vik Verk
Hydro Equipment
Hydro Magnesium Norway
Hydro Metal Products
Hydro Stumek
Hydroslug
Hyspeed Norway
Norcable
Norsk Hydro
Raufoss
Raufoss Automotive
Raufoss Hydro Automotive
SAPA
SAPA / Vest.
Scanmag
Sør-Norge Aluminium
Vigeland Metal Refinery
WICONA Scandinavia AB

Philippines

Conzinc Asia (Philippines), Inc.

Poland

Hoogovens Technical Services Poland
Hydro Aluminium Chrzanów Sp.z.o.o
Sapa Poland Ltd
Wicono Sp.z.o.o

Portugal

Alcan Ibérica sa
Aluport-Matrizas de Portugal Lda.
Estabelecimentos Manuel Ferreira, Lda.
Hoogovens Aluminium Portugal Lda.
Hydro Aluminium Portalex S.A.
Tecnilaca Lacagem de Metais, Lda.
Thyssen Portugal
VAW Iberica S.A.

Puerto Rico

Dow Latin America

Russian Federation (CIS)

AVISMA Titanium-Magnesium Works
Hydro Aluminium CIS a.s
Hydro Aluminium Moscow
Hydro Aluminium Murmansk
Hydro Aluminium Nordisk Aviation
Products Moscow
Russian National Aluminium-Magnesium
Institute
Solikamsk Magnesium Works
Teledyne-Allvac
VIAM - All-Russian Institute of Aviation
Materials
VILS
VSMPO

Saudi Arabia

Zamil Aluminium Industries

Singapore

G. James Singapore Pte. Ltd.
Nordisk Aviation Products Pte. Ltd.
Norsk Hydro Asia Pte. Ltd.
UBE Singapore Office
VAW Aluminium AG

Slovakia

Hydro Slovakia o.z.
Slovalco a.s

Slovenia

Talum

South Africa

Metallurg (South Africa) Pty Ltd.
Titanium International Fabricators

South Korea

Conzinc Asia (Korea) Limited
Daeboong Corporation
Karam Corporation

Spain

Alcan Ibérica sa
Aleastur
Alumino Español SA
Alu Perfil Espana SA
Alusuisse España SA
Brandau y Compania SA
Ekonal España SA
Freire Hermanos SA
Hoogovens Aluminium España S.A.
Hydro Alumino La Roca SA
IM Export Trading & Associates SL
INASA-Reynolds
Inespal Laminacion SA
Industrias R. Jimenez SA
Perfil Arteaga SA
Productos Alumino do Consumo SA
REFINALSA
SOGEM Iberica SA

Technalloy SA
Thyssen Aceros Especiales S.A.
UBE Europe (España), S.A.
VAW Iberica S.A.

Sweden

Aktiebolaget Ferrolegeringer
Alcan Deutschland GmbH
Fundo AB
G & L Beijer - Import och Export AB
Hogstad Aluminium AB
Hoogovens Aluminium NV filial Sverige
Hydro Aluminium Conductors AB
Hydro Aluminium Profiler AB
Hydro Aluminium Sverige AB
Industrilackering i Vetlanda AB
Pilotech HB
Raufoss Automotive Skultuna AB
Sandvik Steel
Sapa - Skandinaviska Aluminium Profiler
Sapa AB
Vetlanda Profilbuckning AB
Wicono Scandinavia AB

Switzerland

Airex AG
Alcan Rorschach AG
Alu Menziken Industrie AG
Aluminium Martigny SA
Aluminium Münchenstein AG
Alusuisse Allega AG
Alusuisse Aluminium Suisse SA
Alusuisse Aluminium Suisse SA, Sierre
Alusuisse-Lonza Holding Ltd.
Alusuisse Technology & Management AG
Atech AG
Bibus Metals AG
Dow Europe S.A.
Eckart Switzerland
Ferrolegeringer Aktiengesellschaft
Hydro Aluminium Extrusion
Hydro Aluminium s.a.
Intermetal S.A. - Compagnie des Métaux
NEMAG Metallhandels-AG
Noralu Walzprodukte AG
Razno Alloys Ltd.
Sapa Aluminium Profile AG
Timminco S.A.
WICONA Bausysteme AG
Robert Zapp AG

Taiwan

Gredmann Taiwan
Teledyne-Allvac
TYK Corporation

Thailand

Gredmann Thailand Co. Limited
TSK Chemical Co., Ltd.
UBE (Thailand) Co., Ltd.

Turkey

Palmex A.S.
Türk Maadin Sirketi AS

Ukraine

Hydro Aluminium Kiev Office

United Arab Emirates

Taj Al Mulook Chemicals L.L.C.

United Kingdom

aalco - Slough
Advanced Metals International
Alcan International Ltd.
Alcan Recycling
Alcan Rolled Products UK
Alcan Smelting & Power UK - Kinlochleven
Alcan Smelting & Power UK - Lochaber
Alcan Smelting & Power UK - Lynemouth

Alcoa Extruded Products (UK) Ltd.
Alcodan Metals Ltd.
Aldec Ltd.
Aldec (Scotland) Ltd.
Alform Extrusions Ltd.
Almetex
ALPOCO - The Aluminium Powder Co.
Alumasc Building Products Ltd.
Alumax Extruded Products (UK) Ltd.
Aluminium Corporation
Aluminium Precision Extruders Ltd.
Aluminium Shapes Ltd.
Aluminium Supply Aerospace
Alusuisse UK Ltd.
AMAG UK Ltd.
AMC - Aerospace Metal Composites
Anglesey Aluminium Metal Ltd.
Anglo Blackwells Ltd.
Apollo Metals (UK) Ltd.
ASP International Ltd.
ASP Spectralite Ltd.
Ayrton & Partners Ltd.
Baco Consumer Products
Baco Contracts
Baco Metal Centres
BAI - British Aluminium Speciality
Extrusions
BAI - British Aluminium Tubes Ltd.
Barclays Metals
Bernhard Metals (UK) Ltd.
Boal UK Ltd.
British Alcan Aluminium plc
British Aluminium Extrusions
British Aluminium Ltd.
British Aluminium Plate
British Aluminium Wire
Ronald Britton & Co.
Brock Metal Company
Bunting Titanium Ltd
Calder Aluminium Ltd.
Capalex - Capital Aluminium Extrusions
CFP - Cold Formed Products Ltd.
Chadwicks of Bury Ltd
Coleshill Aluminium Ltd.
Deeside Aluminium Ltd.
Diemakers Ltd.
Distributorcap Ltd.
Ecumet (UK) Ltd.
EMP Technologies
Generation Metals International Ltd.
Glynwed Metal Services
Goodfellow Cambridge Ltd.
Heraeus Silca & Metals Ltd.
High Duty Alloys - HDA Forgings Ltd.
High Tech Tubes Ltd.
Hoogovens Aluminium Building Systems
Hoogovens Aluminium UK Ltd.
Hydro Aluminium Alupres Ltd.
Hydro Aluminium Century Ltd.
Hydro Aluminium Futuretools Ltd.
Hydro Aluminium Metals Ltd.
Hydro Aluminium Nordisk Aviation
Products Ltd.
Hydro Aluminium Profiler UK Ltd.
Hydro Aluminium Rolled Products Ltd.
Hydro Aluminium Sales & Trading UK
Indalex Ltd.
Kaye Aluminium plc
Krupp Hoesch Steel Ltd.
Lawson Mardon Packaging Ltd.
Lawson Mardon Star Ltd.
London & Scandinavian Metallurgical Co.
Luxfer Gas Cylinders
Magnesium Elektron
MEL Chemicals
Metal Agencies Ltd.
Metallisation Service Ltd.

32 Manufacturers & Suppliers - Countries

United Kingdom (continued)

Mifa Aluminium Precision Ltd.
Mil-Ver Metal Co. Ltd.
Minalex
Monarch Aluminium Ltd
F.E. Mottram (Non-Ferrous)Ltd.
Nemco Metals International
Norsk Hydro (UK) Ltd.
Norton Aluminium Products Ltd.
Osprey Metals Ltd.
Pechiney UK
Portal Products Ltd
Raufoss Automotive (UK) Ltd.
Rio Tinto Aluminium Ltd.
Rowan Cable Products Ltd.
SAPA Holdings Ltd.
SAPA Ltd.
SECO Aluminium Ltd.
Securistyle Ltd
Soro Ltd.
Spa Aluminium Ltd.
Spartal Ltd
Superform Aluminium
B.A. Taylor (Metals) Ltd.
Technal Viking
Teledyne-Allvac
Textron Systems
Thyssen Garfield
Thyssen Garfield Aerospace
Thyssen Garfield Ltd.
Thyssen Garfield Processing
Timet UK Ltd
Titanium International Ltd.
Titanium Products Ltd.
TYK Corporation
Universal Steels & Aluminium Ltd.
VAW Aluminium
Worcester Aluminium Alloys Ltd.

United States of America

Arizona:

The Aberly Group
Alumax Corporation

California:

Alumat Inc.
Alyn Corporation
Harvey Titanium Ltd.
Hydro Aluminum Nordisk Aviation
Products, Inc.
Kaiser Aluminum International
Luxfer USA Ltd.
Mark Metals Inc.
Paramount Extrusions Co.
Superform USA Inc.
Supra Alloys Inc.
Titanium Industries, Inc.
United Alloys Inc.
Williams Titanium Group

Colorado:

Dow Magnesium
TIMET

Connecticut:

Aerodyne Ulbrich Alloys
Pechiney World Trade
Suisman Titanium Corp.

Florida:

Dow Latin America
Hydro Aluminium Rockledge Inc.
Titanium Industries, Inc.
Universal Stainless Inc

Georgia:

Metal Experts International
Reynolds Aluminium

Illinois:

Plymouth Tube Company
Precision Extrusions Inc
Spectrulite Consortium Inc.
Timminco Metals
Titanium Industries, Inc.
TYK Corporation
Vulcanium Corp.

Indiana:

High Performance Alloys, Inc.

Kentucky:

Cardinal Aluminium Co.
Hydro Aluminum Louisville, Inc.

Massachusetts:

Dynamet Technology Inc.
National Northeast Corporation
Nuclear Metals, Inc.
Pioneer Metals & Technology Inc.
Shen Wei East-West Trading Corp. Ltd.
Textron Systems

Michigan:

Dow Chemical Company
Dow Magnesium
Dow USA
Global Titanium Inc.
Howmet Corporation
Hydro Aluminum Adrian, Inc.
Hydro Aluminum Automotive Structures
Hydro Aluminum Cedar Tools Inc.
Hydro Magnesium
International Extrusions
Reynolds International Service Company
Reynolds Metals Company
Tico Titanium, Inc.
TYK Corporation

Minnesota:

Alexandria Extrusion Company
Exact Extrusion Division

Mississippi:

Hydro Aluminum Puckett, Inc.

Missouri:

Conalco - Consolidated Aluminium Corp.
Diemakers Inc.
Dow USA
Hitchiner Manufacturing Co., Inc.

New Hampshire:

Aavid Thermal Technologies, Inc.
Hitchiner Manufacturing Co., Inc.
Metal Casting Technology, Inc.

New Jersey:

Alpac International USA
AMMCO- American Modern Metals Corp.
Hoogovens Aluminium USA Corp.
Magnesium Elektron
Reade Manufacturing
Titanium Industries Inc.

New York:

ALCOA - Aluminium Company of America
ESM II Inc.
Interlink Metals & Chemicals
Metallurg Inc.
Mitsui & Co. (USA) Inc.
Norsk Hydro USA Inc.
Shieldalloy Metallurgical Corporation
Sumitomo Corporation of America
Taiyuan East-United Smelt Magnesium
UBE Industries (America), Inc.
VAW Products Inc.

North Carolina:

Teledyne-Allvac

Ohio:

AstroCosmos Metallurgical Inc.
Brush Wellman Inc.
Dow USA
The Duriron Company
Garfield Alloys Inc.
General Extrusions, Inc
Powder Alloy Corporation
RMI Titanium Company

Oklahoma:

IMCO Recycling Inc.

Oregon:

OREMET Titanium
TIMET Castings Corporation
Titanium Products, Inc.
Wah Chang

Pennsylvania:

ALCOA - Aluminium Company of America
AMETEK Specialty Products Division
B&G Manufacturing Co., Inc.
Dynamet Incorporated
Lord Corporation
Nuson Inc.
Structural Laminates Co.
Titanium Hearth Technologies, Inc.
Titanium Wire Corp.
TYK Corporation
US Vanadium Corporation
Westinghouse Electric Corporation

Philadelphia:

Goodfellow Corporation

Texas:

Dow Chemical Company
Ireland Alloys Inc.
Nova Titanium Inc.
Phoenix
Timminco Metals
Titanium Engineers, Inc.
Titanium Industries, Inc.

Utah:

MagCorp - Magnesium Corp. of America
Titanium Powder Specialists, LLC

Virginia:

Dow USA
Reynolds Aluminum Supply Company
Reynolds International Inc.
Reynolds Metals Company
Reynolds Metals Company (Bellwood)

Washington:

Sandvik Special Metals Corp.

GROUP AFFILIATIONS

Including companies acting as agents and regional sales offices - sorted by country. The actual nature of the relationship is often not clear from company literature.

Aerospace Metals, Inc.

Suisman Titanium Corp. Connecticut - United States of America

Alcan

Alcan Austria GmbH A-1030 Wien - Austria
 Alcan Aluminium Ltd. Montreal - Canada
 Alcan Deutschland GmbH DK-2605 Brønby - Denmark
 Alcan Deutschland GmbH SF-02201 Espoo - Finland
 Alcan France F-31037 Toulouse - France
 Alcan Laminés France SA F-28111 Lucé - France
 Alcan Toyo Europe F-64490 Accous - France
 Alcan Toyo Europe F-78600 Maisons Laffitte - France
 Alcan Deutschland GmbH D-06469 Nachterstedt - Germany
 Alcan Deutschland GmbH D-58507 Lüdenscheid - Germany
 Alcan Deutschland GmbH D-90441 Nürnberg - Germany
 Alcan Deutschland GmbH D-58840 Plettenberg-Ohle - Germany
 Alcan Deutschland GmbH D-37075 Göttingen - Germany
 Alcan Deutschland GmbH D-65726 Eschborn - Germany
 Alcan Deutschland GmbH & Co. D-13509 Berlin - Germany
 Aluminium Norf D-41468 Neuss - Germany
 Alcan Deutschland GmbH H-1026 Budapest - Hungary
 INDAL - Indian Aluminium Company Calcutta - India
 Alcan Alluminio SPA I-10013 Borgofranco d'Ivrea - Italy
 Alcan Alluminio SpA I-20091 Bresco. Milano - Italy
 Alcan Alluminio SpA I-20090 Pieve Emanuele. Milano - Italy
 Alcan Alluminio SpA I-20030 Senago. Milano - Italy
 Alcan Aluminium Products N.V. SA NL-3316 GH Dordrecht - Netherlands
 Vigeland Metal Refinery A/S N-4701 Kristiansand - Norway
 Alcan Ibérica sa P-2775 Parede Lisbon - Portugal
 Alcan Ibérica sa E-28020 Madrid - Spain
 Productos Aluminio do Consumo SA E-28820 Coslada-Madrid - Spain
 Alcan Deutschland GmbH S-422 46 Hisinga-Backa - Sweden
 Alcan Rorschach AG CH-9400 Rorschach - Switzerland
 Alcan International Ltd. Oxfordshire - United Kingdom
 Alcan Recycling Cheshire - United Kingdom
 Alcan Rolled Products UK Newport, Gwent - United Kingdom
 Alcan Rolled Products UK Falkirk, Scotland - United Kingdom
 Alcan Rolled Products UK Glasgow, Scotland - United Kingdom
 Alcan Smelting & Power UK - Kinlochleven Argyll, Scotland - United Kingdom
 Alcan Smelting & Power UK - Lochaber Inverness, Scotland - United Kingdom
 Alcan Smelting & Power UK - Lynemouth Northumberland - United Kingdom
 British Alcan Aluminium plc Buckinghamshire - United Kingdom
 Technal Viking Leeds - United Kingdom
 Technal Viking Hampshire - United Kingdom

Alcoa

Alcoa Extruded Products (UK) Ltd. Swansea, Wales - United Kingdom
 Alcoa - Aluminium Company of America New York - United States of America
 Alcoa - Aluminium Company of America Pennsylvania - United States of America

Alcoa-Akzo (USA)

Structural Laminates BV NL-2629 HT Delft - Netherlands
 Structural Laminates Co. Pennsylvania - United States of America

Allegheny Teledyne (USA)

Teledyne-Allvac S.A. F-92658 Boulogne-Billancourt - France
 Teledyne-Allvac D-65189 Wiesbaden - Germany
 Teledyne-Allvac Tokyo - Japan
 Teledyne-Allvac Moscow - Russia
 Teledyne-Allvac Taipei - Taiwan
 Teledyne-Allvac Birmingham - United Kingdom
 Teledyne-Allvac North Carolina - United States of America
 Wah Chang Oregon - United States of America

Alusuisse-Lonza (CH)

Alusuisse Austria GmbH A-5620 Schwarzach - Austria
 Alusuisse Austria GmbH A-1121 Wien - Austria
 SA Alusuisse Guy Geisler NV B-1190 Bruxelles (Vorst) - Belgium
 Aluminium Decin spol. sr.o. CZ-40535 Decin - Czech Republic
 Alusuisse CMIC SA F-77330 Ozoir le Ferrière - France
 Alusuisse France SA F-89600 Saint-Florentin - France
 BDW GmbH & Ko KG D-85570 Markt Schwaben - Germany
 Alusingen GmbH D-78221 Singen/Hohentwiel - Germany
 Alusuisse Singen GmbH D-78221 Singen (Hohentwiel) - Germany
 Kapa GmbH D-49090 Osnabrück - Germany
 Alusuisse-Lonza Hungaria Kft. H-1088 Budapest - Hungary
 Alusuisse Italia SpA I-20124 Milano - Italy
 Alusuisse Costa srl I-40127 Bologna - Italy
 Alusuisse Nederland B.V. NL-4800 DJ Breda - Netherlands
 Alusuisse España SA E-08750 Molins de Rei (Barc.) - Spain
 Airex AG CH-9320 Arbon - Switzerland
 Alusuisse Allega AG CH-8048 Zürich - Switzerland
 Alusuisse Aluminium Suisse SA CH-3965 Chippis - Switzerland
 Alusuisse Aluminium Suisse SA, Sierre CH-3960 Sierre - Switzerland
 Alusuisse-Lonza Holding Ltd. CH-8034 Zürich - Switzerland
 Alusuisse Technology/Management CH-8212 Neuhausen/Reinfall - Switzerland
 Alusuisse UK Ltd. Wolverhampton - United Kingdom
 Conalco - Consolidated Aluminium Corp. Missouri - United States of America

AMAG Austria Metall AG (Austria)

AMAG Ranshofen Walzwerk GesmbH A-5282 Ranshofen - Austria
 AMAG France Sarl F-68000 Colmar - France
 AMAG Aluminiumwerk Unna AG D-59425 Unna - Germany
 AMAG Benelux B.V. Netherlands
 AMAG UK Ltd. Surrey - United Kingdom

Apollo Metals

Apollo Metal SA F-78310 Coignières - France
 Apollo Metall GmbH D-63110 Rodgau - Germany
 Apollo Metals (UK) Ltd. Birmingham - United Kingdom

Armco Inc. (USA)

Armco Sarl F-78196 Trappes - France

AST / Titania (I) - Deutsche Titan (D)

S.A. Aciers Marathon Staal N.V. B-2710 Hoboken - Belgium
 Oy Algol AB SF-02611 Espoo - Finland
 Deutsche Titan GmbH D-45143 Essen - Germany
 Pianimpianti International S.R.L. I-20123 Milano - Italy
 Titania S.p.A. I-05100 Terni - Italy
 VSG Netherland B.V. NL-2501 CC Den Haag - Netherlands
 Thyssen Portugal P-2580 Alenquer - Portugal
 Thyssen Aceros Especiales S.A. E-08100 Martorrolles (Barc.) - Spain
 G & L Beijer - Import och Export AB S-10397 Stockholm - Sweden
 Robert Zapp AG CH-8155 Niederhasli - Switzerland
 Krupp Hoesch Steel Ltd. Derbyshire - United Kingdom

34 Group Affiliations

British Aluminium Holdings (UK)

Aage Christensen AS	DK-2500 Copenhagen - Denmark
ACI	F-78490 Méré - France
Baco Metal Centres (Dublin) Ltd.	Dublin, Eire - Ireland
Pilotech HB	S-162 45 Vällingby - Sweden
Atech AG	CH-4127 Birsfelden - Switzerland
Almetex	Merseyside - United Kingdom
Aluminium Corporation	Gwynedd, Wales - United Kingdom
Aluminium Supply Aerospace	London - United Kingdom
Aluminium Supply Aerospace	Manchester - United Kingdom
Baco Contracts	Buckinghamshire - United Kingdom
Baco Consumer Products	Buckinghamshire - United Kingdom
Baco Metal Centres	Hertfordshire - United Kingdom
Baco Metal Centres	Glasgow, Scotland - United Kingdom
British Aluminium Ltd.	Manchester - United Kingdom
British Aluminium Extrusions	Oxfordshire - United Kingdom
British Aluminium Plate	Birmingham - United Kingdom
British Aluminium Speciality Extrusions	Cumbria - United Kingdom
British Aluminium Tubes Ltd.	Worcestershire - United Kingdom
British Aluminium Wire	Swansea, Wales - United Kingdom
Luxfer Gas Cylinders	Nottingham - United Kingdom
Magnesium Elektron	Manchester - United Kingdom
MEL Chemicals	Manchester - United Kingdom
Minalex	Oxfordshire - United Kingdom
Superform Aluminium	Worcester - United Kingdom
Luxfer USA Ltd.	California - United States of America
Magnesium Elektron	New Jersey - United States of America
Reade Manufacturing	New Jersey - United States of America
Superform USA Inc.	California - United States of America

Brush Wellman (USA)

Brush Wellman GmbH	D-70499 Stuttgart - Germany
Brush Wellman (Japan) Ltd.	Tokyo - Japan
Brush Wellman Ltd.	Berkshire - United Kingdom
Brush Wellman Inc.	California - United States of America
Brush Wellman Inc.	Illinois - United States of America
Brush Wellman Inc.	Michigan - United States of America
Brush Wellman Inc.	New Jersey - United States of America
Brush Wellman Inc.	Ohio - United States of America

Comalco

APS Chemicals	Victoria - Australia
K-Trade Ltda	Sao Jose - Brazil
Verlap Quimica Ltda.	Sao Paulo - Brazil
Gredmann China Ltd.	Guangzhou - China
Conzinc Asia India	Bangalore - India
P.T. Altrindo Yasa Niagatama	Jakarta - Indonesia
P.T. Justus Kimiaraya	Jakarta - Indonesia
Rio Tinto Japan	Tokyo - Japan
Conzinc (Malaysia) Sdn Bhd.	Petaling Jaya - Malaysia
Harrisons Trading (Peninsular) Sdn Bhd.	Selangor Darul Ehsan - Malaysia
APS Chemicals	Auckland - New Zealand
Comalco New Zealand Limited	Auckland - New Zealand
Conzinc Asia (Philippines), Inc.	Metro Manila - Philippines
Conzinc Asia (Korea) Limited	Seoul - South Korea
Daebong Corporation	Seoul - South Korea
Gredmann Taiwan	Taipei - Taiwan
Gredmann Thailand Co. Limited	Bangkok - Thailand
TSK Chemical Co., Ltd.	Samutprakam - Thailand
Taj Al Mulook Chemicals L.L.C.	Dubai - United Arab Emirates
Metal Experts International	Georgia - United States of America

Concentric

Concentric sarl	F-78150 Le Chesney - France
Norton Aluminium Products Ltd.	Staffordshire - United Kingdom

Dead Sea Works / Volkswagen

Dead Sea Magnesium Ltd.	Be'er Sheva - Israel
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Diemakers Inc. (USA)

Diemakers Ltd.	Berkshire - United Kingdom
Diemakers Inc.	Missouri - United States of America

Distributorcap (UK)

Aldevienne Aluminium SA	F-86150 Le Vigeant - France
Calder Aluminium Ltd.	Derbyshire - United Kingdom
Distributorcap Ltd.	Derbyshire - United Kingdom
EMP Technologies	Derbyshire - United Kingdom

Dow

Emprapas Dow	Brazil
Dow Quimica S.A.	São Paulo - Brazil
Dow Canada	Ontario - Canada
Dow Europe	D-70599 Stuttgart - Germany
Dow Pacific	Wanchai - Hong Kong
Dow Japan Ltd.	Nagoya - Japan
Dow Japan Ltd.	Osaka - Japan
Dow Japan Ltd.	Tokyo - Japan
Dow Latin America	Puerto Rico
Dow Europe S.A.	CH-8810 Horgen - Switzerland
Dow Chemical Company	Michigan - United States of America
Dow Chemical Company	Texas - United States of America
Dow Latin America	Florida - United States of America
Dow Magnesium	Colorado - United States of America
Dow Magnesium	Michigan - United States of America
Dow USA	Ohio - United States of America
Dow USA	Michigan - United States of America
Dow USA	Virginia - United States of America
Dow USA	Missouri - United States of America

Dynamet Inc. (USA)

Dynamet Incorporated	Pennsylvania - United States of America
Dynamet Technology Inc.	Massachusetts - United States of America

Elval - Hellenic Aluminium Industry SA (GR)

Genecos SA	F-75016 Paris - France
Tepros Metall	D-40210 Düsseldorf - Germany
Elval - Hellenic Aluminium Industry SA	GR-32011 Inofita-Viotia - Greece

Erbslöh AG

Rolltech A/S	Hjorring - Denmark
EA Erbslöh Aluminium	F-51400 Sept-Saulx - France
Bergische Pulverbeschichtungs-Technik GmbH	Velbert - Germany
Ekonal Bausysteme GmbH & Co. KG	Velbert - Germany
Erbslöh Aluminium AG	D-42520 Velbert (Neuiges) - Germany
Ekonal Italia sri	Bozen - Italy

Erbslöh AG/Sintermetallwerk Krebsöge

Peak Werkstoff GmbH	Velbert - Germany
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Flandria Aluminium (F)

Alutrade SA	B-7784 Bas Wameton - Belgium
Flandria Aluminium	F-59560 Wameton - France

Girebronze Group

SENPOF Girebronze	F-91349 Massy - France
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Glynwed

aalco - Slough	Berkshire - United Kingdom
Glynwed Metal Services	Surrey - United Kingdom

Goodfellow

Goodfellow SARL	F-59000 Lille - France
Goodfellow GmbH	D-61213 Bad Nauheim - Germany
Goodfellow Cambridge Ltd.	Cambridge - United Kingdom
Goodfellow Corporation	Philadelphia - United States of America

Grohmann (D)

A.T.M. (Aluminium Technique Moselle)	F-57380 Falquemont - France
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D'Halluin (F)

Ets. Georges D'Halluin	F-59813 Lesquin - France
SMH	F-51100 Reims - France

Hampson Industries plc (UK)

Aldec Ltd.	West Midlands - United Kingdom
Aldec (Scotland) Ltd.	Lanarkshire - United Kingdom
Mil-Ver Metal Co. Ltd.	West Midlands - United Kingdom

Haynes International Inc. (USA)

Haynes International	F-95061 Cergy Pontoise - France
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High Tech Tubes

High Tech Tubes Ltd.	Co. Kerry, Eire - Ireland
High Tech Tubes Ltd.	Surrey - United Kingdom

Hitchiner Manufacturing Co., Inc.

Hitchiner Manufacturing Co., Inc.	Missouri - United States of America
Hitchiner Manufacturing Co., Inc.	New Hampshire - United States of America
Metal Casting Technology, Inc.	New Hampshire - United States of America

Hoogovens Groep

Alucor Australia Pty Ltd.	New South Wales - Australia
Hoogovens Aluminium Verkauf GESMBH	A-2100 Korneuburg - Austria
Dufalco NV	B-2570 Duffel - Belgium
Hoogovens Aluminium Building Systems NV	B-2570 Duffel - Belgium
Hoogovens Aluminium International NV	B-2570 Duffel - Belgium
Hoogovens Aluminium NV	B-2570 Duffel - Belgium
Hoogovens Aluminium NV Profiel Centrum	B-2570 Duffel - Belgium
Hoogovens Aluminium Service Center NV	B-2570 Duffel - Belgium
Phenix Aluminium S.A.	B-4400 Ivoz-Ramet - Belgium
Hoogovens Technical Service do Brasil Ltda.	São Paulo - Brazil
Hoogovens Aluminium Quebec & Co Ltd.	Montreal - Canada
Hoogovens Technical Services	Ontario - Canada
Hoogovens Technical Services China	Beijing - China
Tatrarex Precision Castings spol. sr.o.	Koprivnice - Czech Republic
Neumeyer CR, spol. sr.o	Oslavany - Czech Republic
Hoogovens Aluminium Danmark A/S	DK-2630 Taastrup - Denmark
Hoogovens Aluminium Waltzprodukte	DK-3050 Humlebaek - Denmark
Hoogovens Aluminium France SA	F-92404 Courbevoie - France
Hoogovens Aluminium Bausysteme GmbH	D-56033 Koblenz - Germany
Hoogovens Aluminium GmbH	D-56070 Koblenz - Germany
Hoogovens Aluminium GmbH	D-41415 Neuss - Germany
Hoogovens Aluminium Hüttenwerk GmbH	D-46549 Voerde - Germany
Hoogovens Aluminium Metall GmbH	D-41415 Neuss - Germany
Hoogovens Aluminium Profiltechnik GmbH	D-56033 Koblenz - Germany
Hoogovens Aluminium Profiltechnik GmbH	D-88264 Vogt - Germany
Hoogovens Aluminium Profitechnik Bitterfeld GmbH	D-06731 Bitterfeld - Germany
Hoogovens Aluminium Sidal GmbH	D-46101 Oberhausen - Germany
Hoogovens Aluminium Walzprodukten GmbH	D-56033 Koblenz - Germany
Neumeyer Fließpressen GmbH	D-90491 Nürnberg - Germany
Hoogovens Technical Services India,	New Delhi - India
Hoogovens Aluminium Europe Srl.	I-20143 Milan - Italy
Hoogovens Aluminium Italia SpA	I-20094 Corsico (Milan) - Italy
Hoogovens Aluminium Japan Ltd.	Tokyo - Japan
Aluminium Delfzijl	NL-9930 AC Delfzijl - Netherlands
Amefo BV - Advanced Metal Forming	NL-8000 M Zwolle - Netherlands
Brabant Alucast International BV	NL-5340 AN Oss - Netherlands
Cirex BV	NL-7600 AB Almelo - Netherlands
De Globe/Globon BV	NL-5950 M Belfeld - Netherlands
Hoogovens Beheermaatschappij Ind Prod	NL-1950 M Velsen-Noord - Netherlands
Hoogovens Corporate Services BV	NL-1970 CA IJmuiden - Netherlands
Hoogovens Aluminium BV	NL-1970 CA IJmuiden - Netherlands
Hoogovens Aluminium Primary Products	NL-1970 CA IJmuiden - Netherlands
Hoogovens Aluminium Sales BV	NL-2900 EB Capelle a/d IJssel - Netherlands
Hoogovens Aluminium Sales BV	NL-2984 AT Ridderkerk - Netherlands
Hoogovens Hylite BV	NL-1970 CA IJmuiden - Netherlands
Hoogovens Research & Development	NL-1970 CA IJmuiden - Netherlands
Hoogovens Technical Services BV	NL-1970 CA IJmuiden - Netherlands
Hoogovens Technical Services	NL-3503 RL Utrecht - Netherlands
HTS Energy & Environment BV	NL-1970 CA IJmuiden - Netherlands
HTS Tech. & Operational Assistance BV	NL-1970 CA IJmuiden - Netherlands
Koninklijke Hoogovens	NL-1970 CA IJmuiden - Netherlands
CV Scheuer Verzekeringen	NL-1940 EB Beverwijk - Netherlands
CV Willis Corroon Scheuer	NL-1000 BH Amsterdam - Netherlands
Hoogovens Technical Services Poland	Katowice - Poland
Hoogovens Aluminium Portugal Lda.	P-1200 Lisbon - Portugal

Hoogovens Aluminium España S.A.	E-08002 Barcelona - Spain
Hoogovens Aluminium España S.A.	E-28010 Madrid - Spain
Hoogovens Aluminium NV filial Sverige	S-40125 Goteborg - Sweden
Hoogovens Aluminium Building Systems Ltd.	Merseyside - United Kingdom
Hoogovens Aluminium UK Ltd.	Birmingham - United Kingdom
Hoogovens Aluminium UK Ltd.	Hertfordshire - United Kingdom
Hoogovens Aluminium USA Corp.	New Jersey - United States of America
Nuson Inc.	Pennsylvania - United States of America

Inometa

Inometa France sarl	F-92517 Boulogne - France
Inometa	D-32052 Herford - Germany

Ireland Alloys (Holdings) Ltd.

Ireland Alloys Inc.	Texas - United States of America
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Itochu Corp.

Itochu Non-Ferrous Materials Co., Ltd.	Tokyo - Japan
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ITW

Eurofoil S.A.	L-3401 Dudelange - Luxembourg
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G. James (Australia)

G. James Australia Pty. Ltd.	Brisbane - Australia
G. James Industries (Malaysia) Sdn. Bhd.	Johor, Malaysia - Malaysia
G. James Singapore Pte. Ltd.	Singapore

Langley Forge

Bunting Titanium Ltd	Birmingham - United Kingdom
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Lawson Mardon Packaging

Lawson Mardon Packaging Inc.	Ontario - Canada
Lawson Mardon Packaging SA	F-92100 Boulogne - France
Lawson Mardon Packaging Ltd.	Bristol - United Kingdom
Lawson Mardon Star Ltd.	Shropshire - United Kingdom

Metallurg (USA)

Metallurg do Brasil Ltda	Rio de Janeiro - Brazil
Metallurg (Canada)	Toronto - Canada
Gesellschaft fur Elektrometallurgie mbH	D-40237 Düsseldorf - Germany
Metalchimica Srl	I-10100 Torino - Italy
Metallurg (Far East) Ltd.	Tokyo - Japan
Comercial e Industrial Minero Metallurgica SA	Mexico 11590 - Mexico
Metallurg (South Africa) Pty Ltd.	Germiston - South Africa
Brandau y Compania SA	E-28010 Madrid - Spain
Aktiebolaget Ferrolegeringer	S-10388 Stockholm - Sweden
Ferrolegeringer Aktiengesellschaft	CH-8034 Zürich - Switzerland
Türk Maadin Sirketi AS	Istanbul - Turkey
ALPOCO - The Aluminium Powder Co. Ltd.	Anglesey, Wales - United Kingdom
ALPOCO - The Aluminium Powder Co. Ltd.	West Midlands - United Kingdom
London & Scandinavian Metallurgical Co. Ltd	London - United Kingdom
London & Scandinavian Metallurgical Co. Ltd	S. Yorkshire - United Kingdom
Metallurg Inc.	New York - United States of America
Shieldalloy Metallurgical Corporation	New York - United States of America

MIFA Group

Bureau Commercial MIFA	F-67000 Strasbourg - France
Mifa Aluminium BV	NL-5928 PX Venlo - Netherlands
Mifa Aluminium Precision Ltd.	Stratford-upon-Avon - United Kingdom

Mitsui & Co. Ltd. (Japan)

Mitsui & Co. (USA) Inc.	New York - United States of America
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Noranda Inc. (Canada)

Noranda Metallurgy Inc	Toronto - Canada
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36 Group Affiliations

Norsk Hydro

Hydro Aluminium Nenzing GmbH	A-6710 Nenzing - Austria
Hydro Aluminium EXPA S.A.	B-4700 Eupen - Belgium
Hydro Aluminium EXPA S.A. - Remelt	B-4730 Raeren - Belgium
Hydro Aluminium Raeren SA NV	B-4730 Raeren - Belgium
Hydro Aluminium Seneffe SA	B-7180 Seneffe - Belgium
Hydro Magnesium	B-1200 Brussels - Belgium
Raufoss Automotive Belgium NV	B-9042 Gent - Belgium
WICONA Benelux N.V.	B-2200 Herentals - Belgium
Mineração Rio do Norte S.A.	Rio de Janeiro - Brazil
Hydro Magnesium Marketing	Québec - Canada
Norsk Hydro Canada Inc.	Québec - Canada
Shanghai Representative Office of Norsk Hydro	Shanghai - China
Hydro Czech Republic s.r.o.	CZ-111 21 Praha - Czech Republic
Hydro Aluminium Automotive Structures a.s	DK-6270 Tønder - Denmark
Hydro Aluminium HYCOT a.s	DK-6240 Løgumkloster - Denmark
Hydro Aluminium Nordisk Aviation Products a/s	DK-2791 Dragør - Denmark
Hydro Aluminium Rolled Products	DK-2100 København Ø - Denmark
Hydro Aluminium Tønder a.s.	DK-6270 Tønder - Denmark
Heat Transfer Tønder a.s	DK-6270 Tønder - Denmark
WICONA Scandinavia AB (Denmark)	DK-3600 Frederikssund - Denmark
Hydro Aluminium Suomi Oy	SF-02700 Grankulla - Finland
Alunord snc.	F-27416 Louviers - France
Hydro Aluminium Châteauroux s.n.c.	F-36000 Châteauroux - France
Hydro Aluminium Expal	F-28112 Lucé - France
Hydro Aluminium Expal (Pinon) s.n.c.	F-02320 Pinon - France
Hydro Aluminium Extrusion Service sarl	F-28112 Lucé - France
Hydro Aluminium France s.n.c.	F-92502 Rueil-Malmaison - France
Hydro Aluminium I.T.C. s.n.c.	F-28111 Lucé - France
Hydro Aluminium Sales and Trading Snc.	F-92751 Nanterre - France
Wiconna S.A.	F-69634 Venissieux - France
Hydro Aluminium Bellenberg GmbH	D-89287 Bellenberg - Germany
Hydro Aluminium Deutschland GmbH	D-40883 Ratingen/Düsseldorf - Germany
Hydro Aluminium Uphusen GmbH	D-28817 Achim - Germany
Hydro Magnesium GmbH	D-46211 Bottrop - Germany
WICONA Bausysteme GmbH	D-89077 Ulm - Germany
Hydro Aluminium Systems Hellas S.A.	Athens - Greece
Friguia Guinea	Conakry - Guinea
Nordisk Aviation Products Asia Ltd.	Wanchai - Hong Kong
Norsk Hydro Far East Ltd.	Wanchai - Hong Kong
Indal Hydro Extrusion Ltd.	Bangalore - India
Orissa Extrusions Ltd.	Orissa - India
Hydro Alluminio Omago SpA	I-20060 Ornago (MI) - Italy
Hydro Alluminio Atessa S.p.a.	I-66040 Atessa (CH) - Italy
Hydro Aluminium Milano	I-20090 Segrate (MI) - Italy
Hydro Aluminium Systems S.p.a.	I-20060 Ornago (MI) - Italy
Hyspeed S.p.a.	I-30030S.Maria di Sala/Venezia - Italy
Italma	I-20060 Ornago (MI) - Italy
Hydro Aluminium Jamaica	Manchester (Jamaica) - Jamaica
Hydro Magnesium Japan Office	Tokyo - Japan
Norsk Hydro ASA	Tokyo - Japan
Hydro Aluminium Clervaux S.A.	L-9748 Clervaux Eselborn - Luxembourg
Hydro Aluminium	NL-4802 HV Breda - Netherlands
Hydro Aluminium Rolled Products	NL-2900 Capelle aan den Yssel - Netherlands
Hydro Aluminium a.s.	N-1321 Stabekk - Norway
Hydro Aluminium a.s	N-1321 Stabekk - Norway
Hycast a.s	N-6601 Sunndalsøra - Norway
Hydeq AS	N-5870 Øvre Årdal - Norway
Hydro Aluminium a.s	N-5875 Årdalstangen - Norway
Hydro Aluminium a.s	N-5870 Øvre Årdal - Norway
Hydro Aluminium a.s	N-4265 Håvik - Norway
Hydro Aluminium A/S	N-3081 Holmestrand - Norway
Hydro Aluminium a.s	N-5901 Høyanger - Norway
Hydro Aluminium a.s	N-6601 Sunndalsøra - Norway
Hydro Aluminium A/S - AluCoat	N-3081 Holmestrand - Norway
Hydro Aluminium Alupluss	N-1321 Stabekk - Norway
Hydro Aluminium Aluserv a.s	N-5875 Årdalstangen - Norway
Hydro Aluminium Auto Accessories AS	N-3081 Holmestrand - Norway
Hydro Aluminium Conductors A/S	N-3192 Horten - Norway
Hydro Aluminium Extrusion Tools a.s	N-4250 Kopervik - Norway
Hydro Aluminium Formtech a.s	N-3081 Holmestrand - Norway
Hydro Aluminium Fundo a.s	N-5901 Høyanger - Norway
Hydro Aluminium Fundo AS, Sales Vækereø	N-1321 Stabekk - Norway
Hydro Aluminium A/S - Holmestrand Mill	N-3081 Holmestrand - Norway
Hydro Aluminium Hydral AS	N-4265 Håvik - Norway

Hydro Aluminium a.s - Hydro Trans	N-4250 Kopervik - Norway
Hydro Aluminium Hydro Utvikling Sogn	N-5875 Årdalstangen - Norway
Hydro Aluminium a.s Karmøy Metallverk	N-4265 Håvik - Norway
Hydro Aluminium Maritime AS	N-2831 Raufoss - Norway
Hydro Aluminium Maritime, Karmøy	N-4262 Avaldsnes - Norway
Hydro Aluminium A/S - Karmøy Mill	N-4265 Håvik - Norway
Hydro Aluminium A/S - Nordisk Aviation Prod.	N-3081 Holmestrand - Norway
Hydro Aluminium Profiler a.s	N-2831 Raufoss - Norway
Hydro Aluminium Profiler a.s, avd. Gran	N-2770 Jaren - Norway
Hydro Aluminium Profiler Karmøy a.s	N-4265 Håvik - Norway
Hydro Aluminium Profiler a.s, avd. Magnor	N-2240 Magnor - Norway
Hydro Aluminium Raufoss Automotive	N-2831 Raufoss - Norway
Hydro Aluminium a.s Rolled Products	N-3081 Holmestrand - Norway
Hydro Aluminium a.s Sunndal	N-6601 Sunndalsøra - Norway
Hydro Aluminium Vekst a.s	N-1321 Stabekk - Norway
Hydro Aluminium Vik Verk a.s	N-5860 Vik I Sogn - Norway
Hydro Equipment AS	N-1321 Stabekk - Norway
Hydro Magnesium Norway	N-3901 Porsgrunn - Norway
Hydro Metal Products (Div.)	N-1321 Stabekk - Norway
Hydroslug a.s	N-5901 Høyanger - Norway
Hydro Stumek a.s	N-5901 Høyanger - Norway
Hyspeed Norway a.s	N-3108 Tønsberg - Norway
Norcable a.s	N-4265 Håvik - Norway
Norsk Hydro a.s.	N-0240 Oslo - Norway
Norsk Hydro ASA	N-3901 Porsgrunn - Norway
Raufoss A/S	N-2831 Raufoss - Norway
Raufoss ASA	N-2831 Raufoss - Norway
Raufoss Automotive AS	N-2831 Raufoss - Norway
Raufoss Hydro Automotive	N-2831 Raufoss - Norway
Scanmag a.s	N-3108 Tønsberg - Norway
Sør-Norge Aluminium A/S	N-5460 Husnes - Norway
WICONA Scandinavia AB	N-2831 Raufoss - Norway
Hydro Aluminium Chrzanów Sp.z.o.o	PL-32-500 Chrzanów - Poland
Wiconna Sp.z.o.o	PL-04-962 Warsaw - Falenica - Poland
Aluport-Matrizas de Portugal Lda.	P-3752 Agueda - Portugal
Estabelecimentos Manuel Ferreira, Lda.	P-1050 Lisboa - Portugal
Hydro Aluminium Portalex S.A.	P-2735 Cacém - Portugal
Tecnilaca Lacagem de Metais, Lda.	P-2726 Mem Martins - Portugal
Hydro Aluminium CIS a.s	RU-119 048 Moscow - Russian Federation
Hydro Aluminium Moscow	RU-119 048 Moscow - Russian Federation
Hydro Aluminium Nordisk Aviation Products	Moscow - Russian Federation
Hydro Aluminium Murmansk	RUS-183 038 Murmansk - Russian Federation
Nordisk Aviation Products Pte. Ltd.	Singapore
Norsk Hydro Asia Pte. Ltd.	Singapore
Hydro Slovakia o.z.	SK-811 02 Bratislava - Slovakia
Slovalco a.s	SK-96563 Ziar Nad Hronom - Slovakia
Talum	Kidncevo - Slovenia
Karam Corporation	Seoul - South Korea
Hydro Alumino La Roca SA	E-08430 La Roca del Valles - Spain
Fundo AB	S-673 22 Charlottenberg - Sweden
Hydro Aluminium Conductors AB	S-721 88 Västerås - Sweden
Hydro Aluminium Profiler AB	S-360 70 Åseda - Sweden
Hydro Aluminium Sverige AB	S-114 46 Stockholm - Sweden
Raufoss Automotive Skultuna AB	S-730 50 Skultuna - Sweden
Wiconna Scandinavia AB	S-360 70 Åseda - Sweden
Hydro Aluminium s.a.	CH-1007 Lausanne - Switzerland
Hydro Aluminium Extrusion	CH-1007 Lausanne - Switzerland
Noralu Walzprodukte AG	CH-8600 Dübendorf - Switzerland
WICONA Bausysteme AG	CH-8010 Zürich - Switzerland
Hydro Aluminium Kiev Office	Kiev - Ukraine
Aluminium Precision Extruders Ltd.	Newport, Gwent - United Kingdom
Hydro Aluminium Alupres Ltd.	Newport, Gwent - United Kingdom
Hydro Aluminium Century Ltd.	County Durham - United Kingdom
Hydro Aluminium Century Ltd.	Dumfriesshire - United Kingdom
Hydro Aluminium Futuretools Ltd.	Gloucester - United Kingdom
Hydro Aluminium Metals Ltd.	Newport, Gwent - United Kingdom
Hydro Aluminium Nordisk Aviation Products	Gatwick Airport - United Kingdom
Hydro Aluminium Nordisk Aviation Products	Heathrow Airport - United Kingdom
Hydro Aluminium Profiler UK Ltd.	Warwick - United Kingdom
Hydro Aluminium Rolled Products Ltd.	West Midlands - United Kingdom
Hydro Aluminium Sales & Trading UK	Hertfordshire - United Kingdom
Norsk Hydro (UK) Ltd.	Middlesex - United Kingdom
Raufoss Automotive (UK) Ltd.	Hereford-Worcester - United Kingdom
Spa Aluminium Ltd.	Kent - United Kingdom
Hydro Aluminium Adrian, Inc.	Michigan - United States of America
Hydro Aluminium Automotive Structures, Inc.	Michigan - United States of America
Hydro Aluminium Cedar Tools Inc.	Michigan - United States of America

Norsk Hydro - continued

Hydro Aluminum Louisville, Inc.	Kentucky - United States of America
Hydro Aluminum Nordisk Aviation Products	California - United States of America
Hydro Aluminum Nordisk Aviation Products	California - United States of America
Hydro Aluminum Puckett, Inc.	Mississippi - United States of America
Hydro Aluminium Rockledge Inc.	Florida - United States of America
Hydro Magnesium	Michigan - United States of America
Norsk Hydro USA Inc.	New York - United States of America

Oetinge

A.L. (Affinage de Lorraine)	F-54730 Gorcy - France
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Oremet (USA)

Titanium Industries Inc.	British Columbia - Canada
Titanium Industries Inc.	Quebec - Canada
Titanium Industries GmbH	D-40472 Düsseldorf - Germany
Titanium International Ltd.	Birmingham - United Kingdom
Oremet Titanium	Oregon - United States of America
Titanium Industries Inc.	California - United States of America
Titanium Industries Inc.	Florida - United States of America
Titanium Industries Inc.	Illinois - United States of America
Titanium Industries Inc.	New Jersey - United States of America
Titanium Industries Inc.	Texas - United States of America
Titanium Wire Corp.	Pennsylvania - United States of America

Pandolfo (I)

Pandolfo Alluminio SRL	I-32020 Lentiai (Belluno) - Italy
Pandolfo Alluminio SRL	I-35030 Sarmeola (PD) - Italy

Pechiney

Affimet - Aluminium Pechiney	F-60208 Compiègne - France
Affimet	F-92048 Paris La Défense - France
Aluminium Pechiney	F-92048 Paris La Défense - France
Aviatube	F-44471 Carquefou - France
Cegedur	F-75360 Paris - France
Cezus	F-92087 Paris La Défense - France
Pechiney	F-92048 Paris La Défense - France
Pechiney Electrometallurgie	F-92087 Paris La Défense - France
Pechiney Hermillon	F-73302 St. Jean de Maurienne - France
Pechiney Rhenalu	F-49460 Montreuil-Juigné - France
Pechiney Rhenalu	F-92087 Paris La Défense - France
Pechiney Rhenalu	F-68600 Neuf-Brisach - France
Pechiney Rhenalu	F-63504 Issoire - France
Pechiney Rhenalu	F-27250 Rugles - France
Pechiney Rhenalu	F-38191 Brignoud - France
Pechiney Rhenalu d'Annecy	F-74961 Cran-Gevrier - France
PHP - Pechiney High Purity	F-92048 Paris La Défense - France
SMG - Sté. Metallurgique de Gerzat	F-63360 Gerzat - France
Softal	F-92115 Clichy - France
Pechiney Aluminium Presswerk GmbH	D-76809 Landau - Germany
Aluminium de Grèce SAIC	GR-10671 Attiki - Greece
Pechiney Japon	Tokyo - Japan
Pechiney UK	Berkshire - United Kingdom
Pechiney World Trade	Connecticut - United States of America

The Pioneer Group, Inc.

Pioneer Metals & Technology Inc.	Massachusetts - United States of America
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Premetalco Inc.

Amalgamet Canada Ltd.	Ontario - Canada
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Queensland Metals Corp. Ltd. (Australia)

Australian Magnesium Corporation	Queensland - Australia
Queensland Metals Corporation Limited	Queensland - Australia

Reynolds Metals Co. (USA)

Reynolds Aluminium France	Guebwiller - France
RADI - Reynolds Aluminium Deutschland Inc.	D-21112 Hamburg - Germany
Reynolds Italy Slim SPA	I-04012 Cisterna di Latina - Italy
Reynolds Aluminium Holland B.V.	NL-3840 AA Harderwijk - Netherlands
INASA-Reynolds	E-31860 Irurzun - Navarra - Spain
Reynolds Aluminium	Georgia - United States of America
Reynolds Aluminum Supply Company	Virginia - United States of America

Reynolds International Inc.	Virginia - United States of America
Reynolds International Service Company	Michigan - United States of America
Reynolds Metals Company	Michigan - United States of America
Reynolds Metals Company	Virginia - United States of America
Reynolds Metals Company (Bellwood)	Virginia - United States of America

RIMA (Brasil)

BRASMAG	Bocaiúva/Minas Gerais - Brazil
RIMA SA	São Paulo - Brazil
RIMA Electrometalurgia SA	Várzea da Palma/Minas Gerais - Brazil
RIMA Industrial SA	Belo-Horizonte/Minas Gerais - Brazil

RTZ/KACC Consortium Co.

Anglesey Aluminium Metal Ltd.	Gwynedd, Wales - United Kingdom
Barclays Metals	London - United Kingdom
Rio Tinto Aluminium Ltd.	London - United Kingdom
Kaiser Aluminum International Incorporated	California - United States of America

Sandvik (S)

Sandvik Steel	S-811 81 Sandviken - Sweden
Osprey Metals Ltd.	Neath - United Kingdom
Sandvik Special Metals Corp.	Washington - United States of America

SAPA

SAPA Danmark A/S	DK-8500 Grenå - Denmark
Oy SAPA Colt Ab	SF-02920 Esbo - Finland
Lacal SNC	F-81450 Le Garric - France
Sapa Aluminium France SNC	F-81450 Le Garric - France
SAPA Aluminium Profile GmbH	D-77613 Offenburg - Germany
Comhan Holland BV	NL-1422 DR Uithoorn - Netherlands
Goedlicht BV	NL-4870 AK Etten Leur - Netherlands
Sapa Nederland BV	NL-9600 AC Hoogeveen - Netherlands
Sapa Aluminium BV	NL-9600 AC Hoogeveen - Netherlands
SAPA A/S	N-2001 Lillestrøm - Norway
A/S SAPA / Vest.	N-5501 Haugesund - Norway
Sapa Poland Ltd	Trzcianka - Poland
Hogstad Aluminium AB	S-595 23 Mjölby - Sweden
Industrilackering i Vetlanda AB	S-574 35 Vetlanda - Sweden
Sapa AB	S-612 22 Finspång - Sweden
Sapa AB	S-411 01 Gothenburg - Sweden
Sapa AB	S-915 21 Robertsfors - Sweden
Sapa AB	S-730 50 Skultuna - Sweden
Sapa AB	S-102 31 Stockholm - Sweden
Sapa AB	S-114 85 Stockholm - Sweden
Sapa AB	S-685 34 Torsby - Sweden
Sapa AB	S-574 81 Vetlanda - Sweden
SAPA - Skandinaviska Aluminium Profiler AB	S-574 81 Vetlanda - Sweden
Vetlanda Profilbäckning AB	S-574 35 Vetlanda - Sweden
Sapa Aluminium Profile AG	CH-6303 Zug - Switzerland
Chadwicks of Bury Ltd	Lancashire - United Kingdom
Monarch Aluminium Ltd	Gloucestershire - United Kingdom
Portal Products Ltd	Gloucestershire - United Kingdom
SAPA Ltd.	Derbyshire - United Kingdom
SAPA Holdings Ltd.	Gloucestershire - United Kingdom
Securistyle Ltd	Gloucestershire - United Kingdom

Se Jong Materials Ltd. (S. Korea)

Alpac International USA	New Jersey - United States of America
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Shen Wei

Shenwei Corporation	Shanxi - China
Eckart Switzerland	CH-4332 Stein - Switzerland
Ecumet (UK) Ltd.	West Sussex - United Kingdom
Shen Wei East-West Trading Corp.	Massachusetts - United States of America
Taiyuan East-United Smelt Magnesium Co.	New York - United States of America

Spectrulite Consortium Inc. (USA)

ASP Spectrulite Ltd.	West Midlands - United Kingdom
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Strategic Minerals Corp.

US Vanadium Corporation	Pennsylvania - United States of America
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38 Group Affiliations

Sumitomo Corporation (J)

Sumitomo Sitex Corp.	Hyogo - Japan
Sumitomo Corporation of America	New York - United States of America

Textron

Textron Systems	Essex - United Kingdom
Textron Systems	Massachusetts - United States of America

Thyssen Garfield

Thyssen Garfield Ltd.	Dublin - Ireland
Thyssen Garfield Ltd.	Birmingham - United Kingdom
Thyssen Garfield Ltd.	Bristol - United Kingdom
Thyssen Garfield Ltd.	Cheshire - United Kingdom
Thyssen Garfield Ltd.	Glasgow, Scotland - United Kingdom
Thyssen Garfield Ltd.	Surrey - United Kingdom
Thyssen Garfield Ltd.	West Yorkshire - United Kingdom
Thyssen Garfield Aerospace	London - United Kingdom
Thyssen Garfield Processing	Birmingham - United Kingdom

Timminco Ltd. - Canada

Timminco Pty. Ltd.	New South Wales - Australia
Timminco Metals	Ontario - Canada
Timminco Metals	Yokohama - Japan
Timminco S.A.	CH-1208 Geneva - Switzerland
Timminco Metals	Illinois - United States of America
Timminco Metals	Texas - United States of America

Titanium Metals Corp. (USA)

TIMET France	F-91000 Evry - France
TIMET Savoie	F-95023 Cergy Pontoise - France
TIMET UK Ltd	Birmingham - United Kingdom
TIMET	Colorado - United States of America
TIMET Castings Corporation	Oregon - United States of America
Titanium Hearth Technologies, Inc.	Pennsylvania - United States of America

Toyo Aluminium KK (Japan)

Toyal Europe SA	F-78600 Le Mesnil-le-Roi - France
Toyo Aluminium KK	Osaka - Japan

TYK Corporation

TYK Corporation	Ontario - Canada
TYK Corporation	Quebec - Canada
TYK Corporation	F-59130 Lambersart - France
TYK Corporation	D-47198 Duisburg - Germany
TYK Corporation	Tokyo - Japan
TYK Corporation	Kaohsiung-Hsien - Taiwan
TYK Corporation	Durham - United Kingdom
TYK Corporation	Illinois - United States of America
TYK Corporation	Michigan - United States of America
TYK Corporation	Pennsylvania - United States of America

UBE (J)

UBE Sydney Office	New South Wales - Australia
UBE Beijing Office	Beijing - China
UBE Europe GmbH	D-40210 Düsseldorf - Germany
UBE (Hong Kong) Ltd.	Hong Kong - Hong Kong
UBE Chemical Industries, Ltd.	Yamaguchi - Japan
UBE Industries - Light Metal	Tokyo - Japan
UBE Trading Co. Ltd.	Tokyo - Japan
UBE International (Netherlands) B.V.	NL-1079 LH Amsterdam - Netherlands
UBE Singapore Office	Singapore
UBE Europe (España), S.A.	E-12080 Castellon - Spain
UBE (Thailand) Co., Ltd.	Bangkok - Thailand
UBE Industries (America), Inc.	New York - United States of America

Ulbrich Stainless Steels & Special Metals

Aerodyne Ulbrich Alloys	Connecticut - United States of America
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Universal Steels & Aluminium Ltd.

Universal Steels & Aluminium Ltd.	Ayrshire, Scotland - United Kingdom
Universal Steels & Aluminium Ltd.	Lancashire - United Kingdom

Valfond / Valois Group

Affineries de Picardie	F-60320 Bethisy Saint Pierre - France
Châteauroux Fonderies	F-36028 Châteauroux - France
Europalu	F-01602 Trévoux - France
Fabrications Lémaniques d'Outils	F-74200 Allinges - France
Fonderie Fine de Précision	F-94607 Choisy-Le-Roi - France
Fonderies de Léman	F-74204 Thonon - France
Fonlem Centre	F-43360 Arvant - France
Fonlem Industries	F-92309 Levallois Perret - France
Lachenal Industries	F-74140 Douvaine - France
SOFAB	F-19107 Brive - France
Tecla Industries	F-90101 Delle - France
Vanalp Industry	F-69881 Meyzieu - France

VAW (D)

VAW Aluminium AG	São Paulo - Brazil
VAW Skandinavia A/S	DK-2630 Taastrup - Denmark
VAW France S.A.	F-75017 Paris - France
VAW AG	D-10719 Berlin - Germany
VAW AG	D-53014 Bonn - Germany
VAW AG	D-81539 München - Germany
VAW Aluminium AG	D-41513 Grevenbroich - Germany
VAW IMCO Guß und Recycling GmbH	D-41490 Grevenbroich - Germany
VAW Aluminium Italia S.r.l.	I-20025 Legnano (MI) - Italy
VAW Iberica S.A.	P-11000 Lisboa - Portugal
VAW Aluminium AG	Singapore
VAW Iberica S.A.	E-08036 Barcelona - Spain
NEMAG Metallhandels-AG	CH-4005 Basel - Switzerland
VAW Aluminium	Surrey - United Kingdom
VAW Products Inc.	New York - United States of America

Wogen

Ayrton & Partners Ltd.	London - United Kingdom
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Wolstenholme International Ltd. (UK) [Comalco]

Ronald Britton & Co.	Lancashire - United Kingdom
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Affiliation not known / Independent

(Not sorted by country)	
AAA Weber	F-75121 Paris - France
Aavid Thermal Technologies, Inc.	New Hampshire - United States of America
The Aberly Group	Arizona - United States of America
Advanced Metals International	Hertfordshire - United Kingdom
Affibassin	F-12110 Viviez - France
Afficuvre	F-75012 Paris - France
Affinerie d'Anjou	F-49490 Linières Bouton - France
Agents Aluminium Co Pvt Ltd	Bangalore - India
Alba A/S	N-5012 Bergen - Norway
Alcodan Metals Ltd.	Surrey - United Kingdom
Aleastur	E-33400 Avilés (Asturias) - Spain
Alexandria Extrusion Company	Minnesota - United States of America
Alform Extrusions Ltd.	Dorset - United Kingdom
Alimex GmbH	D-47877 Willich - Germany
Almamet GmbH	D-83404 Airing - Germany
Sté Alsacienne d'Aluminium	F-74164 Saint Julien en Genevois - France
Alumasc Building Products Ltd.	Northamptonshire - United Kingdom
Alumat Inc.	California - United States of America
Alumax Corporation	Arizona - United States of America
Alumax Extruded Products (UK) Ltd.	Liantrisant, Wales - United Kingdom
Alu Menziken Industrie AG	CH-5737 Menziken - Switzerland
Aluminium Extrusions Ltd.	Har Far - Malta
Aluminium Martigny SA	CH-1920 Martigny - Switzerland
Aluminium Münchenstein AG	CH-4142 Münchenstein - Switzerland
Aluminium Rheinfelden GmbH	D-79618 Rheinfelden/Baden - Germany
Aluminium Shapes Ltd.	Northants - United Kingdom
Alumino Español SA	E-28003 Madrid - Spain
Alumisir	Giza - Egypt
Alu Perfil Espana SA	E-08191 Rubi - Spain
Alyn Corporation	California - United States of America

Affiliation not known / Independent - continued

Ambica Aluminium Company	Bangalore - India	M. I. O.	F-75008 Paris - France
AMC - Aerospace Metal Composites	Hampshire - United Kingdom	Montangessellschaft GmbH	D-51075 Köln - Germany
AMETEK Specialty Products Division	Pennsylvania - United States of America	Morimura Brothers	Tokyo - Japan
AMMCO - American Modern Metals Corp.	New Jersey - United States of America	F.E. Mottram (Non-Ferrous)Ltd.	Cheshire - United Kingdom
Anglo Blackwells Ltd.	Cheshire - United Kingdom	National Northeast Corporation	Massachusetts - United States of America
ASP International Ltd.	West Midlands - United Kingdom	Nemco Metals International	Northamptonshire - United Kingdom
AstroCosmos Metallurgical Inc.	Ohio - United States of America	Nova Titanium Inc.	Texas - United States of America
AVISMA Titanium-Magnesium Works	Berezniki - Russia	Nuclear Metals, Inc.	Massachusetts - United States of America
P. Balloffet-Technicome	F-78191 Trappes - France	Palmex A.S.	Istanbul - Turkey
Bernhard Metals (UK) Ltd.	Derbyshire - United Kingdom	Paramount Extrusions Co.	California - United States of America
B & G Manufacturing Co., Inc.	Pennsylvania - United States of America	Perfil Arteaga SA	E-28820 Coslada - Madrid - Spain
Bibus Metals AG	CH-8304 Wallisellen - Switzerland	Perrière International	F-92100 Boulogne Billancourt - France
Bihar Extrusion Co Ltd	Calcutta - India	Phoenix	Texas - United States of America
Boal UK Ltd.	Leicestershire - United Kingdom	Plas-Met Chem Corporation	Bangalore - India
Bright Metals	Calcutta - India	Plymouth Tube Company	Illinois - United States of America
Brock Metal Company	Staffordshire - United Kingdom	Powder Alloy Corporation	Ohio - United States of America
Gerard de Bruyn BV	NL-2901 AM Capelle a/d IJssel - Netherlands	Precision Extrusions Inc	Illinois - United States of America
Capalex - Capital Aluminium Extrusions Ltd.	Cumbria - United Kingdom	PREDIMAG	F-63000 Clermont Ferrand - France
Cardinal Aluminium Co.	Kentucky - United States of America	Razno Alloys Ltd.	CH-6301 Zug - Switzerland
CFP - Cold Formed Products Ltd.	London - United Kingdom	REFINALSA	E-47011 Valladolid - Spain
CLAL-MSX	F-60540 Bornel - France	RMI Titanium Company	Ohio - United States of America
Coleshill Aluminium Ltd.	Warwickshire - United Kingdom	Rowan Cable Products Ltd.	Waltham Cross - United Kingdom
Comalco Smelting	Melbourne - Australia	Russian National Aluminium-Magnesium Inst.	RU-199026 St. Petersburg - Russia
Comeca	F-78210 Saint Cyr l'Ecole - France	Saraf Metal Works	Calcutta - India
Ets Robert Creuzet	F-47200 Marmande - France	Carl Schreiber GmbH	D-57290 Neunkirchen - Germany
CYCO International Pty Ltd.	Victoria - Australia	SECO Aluminium Ltd.	Essex - United Kingdom
D.B.S. Metals, Inc.	British Columbia - Canada	Sofogir	F-70250 Ronchamp - France
Dead Sea Magnesium Ltd.	Be'er Sheva - Israel	SOGEM Iberica SA	E-28013 Madrid - Spain
Deeside Aluminium Ltd.	Clywd, Wales - United Kingdom	Solikamsk Magnesium Works	Solikamsk - Russia
D M Company	Calcutta - India	Soro Ltd.	Middlesex - United Kingdom
Dorlec France	F-75001 Paris - France	Spartal Ltd	Gloucestershire - United Kingdom
The Duriron Company	Ohio - United States of America	Speciality Metals Company SA	B-1050 Brussels - Belgium
Eckart-Werke	D-90763 Fürth - Germany	Spectrulite Consortium Inc.	Illinois - United States of America
Drahtwerk Elisental - W. Erdmann GmbH & Co.	D-58809 Neuenrade - Germany	Sudal Industries Ltd.	Mumbai - India
Ekonal España SA	E-08025 Barcelona - Spain	Supra Alloys Inc.	California - United States of America
ESM II Inc.	New York - United States of America	TARAMM S.A.	F-31670 Labège - France
Est-Alu	F-91170 Viry Chatillon - France	B.A. Taylor (Metals) Ltd.	West Midlands - United Kingdom
Eural Gnutti S.p.A.	I-25038 Rovato (Brescia) - Italy	Technalloy SA	E-08191 Rubi - Barcelona - Spain
Exact Extrusion Division	Minnesota - United States of America	Tepro Metall	D-40210 Dusseldorf - Germany
Forge Eclair	F-92190 Meudon - France	TERRA 4 Titanium Inc.	Quebec - Canada
Freire Hermanos SA	E-15008 A Coruña - Spain	Tico Titanium, Inc.	Michigan - United States of America
Otto Fuchs Metallwerke GmbH	D-58528 Meinerzhagen - Germany	Titanium Engineers, Inc.	Texas - United States of America
Garfield Alloys Inc.	Ohio - United States of America	Titanium International Fabricators (Pty) Ltd.	Johannesburg - South Africa
Josef Gartner & Co.	D-89423 Gundelfingen - Germany	Titanium Powder Specialists, LLC	Utah - United States of America
General Extrusions, Inc	Ohio - United States of America	Titanium Products Inc.	Oregon - United States of America
Generation Metals International Ltd.	Berkshire - United Kingdom	Titanium Products Ltd.	W. Midlands - United Kingdom
Gleich GmbH	D-24560 Kaltenkirchen - Germany	United Alloys Inc.	California - United States of America
Global Titanium Inc.	Michigan - United States of America	United Magnesium Company Ltd.	Shanxi - China
GM Metal	F-86150 Le Vigéant - France	Universal Stainless Inc	Florida - United States of America
Gottschol Alucuilux S.A.	L-9701 Clervaux - Luxembourg	UTSC	Tokyo - Japan
Ets Grisot	France	VIAM - All-Russian Institute of Aviation Materials	107005 Moscow - Russia
Harvey Titanium Ltd.	California - United States of America	VIEXAL S.A.	GR-115 27 Athens - Greece
Heera Metals Ltd	Calcutta - India	VILS	Moscow - Russia
Heraeus Silica & Metals Ltd.	Essex - United Kingdom	VSMPO	Sverdlovsk - Russia
High Duty Alloys - HDA Forgings Ltd.	Worcestershire - United Kingdom	Vulcanium Corp.	Illinois - United States of America
High Performance Alloys, Inc.	Indiana - United States of America	Westinghouse Electric Corporation	Pennsylvania - United States of America
Howmet Corporation	Michigan - United States of America	Williams Titanium Group	California - United States of America
IMCO Recycling Inc.	Oklahoma - United States of America	Worcester Aluminium Alloys Ltd.	Worcestershire - United Kingdom
IM Export Trading & Associates SL	E-28223 Pozuelo de Alarcon - Spain	Zamil Aluminium Industries	Saudi Arabia - Saudi Arabia
Indalex Ltd.	Gloucestershire - United Kingdom	Zinkal Ltd.	Petach-Tikva - Israel
Indian Smelting & Refining Co. Ltd.	Mumbai - India		
Inespal Laminacion SA	E-28001 Madrid - Spain		
Interlink Metals & Chemicals	New York - United States of America		
Intermetal S.A. - Compagnie des Métaux	CH-1002 Lausanne/Vaud - Switzerland		
Intermétaux SA	F-92230 Gennevilliers - France		
International Extrusions	Michigan - United States of America		
Intexalu Systèmes Puget SA	F-83488 Puget sur Argens - France		
Japan Metals & Chemicals Co.	Tokyo - Japan		
Industrias R. Jimenez SA	E-46930 Quart de Poblet (VA) - Spain		
Kaye Aluminium plc	Doncaster - United Kingdom		
L. M. P.	F-77200 Torcy - France		
Lord Corporation	Pennsylvania - United States of America		
MagCorp - Magnesium Corp. of America	Utah - United States of America		
Mark Metals Inc.	California - United States of America		
Marle	F-52800 Nogent - France		
M&C Métaux et Chimie	F-95054 Cergy-Pontoise - France		
Metal Agencies Ltd.	Surrey - United Kingdom		
Metallisation Service Ltd.	West Midlands - United Kingdom		

SUPPLIER ADDRESSES AND PRODUCT DETAILS

AAA Weber [Al Mg Ti]

9 rue de Poitou, BP 3121
F-75121 Paris 3
France
Tel: +33 1 42 71 23 45, Fax: +33 1 42 71 69 32, Contact: Mr. Bayard
Notes: Provide a very wide range of light-alloy products to customer requirements.

Age Christensen AS [Al]

Skelmosevej 10, Box 399, Valby
DK-2500 Copenhagen
Denmark
Tel: +45 36 442 444, Fax: +45 36 442 024, Contact: Mr. Allan de Neergaard
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys.
Notes: Agent for Superform Aluminium (UK).

aalco - Slough [Al]

Unit 2, 552 Fairlie Road
Slough Trading Estate
Slough, Berkshire SL1 4PY
United Kingdom
Tel: +44 1753 619900, Fax: +44 1753 512227
Group: Glynwed Metal Services (UK)
Associated Companies: National network of stockists.
Alloys: [See: Glynwed]
Product Types: Wrought alloys Metal stockists, Plate, Sheet, Bar, Tube, Extrusion, Tread-plate
Other Services: Machining (CNC saws). Sourcing & supply (to customer order). **Approvals:** BS EN 9002
Notes: Multi-metal stockists. Wide range of aluminium semi-finished products (also Cu-based alloys, stainless steels).

Aavid Thermal Technologies, Inc. [MMC]

One Kool Path
Laconia, NH 03247
United States of America
Alloys: Aluminum-Silicon Carbide (AlSiC) MMC's.
Product Types: Wrought alloys Cast alloys Three-dimensional net-shape parts. Ingot, Billet, Extrusion.
Applications: Electronics packaging - commercial & military.
Tradenames: Quick-Set (low pressure, low viscosity injection molding of SiC particles), Quick-Cast (pressure assisted infiltration of molten aluminum).

The Aberly Group [Ti]

7934 North 54th Place
Paradise Valley, AZ 85253
United States of America
Tel: +1 602 443 7660, Fax: +1 602 443 7680, Email: theaberlygroup@msn.com
Est: 1996 **Employees:** 2
Product Types: Wrought alloys Billet, Billet CP, Buy, Recycle, & Sell Scrap, Turnings, Billet, Scrap, turnings.
Other Services: Recycling
Notes: Buy and sell metals of various types and grades upon demand from consumers.

ACI [Al]

7 rue du parc Boulogne
F-78490 Méré
France
Tel: +33 1 34 86 08 11, Fax: +33 1 34 86 00 86, Contact: Mr. Eric Jourdain
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys.
Notes: Agent for Superform Aluminium (UK).

S.A. Aciers Marathon Staal N.V. [Ti]

Emile de Harvenstraat 50-52
B-2710 Hoboken
Belgium
Tel: +32 3 827 4091, Fax: +32 3 827 4095, Telex: 33672,
Group: Deutsche Titan (D)
Notes: Sales office (B) for Deutsche Titan (D)

Advanced Metal Forming [Al]

See: Amefo BV- Advanced Metal Forming

Advanced Metals International [Al Ti]

Unit 3 Odhams Trading Estate
St. Albans Road, Watford, WD2 5RE
United Kingdom
Tel: +44 1923 202099, Fax: +44 1923 240517, Contact: John Kent
Alloys: Titanium: Ti1, Ti2 (DIN 3.7025, DIN 3.7035). Aluminium (INCO MAP): MA 956 (mechanically alloyed). **Designation systems:** BS DIN Aerospace
Product Types: Wrought alloys Capillary tube (0.5 mm to 18 mm diameter, typically). Lengths to 6.3 m. Tolerances: DIN 2462 D4/T4, DIN 2391. Tighter tolerances possible.
Applications: Aerospace
Approvals: BS 5750, ISO 9002, BAe, CAA, MoD
Notes: Multi-metal stock holder. Sole UK agents for J & J Ethen. Fully aerospace approved. Certification (on request): EN 10204 (1) test certificate B, A(2) or C(2).

Aerodyne Ulbrich Alloys [Ti]

125 South Satellite Road
South Windsor, CT 06074
United States of America
Tel: +1 860 289 6011, Fax: +1 860 528 3790, Email: aeroalloys@aol.com, Contact: Jon Dymczyk - General Manager
Group: Ulbrich Stainless Steels & Special Metals Est: 1980
Employees: 40
Associated Companies: Company Subsidiaries: Aerodyne Ulbrich Cutting Technologies
Additional Sales Office(s): **Aerodyne Ulbrich Alloys**
Indianapolis, IN United States of America
Tel: +1 800 533 4639, Fax: +1 317 872 5837
Aerodyne Ulbrich Alloys, Fresno, CA United States of America
Tel: +1 800 337 3766, Fax: +1 209 275 7033
Product Types: Wrought alloys Alloys, Bar & Rod, Plate, Strip, Wire & Wire Coil, Billet, Sheet, Foil
Other Services: Cold Working, Cutting, Cutting - Waterjet, Heat Treating, Outside Processing, Roller Leveling, Sawing, Shearing, Warehousing, Wire Conversion
Notes: Aerodyne Ulbrich Alloys, a worldwide distributor of high temperature nickel alloy, cobalt alloy, titanium and stainless steel bar, sheet and plate. Aerodyne Ulbrich supplies materials for the most critical applications in a number of key industries - aerospace, medical, power generation, oil field and defense.

Aerospace Metal Composites [Al MMC]

See: AMC - Aerospace Metal Composites

Affibassin [Al]

Z.I. Laubarède
F-12110 Viviez
France
Tel: +33 5 65 43 33 00, Fax: +33 5 65 43 35 41, Contact: Marc Pezet
Est: 1991 **Employees:** 6
Product Types: Cast alloys Ingot - SN3 (Al-Si-Mg-Ni-Cr) to EN spec. Ingot
Notes: Late entry.

Supplier Addresses & Product Details 41

Afficuvivre [AI]

119, Avenue du General Michel Bizot
F-75012 Paris
France
Tel: +33 1 44 75 40 40, Telex: 211914 f, Contact: Mr. Segal
Est: 1979 Employees: 85
Designation systems: NF.
Product Types: Cast alloys Ingots to NF's (recycling aluminium).
Notes: Late entry.

Affimet [AI]

Immeuble Balzac, 10, Place des Vosges
Courbevoise Cedex 68
F-92048 Paris La Défense
France
Tel: +33 1 46 91 46 91, Fax: +33 1 46 91 46 46, Telex: 612013 f
Group: Pechiney Est: 1970 Employees: 223
Alloys: [See: Affimet - Aluminium Pechiney, Compiègne]
Product Types: Cast alloys.
Notes: Administration office for Aluminium Pechiney, Aluminium Metals division - Casting alloys.

Affimet - Aluminium Pechiney [AI]

Division Alliages de Moulage
101, Route de Choisy, BP 60809
F-60208 Compiègne Cedex
France
Tel: +33 3 44 85 45 00, Fax: +33 3 44 85 46 33, Telex: 145719 f,
Contact: Mr. Jacob
Group: Pechiney Est: 1966 Employees: 350
Associated Companies: Representatives & Agents worldwide.
N. America: Mississauga, ON (Canada), Greenwich, CO (USA).
Central America: Guatemala City, Mexico City, San Jose. South
America: Bogota, Lima, Montevideo, Quito, Santiago de Chili,
Sao Paulo. Europe: A, Greece, B, S, D, Turkey, P, UK, E;
Russia; Africa; Asia; Australia.
Alloys: Affimet CALYPSO alloys (AFNOR) : 49R (A-S9), 41R (A-S11), 43X (A-S13), 43B (A-S13), 67N (A-S7G03), 67N1 (A-S7G06), 67B (A-S7G03), 67B1 (A-S7G06), 67R (A-S7G03), 67R1 (A-SG06), 67R2 (A-S7G(0.2)), 67R3 (A-S7G(0.1)), 67S (A-S7G03), 67S2 (A-S7G03), 69N (A-S10G), 69B (A-S10G), 69R (A-S9G03), 69S (A-S10G), 61S (A-S11G), 85R (A-SU3G), 82P (A-S12UNG), 87P (A-S17U4G), Calypso 92A (no NF standard; ISO type AlCo2Fe). Designation systems: NF Proprietary.
Product Types: Cast alloys Group: Primary & secondary ingot (8-11kg). Liquid metal. Ingot, Billet.
Applications: Automotive (cylinder head, suspension arms, brake calipers, wheels, pistons, housings). Aircraft (EFA canopy). Train (TGV driver's door). Mechanical & electrical engineering components. Defence.
Tradenames: CALYPSO (alloys). ALPUR (ladles). MINIMAG (ladles). ALTHIX (thixotropic billets). CALYPSO (alloys).
Other Services: Recycling/scrap collection. Approvals: ISO 9001
Notes: The administration & sales offices for the Pechiney Group 'Casting Alloys Division' (four manufacturing sites in France), which produce & supply Al-alloys to foundries for making cast parts (mainly automotive). Division annual production 100000-150000T (~10% European market). Compiègne plant produces secondary aluminium alloys from recycled/secondary raw materials. Annual production 65000T. Scrap collection depot at Bagnolet & recuperation of Al- & Cu- from cables at Dammarieles-Lys. Sabart plant (Nr. Tarascon-sur-Ariège): Primary casting alloys, two 25T & three 12T furnaces. Riouperoux plant (Nr. Grenoble): Primary casting alloys, four 21T furnaces. Venthon (Nr. Albertville): Primary casting alloys, two 15T furnaces, ALTHIX thixotropic billets by vertical semi-continuous casting. Casting research group based at Voreppe, Nr. Grenoble, covering alloys, casting technology & new applications.

Affinage de Lorraine [AI]

See: A.L. (Affinage de Lorraine)

Affinerie d'Anjou [AI]

F-49490 Linières Bouton
France
Tel: +33 2 41 82 61 90, Fax: +33 2 41 82 30 06
Alloys: Primary alloys to customer requirements.
Product Types: Cast alloys Ingots - to customer requirements (1st & 2nd Melt).
Notes: Late entry.

Affineries de Picardie [AI]

144, Chemin Saint Luce
F-60320 Bethisy Saint Pierre
France
Tel: +33 3 44 39 71 21, Fax: +33 3 44 39 70 12, Telex: 145749 f,
Contact: Gisèle Coencas
Group: Groupe Valois Est: 1949 Employees: 180
Alloys: No details.

Agents Aluminium Co Pvt Ltd [AI]

Pallavi Complex, 10 Mission Road
Bangalore 560027
India
Tel: +91 8022 23677, 79948, Fax: +91 80 2279948, Contact: Mr. Sreeram - Director
Group: Agents Aluminium Co
Notes: Consignment Agents : Indian Aluminium Company Limited. Aluminium Sheets, Coils for Bus Body Building, PP Cap Manufacturing, Chequered Plates and Al Roofing Sheets.

Airex AG [AI]

Composites Manufacturing
CH-9320 Arbon
Switzerland
Tel: +41 71 46 77 46, Fax: +41 71 46 23 85
Group: Alusuisse-Lonza (CH)
Alloys: No details.
Product Types: Wrought alloys, Formed parts (automotive).
Applications: Automotive. Formed parts for outer body. Composites for inner & outer body.
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division, an interdisciplinary team experienced in the automotive industries requirements.

Aktiebolaget Ferrolegeringer [AI Mg Ti]

Box 7163
S-10388 Stockholm
Sweden
Tel: +46 8 235130, Fax: +46 8 7960636, Telex: 19122,
Group: Metallurg (USA)
Product Types: Powders
Notes: Sales Office

A.L. (Affinage de Lorraine) [AI]

ZI de la Castin
1, rue Jean Joseph Labbé, BP 16
F-54730 Gorcy
France
Tel: +33 3 82 26 89 89, Fax: +33 3 82 26 89 31, Contact: Mr. Steinfort - Service commercial
Group: Oetinger Est: 1989 Employees: 80
Product Types: Cast alloys Ingots, liquid, piglets/pastiles (deoxidation of steel), Ingot
Applications: Steel industry. Motor vehicles. Pistons. Aluminium semi-finished product industry.
Notes: Annual production of 20 000T. One of three production sites; overall capacity 90 000T. Recycling. Producing a range of alloys to meet standards & customer specifications.

42 Supplier Addresses & Product Details

Alba A/S [Ti]

Ole Bulls Plass.7
N-5012 Bergen
Norway
Tel: +47 55 23 21 00, Fax: +47 55 23 40 50, Telex: 40113 alba n,
Email: alba@alba.no
Alloys: ASTM B 367 Grade C-2 CP titanium, Grade C-3 CP titanium, Grade C-7 Ti-0.2%Pd. (others on request) Designation systems: USA National & International
Product Types: Cast alloys Titanium castings. Weight: 2500kg (max), 2-300g (min). Max. dimensions (mm): 2000x1500., Castings (semi- & finished items).
Applications: Marine, oil & gas, industrial, aviation & recreational.
Other Services: Pattern-making. Mould manufacture. Inspection & quality control. NDT (liquid penetrant, radiographic, ultrasonic). Chemical analysis, metallography. Weld repairs by GTAW under argon. Weld procedures to ASME IX. Machining & finishing (to customer requirements).
Notes: Alba AS represents the Zelendolsk Shipyard foundry. It is one of the worlds largest Ti-casting production plants, with 12 centrifugal vacuum furnaces having capacities between 80 to 3500kg. Sand, chill & investment casting techniques. To ASTM/ANSI/ASME specifications.

Alcan Alluminio SpA [AI]

Regione Granges
I-10013 Borgofranco d'Ivrea. Torino
Italy
Tel: +39 125 75 2011, Fax: +39 125 75 2468, Telex: 210233
Group: Alcan
Product Types: Cast alloys Secondary metals & alloys

Alcan Alluminio SpA [AI]

Via Vittorio Veneto 104/112
I-20091 Breso. Milano, Italy
Tel: +39 2 614 541, Fax: +39 2 614 0166
Group: Alcan
Product Types: Wrought alloys Rolled products: finstock, painted sheet & systems. Sheet, Strip, Foil.

Alcan Alluminio SpA [AI]

Via Bruno Buozzi 12
I-20090 Pieve Emanuele. Milano, Italy
Tel: +39 2 907 441, Fax: +39 2 907 82155
Group: Alcan
Associated Companies: Alcan Alluminio Distribution Centres:
Corato-Bari; Zola-Predosa, Bologna; Firenze; Pioltello-Milano;
Pomezia-Roma; Buon Albergo, Verona.
Product Types: Wrought alloys Cast alloys Circles, blanks, plain & bright sheet, extrusions & extruded systems. Plate, Sheet, Strip, Foil, Bar, Extrusion.
Tradenames: Lamcolor (sheet), Abithal (hard-alloy bars)
Notes: Executive Office for Italian-based operations which produce a variety of wrought products. Casting alloys (from miscellaneous scrap).

Alcan Alluminio SpA [AI]

Via Piemonte 28
I-20030 Senago. Milano
Italy
Tel: +39 2 990 10273, Fax: +39 2 990 10420
Group: Alcan
Product Types: Wrought alloys. Packaging.

Alcan Aluminium Ltd. [AI]

1188 Sherbrooke Street West, P.O. Box 6090
Montreal, Quebec
H3A 3G2
Canada
Tel: +1 514 848 8000, Fax: +1 514 848 8115/6
Group: Alcan

Associated Companies: Business operations in Europe, USA, Canada, Caribbean, S. America, Africa, India, Australia, China, Japan, Korea, Thailand, Malaysia & Russia.
Product Types: Wrought alloys Cast alloys. See individual Alcan businesses.
Notes: Alcan group head office. One of the world's largest aluminium businesses. Its operations include bauxite mining, alumina refining, power generation, aluminium smelting, rolling, manufacturing & recycling.

Alcan Aluminium Products N.V. SA [AI]

Galvanistraat 39
NL-3316 GH Dordrecht
Netherlands
Tel: +31 78 617 8055, Fax: +31 78 618 3477,
Group: Alcan Est: 1979 Employees: 11
Product Types: Wrought alloys, Extrusion,
Notes: Sales office & distribution for extrusions into Benelux area.

Alcan Austria GmbH [AI]

Uchatiusgasse 4/3
A-1030 Wien
Austria
Tel: +43 1 713 2155, Fax: +43 1 713 215521
Group: Alcan
Product Types: Wrought alloys Notes: Sales office

Alcan Deutschland GmbH [AI]

Nordic Office Denmark
Ringager 4 A
DK-2605 Brønby
Denmark
Tel: +45 43 43 42 77, Fax: +45 43 43 52 66,
Group: Alcan Est: 1993 Employees: 5
Notes: Sales office

Alcan Deutschland GmbH [AI]

Nordic Office Finland
PO Box 61, Kappelite 6D
SF-02201 Espoo
Finland
Tel: +358 700 2461, Fax: +358 427268,
Group: Alcan
Product Types: Wrought alloys Notes: Sales office

Alcan Deutschland GmbH [AI]

Aluminiumfolienwerk
Holzhauser Straße 96-100
D-13509 Berlin
Germany
Tel: +49 30 430 08 0, Fax: +49 30 430 08 43
Group: Alcan
Product Types: Wrought alloys. Wrapping foil, inc. cigarettes.
Foil.

Alcan Deutschland GmbH [AI]

Postfach 51 49
D-65726 Eschborn, [Kölner Straße 8, D- 65760 Eschborn]
Germany
Tel: +49 6196 407 0, Fax: +49 6196 407 145
Group: Alcan Est: 1909 Employees: 4000
Product Types: Wrought alloys. Cast alloys.
Notes: Executive office for German operations which produce bare & coated rolled products, plain & converted foil, semi-rigid foil containers, flexible tube, automotive pistons, castings & impact extrusions.

Supplier Addresses & Product Details 43

Alcan Deutschland GmbH [AI]

Werk Göttingen
Hannoversche strasse 1
D-37075 Göttingen, [Postfach 1241 D-37002 Göttingen]
Germany
Tel: +49 551 304 0, Fax: +49 551 305 93, Contact: Herr. E.D
Walterscheid
Group: Alcan
Product Types: Wrought alloys. Rolled products, litho sheet, closure sheet, can end sheet, can body sheet, painted sheet, impact extrusions, Strip, Extrusion, impact extrusions.

Alcan Deutschland GmbH [AI]

Wiesenstrasse 24-30
D-58507 Lüdenscheid, [Postfach 1190, D-58461 Lüdenscheid]
Germany
Tel: +49 2351 8720, Fax: +49 2351 872243
Group: Alcan
Product Types: Wrought alloys Plain & converted foil. Foil.
Applications: Packaging.

Alcan Deutschland GmbH [AI]

Werk Nachterstedt
Gaterslebener Strasse 1
D-06469 Nachterstedt, [Postfach 1345, D-06433 Aschersleben]
Germany
Tel: +49 347 41770, Fax: +49 347 41204
Group: Alcan
Product Types: Wrought alloys. Rolled products: sheet & shate, anodized & painted. Foil stock. Plate, Sheet, Foil.
Applications: Automotive, engineering & building.

Alcan Deutschland GmbH [AI]

Nopitschstrasse 67
D-90441 Nürnberg, [Postfach D-90041 Nürnberg]
Germany
Tel: +49 911 42330, Fax: +49 911 423 3601
Group: Alcan
Product Types: Cast alloys.
Applications: Automotive castings & pistons.

Alcan Deutschland GmbH [AI]

Am Eisenwerk 30
D-58840 Plettenberg-Ohle
[Postfach 40 26, D-58826 Plettenberg-Ohle]
Germany
Tel: +49 2391 610, Fax: +49 2391 612201
Group: Alcan
Product Types: Wrought alloys Foil: containers & flexible tubes.

Alcan Deutschland GmbH [AI]

Market Center Hungary
Balogh Ádám Köz 6
H-1026 Budapest
Hungary
Tel: +36 1 275 1574, Fax: +36 1 275 1581,
Group: Alcan
Notes: Sales office

Alcan Deutschland GmbH [AI]

Filial Sverige
Box 321, Exportgatan 81
S-422 46 Hisings-Backa
Sweden
Tel: +46 31 52 68 20, Fax: +46 31 52 92 31,
Group: Alcan Est: 1993 Employees: 3
Notes: Sales office

Alcan France [AI]

270 rue Léon Joulin, BP 1209
F-31037 Toulouse Cedex
France
Tel: +33 5 61 31 25 26, Fax: +33 5 61 31 25 00,
Group: Alcan
Associated Companies: Alcan Systems (architectural façade profiles & accessories):
Tel +33 5 23 59 82 00, Fax +33 5 23 59 82 05.
Product Types: Wrought alloys, Extrusion,
Notes: Executive office for French operations. Provide plain, anodized & painted extrusions. Design & distribution of aluminium systems (architectural facades). Sales office for Technal glazing system products.

Alcan Ibérica sa [AI]

Rua do Lobito 4B
P-2775 Parede Lisbon
Portugal
Tel: +351 1 456 0181, Fax: +351 1 458 3020,
Group: Alcan
Notes: Sales office

Alcan Ibérica sa [AI]

Orense 16-5
E-28020 Madrid
Spain
Tel: +34 1 555 0348, Fax: +34 1 555 0882,
Group: Alcan
Notes: Sales office

Alcan International Ltd. [AI]

Banbury Laboratory
Southam Road, Banbury, Oxfordshire OX16 7SP
United Kingdom
Tel: +44 1295 27 2626, Fax: +44 1295 27 4216
Group: Alcan
Notes: Wholly-owned Canadian subsidiary of Alcan Aluminium Ltd. The Alcan group's main research & development facility.

Alcan Laminés France SA [AI]

56 rue du Maréchal Leclerc, BP 49
F-28111 Lucé Cedex
France
Tel: +33 2 37 30 46 59, Fax: +33 2 37 30 26 22, Telex: 781295
Group: Alcan
Associated Companies: Distribution centres: Paris & Eastern region (Marne la Vallée) +33 1 60 17 55 10; Central & West region (Lucé) +33 2 37 35 39 55; Southern region (Mions) +33 4 78 20 58 02
Alloys: For FF2: ALCAN WG 53S (DIN 1725& 1745 AIMg3)
Temper H42; For Falzonal: ALCAN WG C4S (DIN AlMn1Mg0.5)
Temper H41.
Product Types: Wrought alloys Prepainted coil, sheet & blanks (stove enamelled, plastic-coated or sound-damped in a wide range of colours/patterns). 0.2-2mm thick, max. width ~1600mm. Coating thickness (varies with coating materials): 15-25 microns, 5-10 microns (epoxy), 170-250 microns (PVC film). ALCAN FF2 precoated building façade panel systems. Profiled sheet. Sheet, Strip, Building façade panels; roofing sheet.
Applications: Architectural façade & roofing. Suspended ceilings. Roller shutters. Venetian blinds. Electrical/electronic housings, Road signs & display panels. Clock/dial faces. Number plates. Rolled profiles.
Tradenames: Falzonal (roofing & wall-cladding)
Approvals: AFAQ ISO 9002 (1996/5355)
Notes: Sales Office & Service Centre.

44 Supplier Addresses & Product Details

Alcan Recycling [AI]

Latchworth Locks Works, Warrington, Cheshire. WA4 1NP
United Kingdom
Tel: +44 1925 78 4100, **Fax:** +44 1925 78 4101
Group: Alcan
Associated Companies: Can recycling (free-phone UK): 0800 262465; Can recycling enquiries, tel +44 1925 78 4136
Product Types: Wrought alloys Sheet ingot. Aluminium alloy hardeners. Ingot, Sheet.
Notes: Consists of two recycling plants:
General products producing sheet ingot & aluminium alloy hardeners from scrap.
Beverage can recycling plant producing can-body sheet ingot. Collection & trade buying. Within the UK, there is an organisation of can collection centres & authorised dealers for major towns.

Alcan Rolled Products UK [AI]

Divisional Office
Castle Works, Rogerstone, Newport, Gwent. NP1 9YA
United Kingdom
Tel: +44 1633 20 2443, **Fax:** +44 1633 20 2284, **Telex:** 497381,
Contact: Jeff Fackrell - Sales Office
Group: Alcan
Associated Companies: Export sales: +44 1633 20 2274
Alloys: Standard alloys: 1050A, 1100, 1200, 3003, 3004, 3005, 3103, 3105, 5005, 5251, 5754, 8006, 8008, 8011, 8018, 8079, 5049, 5052, 5154A. Tempers (BS 1470): O, H14, H18, H12, H16, H34, H36, H18, H22, H24, H26, Hx2, Hx4, Hx6, Hx8.
Designation systems: USA BS
Product Types: Wrought alloys Sheet & coil (cold-rolled, 0.25 to 3.25 mm thick). Wide coil (>350mm width, 0.25 to 2.50mm thick). Narrow coil (18 to 349 mm wide, 0.25 to 1.63 mm thick). Foilstock. Paintstock (subsequent painting, surface finish controlled). Brazing sheet & coil (heat-exchangers). Closure sheet & foil (packaging). Embossed sheet & coil (stucco finish). Hot mill coil (2.5 to 8.00 mm thick, 1693mm max. width). Foil (6.5 microns min. thickness). **Note:** Sizes & tempers available vary with alloy & product form. Tempers to BS (DIN on request). Sheet, Strip, Foil.
Applications: Food packaging, telecommunications cables, automotive, petro-chemical/oil exploration, architecture.
Approvals: BS Q/09730, BS FM20066
Notes: Part of Alcan's European rolled products division. Plants in D, I & CH. Offers an extensive range of alloys in various product forms; both hot-mill and cold-mill items. Also sheet ingot from recycled beverage cans & other materials.

Alcan Rolled Products UK [AI]

David's Loan, Falkirk FK2 7XT
United Kingdom
Tel: +44 1324 50 2000, **Fax:** +44 1324 50 2001
Group: Alcan
Associated Companies: Newport, Gwent
Alloys: Standard: 1050A, 5754, 5005. Others: 1200, 3003, 3103, 3105, 3005, 3004, 5251, 5052, 5049, 5754. Tempers: H14, H18, H12, H22, H111, H24 **Designation systems:** USA BS.
Product Types: Wrought alloys General engineering sheet & coil. Standard sizes (1 to 3 mm thick, 1500x4000 max). **Note:** Sizes vary with alloy & sheet thickness. Sheet.
Other Services: Non-standard alloys, tempers & product sizes (related in ingot quantity). **Approvals:** BS 5750-2, ISO EN 290002.
Notes: Provides range of standard cold-rolled products, non-standard items (sizes & tempers), protective plastic film. Products normally supplied to stock-holders.

Alcan Rolled Products UK [AI]

321 Aikenhead Road, Glasgow G42 0PE
United Kingdom
Tel: +44 141 531 2800, **Fax:** +44 141 531 2801
Group: Alcan
Associated Companies: Alcan Rolled Products (Rogerstone, Gwent)
Product Types: Wrought alloys. Foil: packaging & laminating.

Alcan Rorschach AG [AI]

Industriestrasse 35
CH-9400 Rorschach, [Postfach 498 CH-9401 Rorschach]
Switzerland
Tel: +41 71 844 3333, **Fax:** +41 71 844 3541
Group: Alcan
Product Types: Wrought alloys. Printed & laminated foils. Foil.
Applications: Packaging.
Notes: Executive office & plant. Second plant CH-9400 Rorschach, tel +41 71 403333.

Alcan Smelting & Power UK - Kinlochleven Smelter [AI]

Kinlochleven
Argyll PA40 4SF
United Kingdom
Tel: +44 1855 40 4246, **Fax:** +44 1855 40 4244, **Contact:** Sales Manager - Metal Sales
Group: Alcan
Product Types: Cast alloys. High purity remelt and foundry ingot.
Approvals: BS 5750
Notes: One of 3 UK smelters producing ingot for Alcan mills across Europe; specializing in high purity aluminium ingot.

Alcan Smelting & Power UK - Lochaber Smelter [AI]

Fort William
Inverness-shire PH33 6TH
United Kingdom
Tel: +44 1397 90 2233, **Fax:** +44 1397 90 2200
Group: Alcan
Associated Companies: Sales office for super-purity remelt ingot produced by Kinlochleven smelter & Vigeland Metal Refinery A/S, Norway.
Product Types: Cast alloys. Sheet ingots (for Alcan rolling mills).
Notes: One of 3 UK smelters supplying sheet ingot to Alcan mills; using their own hydro- or coal-fired power. Annual capacity ~39000T.

Alcan Smelting & Power UK - Lynemouth Smelter [AI]

Ashington
Northumberland NE63 9YH
United Kingdom
Tel: +44 1670 393 811, **Fax:** +44 1670 393 956 / 817
Group: Alcan
Product Types: Cast alloys Sheet ingot (for Alcan Rolling Mills); remelt ingot. Ingot
Approvals: BS 5750.
Notes: One of 3 UK aluminium smelters that supply sheet ingot to Alcan mills across Europe; using their own hydro- or coal-fired power. Annual capacity ~130 000T.

Alcan Toyo Europe [AI]

Usine du Pont du Roy
Route de Lescun
F-64490 Accous
France
Tel: +33 5 59 88 20 00, **Fax:** +33 5 59 34 51 88, **Telex:** 560730 f
Group: Alcan (23.3%, via Japanese affiliate)
Associated Companies: Ile de France: Tel +33 1 39 62 11 77, Fax +33 1 39 12 32 23.
Product Types: Powders & pastes.
Notes: Manufacturing plant.

Alcan Toyo Europe [AI]

14 rue Gambetta, Le Mesnil-le-Roi
F-78600 Maisons Laffitte
France
Tel: +33 1 39 62 11 77, **Fax:** +33 1 39 12 32 23,
Group: Alcan (23.3% owned via Japanese affiliate)
Product Types: Powders Aluminium paste & powder.
Notes: Executive & Sales Office. Plant situated at Accous.

Supplier Addresses & Product Details 45

ALCOA - Aluminium Company of America [AI]

425 Sixth Avenue, Alcoa Building
Pittsburgh, PA 15219-1850
United States of America
Tel: +1 412 553 3042

Group: ALCOA - Aluminium Company of America

Product Types: Wrought alloys Cast alloys

Notes: Head Office – Late Entry -

ALCOA - Aluminium Company of America [AI]

Wire, Rod & Bar Division, PO Box 5300, Park Avenue East
Massena, New York 13662-5300
United States of America
Tel: +1 800 622 5262

Group: ALCOA - Aluminium Company of America

Alloys: Toolrite 2011-T3, T451, T8; 2024-T6, T851, T4, T351;
Deltalloy 4032; 6013-T8; X6020-T8; 6061-T4; 6262-T8; 7075-
T73, T7351

Product Types: Wrought alloys

Tradenames: Toolrite, Deltalloy

Other Services: In-house Customer Service Specialists; Sales Support Managers; Application Engineering/Technical Assistance; Metallurgical Support; Quality Assurance/SPC Experts; Materials Characterization Laboratory including a unique to the industry Scanning Electron Microscope (SEM); Machinability Test Center; Technical Research Facility; Customized packing and shipping upon request; Customized alloys and tempers

Notes: - Late Entry -

Alcoa's - Wire, Rod & Bar Division is the largest continuously operating aluminum facility in the western hemisphere. This fully integrated smelting and fabricating facility. Within the aluminum industry, the broadest line of cold finished rod, bar and screw machine stock, as well as redraw rod are produced at Alcoa's - Wire, Rod & Bar Division.

Toolrite 2011 : A free-machining cold finished wrought alloy suggested for applications requiring high productivity without concerns for overall corrosion resistance. The T3 temper offers high productivity at moderate strength levels. The T451 tempers offers excellent deep drilling characteristics at a lower strength level. When higher strength is required, T8 temper is the choice. Typical applications include auto fuel system componentry, gears, camera and clock parts, meter shafts, connectors, ordnance and speedometer components.

2024 : A high strength aluminum screw machine stock alloy with tensile strengths in the T351 and T4 temper approaching mild steels. The alloy has good machinability and deep drilling characteristics. Anodizing response is rated moderate for the alloy. The T6 and T851 tempers offer both an increase in strength and improved stress-corrosion cracking resistance over the T4 and T351 tempers. Typical applications include aircraft fittings, hydraulics, hinge pins, valve and valve parts and brake pistons.

Deltalloy 4032: Because of its' superior wear and abrasion resistance, Deltalloy 4032 eliminates the need for hard coat anodizing commonly required in applications using 6061 and 6262 alloys. The alloy offers good machinability when used with polycrystalline or carbide tooling. Typical applications include master brake cylinders, transmission valves, copier parts, bearings and hydraulic applications.

6013 : Suggested for applications needing high strength and good corrosion resistance. Additional benefits include joining and anodizing response similar to that of 6061 and 6262 alloys. The T8 temper has typical yield strength properties which are 15-20% higher than those of 6262-T9 cold finished rod and bar. The T8 temper has typical yield strength properties which are 40-45% higher than those of 6061-T6 cold finished rod and bar. 6013 offers moderate machinability and has excellent compressive properties. Initial applications include ABS braking systems and hydraulic valves and blocks.

X6020 : For applications requiring a high degree of machinability along with high corrosion resistance. X6020 has both good joining characteristics and excellent response to anodizing. It offers "A" rated machinability without lead additions. The T8 temper has excellent residual stress control for applications requiring tight dimensional control after machining. Typical applications include CATV connectors, hinge pins, transmission

valves, brake pistons, air conditioning compressor pistons, tripod fittings.

6061 : Offers high corrosion resistance with excellent joining characteristics along with excellent anodizing and applied coatings response. The T4 temper offers good formability for cold upset applications. Initial applications include aircraft fittings, electrical fittings and connectors, decorative hardware, hydraulic and brake pistons, and valve parts.

6262 : This alloy is suggested for applications requiring a high degree of machinability along with high corrosion resistance. It has both good joining characteristics with excellent response to anodizing. The free-machining alloy offers good machinability. The T8 temper has excellent residual stress control for applications requiring tight dimensional control after machining. Typical applications include CATV connectors, television fittings, camera parts, hinge pins.

7075 : The highest strength of all aluminum screw machine stock alloys, the T6 and T651 tempers have a typical tensile strength higher than most mild steels. The alloy has good machinability and anodizing response. The T73 and T7351 tempers offer improvement in stress corrosion cracking resistance over the T6 and T651 tempers. Typical applications include aerospace connectors and fittings, fuse and missile parts, worm gears and regulating valve parts.

Alcoa Extruded Products (UK) Ltd. [AI]

PO Box 42, Waunarlwydd Works
Swansea, West Glamorgan SA1 1YD
United Kingdom

Tel: +44 1792 873 301, Fax: +44 1792 879 723, Contact: Godfrey Benson - Quality Engineer

Group: Alcoa

Alloys: 6005A, 6082, 6063A, 6063. Tempers: T6. **Designation systems:** USA CEN BS

Product Types: Wrought alloys Rolled. Starting materials for beverage cans. Extrusion.

Approvals: BS EN ISO 9002

Notes: Part of the worldwide Alcoa operation, this plant has extrusion presses: 1500T, 2200T & 3150T. State of the art temperature control & cooling.

Alcodan Metals Ltd. [AI]

17 Isabel House
46 Victoria Road, Surbiton, Surrey KT6 4JL
United Kingdom

Tel: +44 181 390 1625, Fax: +44 181 390 8098, Contact: Mr. K. R. Petersen

Product Types: Profiles. Wire & rod.,

Notes: Agents for: Aluminium Munchenstein AG, CH (Extrusions), Aluminium Martigny SA, CH (casting, forging & extrusion stock) & Drahtwerk Elisental, D (Wire & rod).

Aldec Ltd. [AI]

Siddons Factory Estate, Howard St., Hill Top, West Bromwich
West Midlands B70 0SX
United Kingdom

Tel: +44 121 556 1687, Fax: +44 121 556 8758

Group: Hampson Industries plc (UK)

Associated Companies: Glasgow

Product Types: Cast alloys. Ingot

Other Services: BS 5750. ISO 9002.

Notes: Manufacturers of filtered secondary aluminium ingot. Processors of aluminium dross & scrap refiners. [Information from ALFED].

Aldec (Scotland) Ltd. [AI]

Lowland Works, Blantyre Farm Road
Uddingston, Lanarkshire. G71 7RR
United Kingdom

Tel: +44 141 641 2231, Fax: +44 141 641 2602

Group: Hampson Industries plc (UK)

Associated Companies: Glasgow

Product Types: Cast alloys. Ingot.

Other Services: BS 5750. ISO 9002.

Notes: [Information from ALFED]

46 Supplier Addresses & Product Details

Aldevienne Aluminium SA [AI]

F-86150 Le Vigeant
France
Tel: +33 5 49 84 59 59, Fax: +33 5 49 48 81 81, Telex: 790857
f/799837(minitelex), Contact: Mr. Christian Delaunay - President
- General Manager

Group: Distributorcap (UK) Est: 1981 Employees: 34
Alloys: NF Alloys (General purpose): A-U8S, A-U8SZ, A-S5U3,
A-S5UZ, A-S7G, A-S7U3G, A-S9G, A-S9GU, A-S10G, A-S12,
A-S12U, A-S13; (Special applications): A-U4NT, A-U5NKZr,
A-S2GT, A-S10UG, A-S11UNG, A-S12UNG, A-S18UNG,
A-S25UNG, A-G3T, A-G6, A-Z5G; (High strength): A-U5GT,
A-S5U3G, A-S7G03, A-S7G06; (Die casting): A-S9U3A,
A-S9U3B, A-G10. ISO Alloys: Al-Cu8Si, Al-Cu8SiZn, Al-Si5Cu3,
Al-Si6Cu4, Al-Si7Mg, Al-Si7Cu3Mg, Al-Si9Mg, Al-Si9MgCu,
Al-Si10Mg, Al-Si12, Al-Si12Cu, Al-Si13, Al-Cu4Ni2Mg2,
Al-Cu5NiCo, Al-Si2MgTi, Al-Si10CuMg, Al-Si11CuNiMg,
Al-Si12CuNiMg, Al-Si18CuNiMg, Al-Si25CuNiMg, Al-Mg3,
Al-Mg6, Al-Zn5Mg, Al-Cu4MgTi, Al-Si5Cu3Mg, Al-Si7Mg0.3,
Al-Si7Mg0.6, Al-Si9Cu3, Al-Mg10. Designation systems: ISO
NF

Product Types: Cast alloys Alloys, Ingot, Liquid metal by road
transport.

Applications: Automotive.

Approvals: ISO 9002, Renault A94.

Notes: Major supplier of high volume aluminium alloys to French
automotive industry.

Aleastur [AI]

Asturiana de Aleaciones SA
Poligono Industrial de Maqua S/N
P.O. Box 371
E-33400 Avilés (Asturias)
Spain
Tel: +34 8 5544933, Fax: +34 8 5548969, Telex: 87537 faea-e
Est: 1980

Alloys: Master alloys: Pure Al (99.7%), AlTiB, AlSr, AlSrTiB, AlTi,
AlB, AlZr, AlCa, AlSi, AlCu.

Product Types: Cast alloys Grain refiners & master alloys. Coils:
wire dia. 9.5mm +/- 0.5mm, 180kg +/- 20kg (standard, others on
request). Conti-bar-ingots: 200 & 500 g (standard, other on
request). Waffle-plates: size 500x200x50mm, 18 ingots/plate,
weight 7kg +/- 1kg. Sticks: wire dia. 9.5mm +/- 0.5mm, 500 or
1000mm long. Ingot.

Applications: Aluminium industry.

Other Services: Research & development. Customer support &
technical advice. QA by eddy current, grain refining test,
chemical analysis, metallography, physical property testing.
Statistical process controls. Approvals: ISO 9002, EQNET,
AENOR.

Notes: Founded in the 1980's, manufactures a comprehensive
range of grain refiners & master alloys for the aluminium
industry. Major activity is AlTiB alloys.

Alexandria Extrusion Company [AI]

401 Co Road 22 NW
Alexandria, MN 56308
United States of America
Tel: +1 612 763 6537, Fax: +1 612 763 6530

Product Types: Wrought alloys heat sinks, actuators, etc.
Extrusion.

Applications: Electronics, mechanical engineering.

Alform Extrusions Ltd. [AI]

Unit 6 & 7
Holton Heath Trading Park
Holton Heath, Poole
Dorset BH16 6LG
United Kingdom
Tel: +44 1202 624830, Fax: +44 1202 624976, Contact: Mike
Willshire - Sales Director

Alloys: EC Grade 99.7% purity. Some alloys in the 1XXX-, 3XXX-,
6XXX- series.

Product Types: Wrought alloys Extrusions - round, shaped &
rectangular. Strips & special profiles. Max. section width: 60 mm.
Cross-sectional area (solid): 6 to 500 mm². Tube: 6 to 40 mm
dia. Note: Maximum dimensions may vary for particular product
types. Products supplied on drums, reels or in tied coils.
Extrusion.

Applications: Electrical conductors (power cables, motors,
magnets, transformers, earth protection). Refrigeration. Air
conditioning. Radiators. Slotted carrier cores for fibre optics.

Approvals: BS EN ISO 9002

Notes: Manufacturers of extruded aluminium (& copper) products.

Oy Algot AB [Ti]

Karapellontie 6
SF-02611 Espoo
Finland
Tel: +358 80 50991, Fax: +358 80 595006, Telex: 12143
Group: Deutsche Titan (D)
Notes: Sales office (SF) for Deutsche Titan (D).

Alimex GmbH [AI]

Daimlerstraße 21-23
D-47877 Willich
Germany
Tel: +49 2154 91 77 0, Fax: +49 2154 91 75 85, Contact: Mr.
Krone
Group: Alimex Est: 1970 Employees: 40
Notes: Late entry.

Allega [AI]

See: Alusuisse Allega AG

Allvac [Ti]

See: Teledyne-Allvac Group

Almamet GmbH [AI Mg]

Gewerbestraße 5a
D-83404 Ainning
Germany
Tel: +49 8654 500 44, Fax: +49 8654 5605, Contact: Alexander
Rhombert
Est: 1983 Employees: 6
Alloys: Pure magnesium. Aluminium-Magnesium alloys
Product Types: Rasplings, powder & granules. Mg pieces for
spheroidal iron & desulphurisation of melts.
Applications: Foundry uses.
Notes: Granulation varied to customer requirements.

Almetex [AI]

Office & Plant
Parr Industrial Estate, St. Helens
Merseyside, WA9 1QW
United Kingdom
Tel: +44 1744 48 4300, Fax: +44 1744 48 4311
Group: British Aluminium Holdings (UK)
Alloys: Alloys 1XXX & 6XXX-series.
Product Types: Wrought alloys Mill finish, painted & anodised
standard extrusions. Max. circumscribed circle: 385mm, max.
width 385mm, weight 0.2-255kg/m. Extrusion.
Applications: Metal stockists. Road & rail transport. Marine. Civil
engineering. General engineering.
Other Services: Custom-designed extrusions. Approvals: ISO
9002, CAA BCAR A8-4B2, BAe. (ISO 9001, QS 9000 in
progress), RG 2000.
Notes: Two plants in UK (Merseyside & Warrington).

Supplier Addresses & Product Details 47

Alpac International USA

[Ti]

Se-Jong Materials Ltd.
10 Fairmount Avenue
Chatham, NJ 07928
United States of America
Tel: +1 201 635 6959, **Fax:** +1 201 635 5109,
Group: Se Jong Materials (S. Korea) **Est:** 1993 **Employees:** 38
Associated Companies: Se Jong Materials Ltd.
Inchon, South Korea
Tel: +82 32 812 8184, **Fax:** +82 32 818 5701
Product Types: Wrought alloys, Powders (alloy & high-purity).
Applications: Powder metallurgy.
Notes: Alpac International is the United States of America sales representative handling titanium powder / zirconium powder of high purity grade. The powder is produced by Se Jong Materials Ltd. in the process of hydride and dehydride method, which is for the application of manufacturing the parts and components by powder metallurgy.

ALPOCO - The Aluminium Powder Co. Ltd. [Al Mg MMC]

Forge Lane
Minworth, Sutton Coldfield
West Midlands B76 8AF
United Kingdom
Tel: +44 121 351 4686, **Fax:** +44 121 351 7604, **Telex:** 339514,
Contact: Linda Cox - Sales Office
Group: Metallurg (USA) **Est:** 1970
Associated Companies: World-wide
Alloys: High-purity Al & Mg. 2XXX, 6XXX, 7XXX, 8XXX-series alloys, inc. Al-Li alloys. Al-Si, Al-Fe-X.
Product Types: Powders Powder Super-pure Al powder (99.93-99.99%), Primary Al powder (99.50-99.70%), Secondary Al powder (97.00%), Al needles, by spun melt (99.50-99.70% & various alloys), Spherical Al powder (5, 15, 30 micron), Superfine Al powder (5, 8, 10, 15 micron). Al-alloy powder (specialist alloys), Atomised Mg powder. Al/grit MMC powder.
Applications: Mining explosives. Propellants. Refractories (steel furnaces). Pyrotechnics (fireworks, flares). Pigments (flake & paste for paint & ink). Metallurgical (reduction/ferrolloy). Welding & cutting. Chemical uses, (mainly Ziegler reactions). Pharmaceutical. Fillers (adhesives & resins for dies & moulds).
Other Services: Special Powders Division provide small quantities (1kg-3000kg) of Al- & Mg powder, special grades & alloys. Coated powders & pre-mixes. To customer requirements.
Approvals: ISO 9002.
Notes: A subsidiary of London & Scandinavian Metallurgical Co. Ltd. Provide a range of standard & custom powder products; both high-purity & alloy grades for a variety of industrial & research uses.

ALPOCO - The Aluminium Powder Co. Ltd. [Al Mg]

Manufacturing Plant
Holyhead, Anglesey, Gwynedd
North Wales LL65 2UX
United Kingdom
Tel: +44 1407 762369, **Fax:** +44 1407 760219, **Contact:** Mr. R.
Plant - Manufacturing Manager
Group: Metallurg (USA)
Associated Companies: Sutton Coldfield, UK
Product Types: Powders.
Notes: A subsidiary of the London & Scandinavian Metallurgical Co. Ltd.

Sté Alsacienne d'Aluminium

[Al]

Le Chable-Beaumont, BP 111
F-74164 Saint Julien en Genevois
France
Tel: +33 4 50 04 50 00, **Fax:** +33 4 50 04 50 01, **Telex:** 385714 f,
Contact: Michel Blaise
Est: 1932 **Employees:** 942
Associated Companies: France - **Tel:** +33 3 88 58 35 00, **Fax:** +33 3 88 58 35 04, **Contact:** Carmen
Product Types: Wrought alloys Foil.
Applications: Packaging (food & industrial)

P.T. Altrindo Yasa Niagatama

[Al]

Gedung Gapuramus
5th floor, Gateway Building
Jl Letjin S. Parman Kav. 91 Slipi
Jakarta 11150
Indonesia
Tel: +62 21 566 8305, **Fax:** +62 21 566 8302, **Contact:** Agus Yahya
Group: Comalco

Alucast International

[Al]

See: Brabant Alucast International BV

AluCoat

[Al]

See: Hydro Aluminium A/S - AluCoat

Alucor Australia Pty Ltd.

[Al]

PO Box 29 Lindfield West
10 Buckingham Road
Killara, NSW 2070
Australia
Tel: +61 29 498 3011, **Fax:** +61 29 418 4150
Group: Hoogovens Groep
Product Types: Wrought alloys, Plate, Sheet, Strip
Notes: Hoogovens Aluminium Waltzprodukte - Koblenz (D).

Alucuilux

[Al]

See: Gottschol Alucuilux S.A.

Alumasc Building Products Ltd.

[Al]

Burton Latimer, Kettering
Northamptonshire. NN15 5JP
United Kingdom
Tel: +44 1536 383838, **Fax:** +44 1536 383830, **Contact:** Simon - Sales - Building Products
Group: Alumasc
Alloys: LM2, LM6, AA6063, 99%+ Wrought & Cast Aluminium.
Temper: TF.
Product Types: Wrought alloys Cast alloys Full range of extruded, pressed or cast aluminium rainwater products. Aluminium sheet wall copings. Fascia and soffit sheeting. Plain or polyester powder coated.
Applications: Building and construction products. Brewery products and industrial components, guttering/tubing, casters.
Tradenames: Aqualine, Aquarius, Skyline, Guardian.

48 Supplier Addresses & Product Details

Alumat Inc. [AI]

166 Gentry Street
Pomona, CA 91767
United States of America
Tel: +1 909 392 1353, **Fax:** +1 909 392 1360, **Email:**
alumat01@aol.com, **Internet:** http://www.thomasregister.com,
Contact: Gert von Marschner

Associated Companies: USA: 800 433 9903, 800-905-1171 (export)

Alloys: 1100, 1350 (EC), 3002, 3003, 3004, 3005, 5005, 5050, 5052, 5056, 5252, 5657, 6061. **Temperatures:** O, H12, H14, H16, H18, H24, H25, H26, H28, H32, H34, H36, H38, H241, T4, T451, T4510, T4511, T6, T651, T652, T6510, T6511.

Designation systems: USA

Product Types: Wrought alloys Coil foil & strip: Thickness 0.025mm to 1.526mm, Width 3.175mm to 609 mm, Colour - natural anodized (304mm max. width), coating (609 mm width max.). Painted aluminium coil (modified- or linear-polyester, fluorocarbon, epoxy, prints): 0.200 to 1.27 mm thick, 178 to 916mm wide, 1.295mm to 1.600 mm thick, width 178 to 762 mm wide. Wire sizes: 0.05mm to 10 AWG (others on request).

Shape: square, flat & round. Anodized finish (to AMS 4182C, MIL-A-8625). Organic enameling finish: polyurethane/nylon, butyral, polyester, polyesterimide, polyamide. Insulation: Teflon^(TM), Scotchcast^(TM), Kynar, PVC, nylon. Special products: Single end aluminium, inc. knitting wire for EMF shielding to AMS 4182. Coaxial dropwire (cable braid). Strip, Foil, Wire.

Applications: Electrical & electronic, inc. airborne equipment, moving & deployable parts, rotary & moving coils, voice coils. Cables & braids. EMF shielding. Medical.

Other Services: Technical engineering advice & customer product development. Coatings on foil & coiled sheet (double or one-sided). Anodizing to AMS 4182C-8, MIL-A-8625 - Type II, Class 1 & Class 2. Conversion coating to MIL-C-5541 Class 1A & Class 3.

Notes: Provides an extensive range of anodized & custom-coated semi-finished products. Custom products available (on request).

Alumax Corporation [AI]

1617 North Washington, Magnolia, AR 71753
United States of America
Tel: (800 643 1514) toll free, **Fax:** +1 501 234 3181

Alloys: No details.

Product Types: Wrought alloys, Extrusion.

Other Services: Metal Finishing, Powder Coatings, Protective Coatings, Etched Products.

Alumax Extruded Products (UK) Ltd. [AI]

Liantrisant Business Park, Polyclun, Liantrisant
Mid. Glamorgan CF72 8LF
United Kingdom

Tel: +44 1443 238 888, **Fax:** +44 1443 237 936

Group: Alumax Inc (USA)

Alloys: 6063, 6082, 6063, 6005.

Product Types: Wrought alloys. Extrusions (to 203mm dia.). Some standard shapes.

Other Services: Custom-profiles. Powder coating (polyester), anodising, thermal break lines. Extensive fabrication facilities.

Approvals: BS 5750, ISO 9002. Approved: Synth Pulvin, International Paint applications.

Notes: [Information from ALFED]

Alu Menziken Industrie AG [AI]

CH-5737 Menziken
Switzerland

Tel: +41 64 70 21 21, **Fax:** +41 64 70 21 04, **Contact:** Mr.

Smoldrek - Managing Director

Alloys: Proprietary designations: Aluman-100, Peraluman-100, Peraluman-101, Peraluman-150, Peraluman-151, Peraluman-253, Peraluman-260, Peraluman-300, Peraluman-301, Peraluman-410/412, Peraluman-460/462, Extrudal-043, Extrudal-050, Anticorodal-062, Anticorodal-082, Anticorodal-100/105, Anticorodal-110/112, Avional-100/102, Avional-150/152, Avional-150 plaqué, Avional-660/662, Unidur-102, Perunal-205, Perunal-215, Perunal-215 plaqué, Anticorodal Pb-

107, Anticorodal Pb-109, Avional Pb-118, Decolta-500; CEN designations (EN): AW-1050A, AW-1200, AW-3003, AW-3103, AW-5005A, AW-5050, AW-5052, AW-5454, AW-5754, AW-5086, AW-5083, AW-6060, AW-6063, AW-6005A, AW-6061, AW-6082, AW-2017A, AW-2024, AW-2024pl, AW-2014A, AW-7020, AW-7022, AW-7075, AW-7075pl, AW-6012, AW-6018, AW-2030, AW-2011, AW-2011A, AW-1350, AW-6101B; ISO designations: Al99.0, Al99.5, AlMn1Cu, AlMn1, AlMg1, AlMg1.5, AlMg2.5, AlMg2.7Mn, AlMg3, AlMg4Mn, AlMg4.5Mn, AlMgSi0.5, AlMgSi0.7, AlMg1SiCu, AlMgSi1, AlCuMg1, AlCuMg2, AlCuMg2pl, AlCuSiMn, AlZn4.5Mg1, AlZnMgCu0.5, AlZnMgCu1.5, AlZnMgCu1.5pl, AlMgSiPb, AlCuMgPb, AlCuBiPb, E-Al99.5, E-AlMgSi0.5. **Designation systems:** CEN ISO Proprietary

Product Types: Wrought alloys. wrought products (extrusions, bar, tube), Bar, Tube, Extrusion.

Tradenames: Aluman, Peraluman, Extrudal, Anticorodal, Avional, Unidur, Perunal, Decolta.

Aluminium Company of America [AI]

See: ALCOA - Aluminium Company of America

Aluminium Corporation [AI]

Dolgarrog, Conwy, Gwynedd, Wales. LL32 8JH
United Kingdom

Tel: +44 1492 61 4200/4258, **Fax:** +44 1492 61 4294/4295

Group: British Aluminium Holdings (UK)

Product Types: Wrought alloys Circles, plain sheet & coil, patterned sheet, hot & cold rolled plate, PTFE-coated products. (inc. Al-Li alloys). Superplastic alloys, Plate, Sheet

Applications: Aerospace, inc. satellite dishes. Cookware. Cathode sheet.

Notes: Specialist producer of non-standard aluminium rolled products, inc. Aluminium-lithium. Superplastic alloys. Satellite dishes. Cookware.

Aluminium Decin spol. sr.o. [AI]

Ustecká 37
CZ-40535 Decin 5
Czech Republic

Tel: +42 412 510 220, **Fax:** +42 412 510 226, **Contact:** Karen Levering - Controller, Marketing & Sales

Group: Alusuisse-Lonza (CH) **Est:** 1991 **Employees:** 700

Associated Companies: Alusuisse: A, B, CH, D, E, F, GB, I, NL, Hungary.

Alloys: Standard Alloys: 1050A, 1050, 1100, 2007, 2011, 2014, 2017, 2024, 2038, 2618, 3003, 3103, 5051A, 5052, 5056A, 5083, 5251, 5754, 6005A, 6012, 6060, 6082, 7020, 7022, 7075.

Group I: CP Al, AlMgSi0.5, AlMg1, 4406 (CSN). **Group II:** AlMgSi0.7, AlMgSi1, AlMg1.8, AlMg2, AlZn4.5Mg1. **Group III:** AlMg2Mn0.8, AlMg2.5, AlMg3, AlMg4.5Mn, AlMg5, 4261 (CSN), GOST L1, Z 4208 (ONZ), GOST V65, Z 4219 (ONZ). **Group IV:** AlZnMgCu0.5, AlZnMgCu1.5, 4417 (CSN), Z 4218 (ONZ).

MgSiPb. **Temperatures:** Not stated. **Designation systems:** USA DIN CSN, GOST, ONZ

Product Types: Wrought alloys Billets. Extruded tubes (round), seamless tubes (round), bars (round, square, hexagonal, flat). Drawn seamless tubes (round), bars (round, square, hexagonal, flat). Cast bars (round). Ferrules (flat-oval). Coextruded (flat) Sections (sizes): Standards - 160 mm circumscribed circle, 250x60, cross-sectional area 35 to 3000 mm². Min. wall thickness 1.0 mm. Hollow - 225 mm circumscribed circle, 200x60, 160x160, min. wall thickness 1.0 mm. Over mandrel - 20 to 175 mm, wall thickness 2 to 5 mm (varies with diameter range). Solid 225 mm circumscribed circle, 250x60, min. wall thickness 1 mm. Billet, Bar, Tube, Extrusion.

Applications: Numerous. Automotive. Extrusions for chassis, outer & inner body.

Approvals: EN ISO 9002

Notes: Joint venture with Alusuisse-Lonza (CH) & Kovohute Decin (CZ). Annual production (1996): 22500 T extruded semi-finished products, 35000T billets. Eleven extrusion presses (direct & indirect) Aluminium alloys & Cu-based and Mg-alloy. Member of the Alusuisse-Lonza (A-L) Aluminium Division, an interdisciplinary team experienced in the automotive industries requirements.

Aluminium de Grèce SAIC [AI]

1 Sekeri
Athens, GR-10671 Attiki
Greece
Tel: +30 1 369 3000, Fax: +30 1 369 3115, Telex: 215290
Group: Pechiney Est: 1961 Employees: 1844

Aluminium Delfzijl [AI]

Oosterhorn 20-22, Postbus 133
NL-9930 AC Delfzijl
Netherlands
Tel: +31 596 638555, Fax: +31 596 638446
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Primary Products.

Aluminium Extrusions Ltd. [AI]

HF12 Har Far Industrial Estate,
Har Far, ZRQ 06
Malta
Tel: +356 682957/8, Fax: +356 681187, Contact: Mr. Raymond
Borg
Employees: 60
Product Types: Wrought alloys, Billet, Extrusion,

Aluminium Martigny SA [AI]

CH-1920 Martigny
Switzerland
Tel: +41 27 722 32 04, Fax: +41 27 722 93 88
Associated Companies: Alcodan Metals Ltd. (UK). Connected
with Aluminium Munchenstein AG (CH).
Product Types: Wrought alloys, Cast alloys, master alloys, ingots,
etc. Casting, forging (dia. Min. 75mm, max 635mm) and
extrusion (dia. min. 75mm, max 635mm) stock. Busbars in any
dimensions. Ingot, Billet, Forgings/Stock, Busbars.

Aluminium Münchenstein AG [AI]

Tramstrasse 56-66
Postfach, CH-4142 Münchenstein 2
Switzerland
Tel: +41 61 4157777, Fax: +41 61 4157384
Est: 1918
Product Types: Wrought alloys, Bar, Tube, Extrusion
Applications: Automotive, Mechanical engineering,
Electrical/electronic, Metallic constructions.
Approvals: ISO 9001/EN 29001
Notes: Three extrusion presses: 2000 t, 2500 t & 5000 t.

Aluminium Norf [AI]

Koblenser Strasse 120
D-41468 Neuss, [Postfach 100353, D-41403 Neuss]
Germany
Tel: +49 2131 937-0, Fax: +49 2131 937239
Group: Alcan (50%)
Product Types: Wrought alloys Rolled products.
Notes: Europes largest rolling mill. Sales enquiries to Eschborn.
Tel +49 6196 4070, Fax +49 6196 407145 or to regional sales
offices.

Aluminium Pechiney [AI]

[Pechiney Balzac]
10, Place des Vosges, La Défense 5
F-92048 Paris La Défense Cedex
France
Tel: +33 1 46 91 46 91, Fax: +33 1 46 91 46 46/51 42, Telex:
612013 pech f
Group: Pechiney Employees: 3743
Associated Companies: Worldwide
Product Types: Cast alloys Bauxite, alumina, primary aluminium
(ingots, billets, slabs, wire & speciality products). Secondary
aluminium. Ingot, Billet, Wire, slabs.
Notes: Head office for Pechiney Aluminium, part of the Pechiney
Aluminium Metal Division.
Production facilities (either wholly-, partly-owned or with an
interest):
Bauxite (mines inc. Boké & Fria, Guinea; Parnasse, Greece).
Alumina refineries (in Australia, France, Greece & Guinea).
Primary aluminium smelters: Auzat, F; Lannemezan, F; Saint-
Jean-de-Maurienne, Dunkerque, F; Saint-Nicolas, Greece;
Flessingue, NL; Edéa, Cameroon; Bécancour, Canada.
Secondary aluminium: Compiègne, F.

The Aluminium Powder Co. Ltd. [AI Mg MMC]

See: ALPOCO

Aluminium Precision Extruders Ltd. [AI]

Pant Glas Industrial Estate
Bedwas, Newport NP1 8DR
United Kingdom
Tel: +44 1222 867311, Fax: +44 1222 863728, Contact: Steve
Woodman
Group: Norsk Hydro
Product Types: Wrought alloys, extrusions.

Aluminium Rheinfelden GmbH [AI]

Postfach 11 40
D-79601 Rheinfelden/Baden
(Friedrichstraße 80, D-79618 Rheinfelden)
Germany
Tel: +49 7623 93 303/511, Fax: +49 7623 93 546/5/7, Contact:
Dr. Alois Franke/ M. Denni
Est: 1898 Employees: 320
Alloys: No details Designation systems: CEN
Product Types: Wrought alloys Cast alloys Foundry & wrought
alloys. Rolling slab. Aluminium grit. Paste (electrode & anodes)
Semis/slugs for impact extrusion. Ingot, Billet, Plate, extrusion
billet, impact extrusion slugs.
Applications: Impact extrusion (aerosol cans, collapsible tubes,
bottles, fire-extinguishers, industrial parts). Chemical
engineering reagents.
Tradenames: VACONO (slugs).

Aluminium Shapes Ltd. [AI]

Princetown Road
Corby, Northants NN17 4AP
United Kingdom
Tel: +44 1536 262437, Fax: +44 1536 204216, Contact: Chris
Rentowl
Product Types: Wrought alloys. Extruded profiles mainly to
customer requirements. Normally lighter & smaller types of
profiles.
Other Services: Fabrication facilities. Approvals: ISO 9000
Notes: Five extrusion presses (indirect & direct) . Max. size:
sections within a 135 mm circumscribing circle.

Aluminium Suisse SA [AI]

See: Alusuisse Group

50 Supplier Addresses & Product Details

Aluminium Supply Aerospace [AI]

PO Box 257, Allum Way, Totteridge
London N20 9QS
United Kingdom
Tel: +44 181 700 2000, Fax: +44 181 700 2099, Contact: Rob Smith - Export Manager
Group: British Aluminium Holdings (UK)
Associated Companies: UK: Totteridge, N. London (National Centre & Export Office); Tyldesley, Manchester; Newtownards, Co. Down, N. Ireland.
Alloys: Aerospace alloys: Mainly 2XXX-series. Designation systems: USA CEN BS
Product Types: Wrought alloys High-performance aluminium alloys. Mainly 2XXX series alloys., Plate, Sheet, Bar,
Applications: Aircraft industry (airframes), defence, aircraft equipment manufacturers.
Other Services: Machining (cut-to-size, chamfering), billeting. Extrusion design. Sheet protective coating. Stock-holding to customer requirements. Contracts centre (London). Testing (conductivity, hardness, ultrasonic gauging, X-ray. Approvals: BS EN ISO 9000, CAA, MoD, BAe.
Notes: Specialist supplier of aluminium & metallics to the aerospace industry for >35 years. Cooperation with clients to provide full service, inc. JIT supply & closer to final form materials. Export (Europe, USA, Far East, Australia)

Aluminium Supply Aerospace [AI]

Bankfield Road, Mosley Common Road
Tyldesley, Manchester M29 8QH
United Kingdom
Tel: +44 161 911 2800, Fax: +44 161 911 2899,
Group: British Aluminium Holdings (UK)
Associated Companies: UK: Totteridge, N. London; Tyldesley, Manchester; Newtownards, Co. Down, N. Ireland.
Alloys: Aerospace alloys: Mainly 2XXX-series. Designation systems: USA CEN BS
Product Types: Wrought alloys High-performance aluminium alloys. Mainly 2XXX series alloys., Plate, Sheet, Bar,
Applications: Aircraft industry (airframes), defence, OEM aircraft equipment manufacturers.
Other Services: Contract management, inc. JIT supply. Machining centre. Bulk warehousing. Approvals: BS EN ISO 9000, CAA, MoD, Bae.
Notes: Specialist supplier of aluminium & metallics to the aerospace industry for >35 years. Cooperation with clients to provide full service, inc. JIT supply & closer to final form materials. Export (Europe, USA, Far East, Australia)

Aluminium Technique Moselle [AI]

See: A.T.M. (Aluminium Technique Moselle)

Aluminiumwerk Unna AG [AI]

See: AMAG Aluminiumwerk Unna AG

Alumino Español SA [AI]

Jose Abascal 4
E-28003 Madrid
Spain
Tel: +34 91 4484100, Fax: +34 91 4487657
Product Types: Cast alloys, Ingot, Billet, Plate, Bar.
Notes: Main Spanish smelter. Producing aluminium & alloys. Information provided by ICEX (Instituto Español de Comercio Exterior).

Alumisr [AI]

Egyptian Aluminium Products Co.
Lebanon Square
El Mohandiseen, Giza [P.O. 215/12612, Orman Giza]
Egypt
Tel: +20 2 345 5837, Fax: +20 2 345 5272, Telex: 94032, Email: alumisr@ritsec2.com.eg, Contact: Ahmed Ibrahim - Ass. Marketing/Sales Director
Est: 1977

Alloys: 1050, 1070, 1100, 6005, 6060, 6061, 6063, 6082, 6364.
Tempers: T4, T5, T6; DIN AlMgSi0.5-1. Designation systems: USA DIN.

Product Types: Wrought alloys Extruded profiles. Max. diagonal 180 mm, minimum thickness 1.2 mm. Extrusion.

Applications: Architectural, industrial, electrical, heat-sinks, decoration, irrigation systems, exhibition stands.

Other Services: Design, anodising: class 1 & class 2, powder coating, fabrication workshop. Custom profiles. Approvals: ISO 9001 (95-LON-AQ-263) by Det Norsk Veritas QA Ltd.

Notes: Est. 1977. Joint venture with Reynolds, USA (10%), Arab Contractors Group (49%) & other Egyptian companies (41%). Turnover (1996): 32 million US\$. Technical cooperation agreements with Reynolds (USA), Solarlux Aluminium Systems GmbH (D) - sliding & folding doors, windows, partitions, SYMA Intercontinental SA (CH) - exhibition stands, shop fitting, Eurospace Engineering (B) - skylight systems. Production: 12000 tonnes/yr (70% anodised). Export: Arab countries, Europe (D, UK & F), Africa.

Alunord snc. [AI]

Parc Industriel d'Incarville, BP 613
F-27416 Louviers Cedex
France
Tel: +33 2 32 09 32 09, Fax: +33 2 32 40 09 21, Telex: 180350 alunord f, Contact: Bernard Gossent
Group: Norsk Hydro Est: 1973 Employees: 56
Alloys: Alunord Alloys: 1370-70, 6005A, 6060-48, 6063-79, 6081-11, 608250, 6106, C 50S; NF Alloys: A7, AGS, AGS85, ASG, ASGM0.7; AA Alloys: 1070A, 6005A, 6063, 6082, 6106, 6181.
Tempers: H9, H19, H30. Designation systems: USA NF Alunord.
Product Types: Wrought alloys Extruded aluminium profiles - stock sections and custom profiles. Extrusion, Architectural, structural and standard sections.
Applications: Architectural, building, windows, etc.
Other Services: Very wide range of surface treatments and finishes available, including: brushing, mechanical & electrochemical polishing, anodising, lacquering, tin coating, etc.
Notes: Direct extrusion of solid profiles up to 150 mm circumscribing circle and hollow profiles up to 120 mm circumscribing circle. Development of automotive applications.

Alu Perfil Espana SA [AI]

Ctra. Molins de Rei, km 8,6
E-08191 Rubi (Barcelona)
Spain
Tel: +34 3 588 15 55, Fax: +34 3 588 28 28/588 22 14, Contact: G. Reichel - President
Group: Alu Perfil Espana SA
Alloys: Aluminium-Magnesium-Silicon Alloys Designation systems: USA DIN
Product Types: Extrusions (AlMgSi alloys) to ASTM & DIN standards., Extrusion,
Applications: Building. Automotive. Electrical/electronic.

Alupluss [AI]

See: Hydro Aluminium Alupluss

Aluport - Matrizes de Portugal Lda. [AI]

Raso de Paredes
Mail: Apartado 113
P-3752 Agueda Codex
Portugal
Tel: +351 34 62 35 24, Fax: +351 34 62 15 29
Group: Norsk Hydro
Notes: Extrusion die production.

Alupres [AI]

See: Hydro Aluminium Alupres Ltd.

Aluserv [AI]

See: Hydro Aluminium Aluserv a.s

Supplier Addresses & Product Details 51

Alusingen GmbH [A/]

Alusingen-Platz 1
D-78221 Singen/Hohentwiel (D-78224 Singen)
Germany
Tel: +49 7731 800, Fax: +49 7731 80 2222, Telex: 79381220 al d,
Contact: Mr. Sauer - Production.
Group: Alusuisse (CH) Est: 1912 Employees: 3000
Associated Companies: France (Lyon): +33 4 78 31 59 98
Alloys: AA: 1090, 1080A, 1050A, 5005A, 5754. DIN: Al99.0,
Al99.0Mg0.5, Al99.9Mg1, Al99.85Mg0.5, Al99.85Mg1,
Al99.85Mg1Cu, Al99.8, Al99.5, AlMg1, AlMg3. Modified-AA &
DIN: Al99.85, 1085, 5657, 5252, Al99.85Mg2.5,
Al99.85Mg0.5Cu, Al99.85Mg0.8Cu, 5657, 5205,
Al99.7Mg0.8Cu, AlMg0.5.
Alusingen No. 183, 119, 184, 281, 282, 285, 286, 288, 289, 297,
276, 277, 278, 111, 134, 294, 205, 214, 234.
Alusingen Tradenames (brightening alloys): Relital, Reflectal-
050, Reflectal-100, Remiral-050, Remiral-100, Peraluman-845,
Peraluman-860, Peraluman-875, Peraluman-843, Peraluman-
853, Peraluman-863; (anodizing qualities) Peraluman-708,
Peraluman-050, Peraluman-100, Peraluman-300.
Nameplate grades Alusingen alloy (DIN-type) : 294
(Al99.7Mg0.8Cu), 134 (Al99.5), 234 (AlMg3), 214
(Al99.7Mg8Cu), 131 (Al99.5), 211 (AlMg1), 231 (AlMg3).
Designation systems: USA DIN Proprietary
Product Types: Wrought alloys Rolled products (sheet, strip, coil
& circles) in a variety of alloys & surface finishes. Strip thickness:
0.2-1.2mm (4mm for some finishes), strip width 10-1250mm,
sheet width 60-1500mm, sheet length 350-6500mm Note: Sizes
vary with finish. Anodized finishes code: ED (decorative,
demanding), EI (decorative, normal), EB (anodizing after etch),
EA (anodizing after etch), ES (anodizing after
chemical/electrolytic brightening), EG (anodizing after
chemical/electrolytic brightening- minimum earing). Nameplate
qualities for anodizing & laquering. Finishes: ED, EB, EI, ET, EN
(clear laquering, not anodizing), NA (not anodizing, for opaque
laquering). Sheet, Strip.
Applications: Varies with finish. ES (special bright) decorative
trim, inc. cars, cosmetic containers/closures. EG (bright) deep-
drawn reflectors & lamp housings, cosmetic containers/closures.
ED (decorative) high-quality equipment front & display panels,
interior fittings. EI (industrial) - nameplates, door fittings, switch
covers, housings, interior fittings. EB (etch/anodize) Front
panels/plates, interior & shop fittings. EA (architectural) fascia
parts, letter-boxes, nameplates. EN (laquering) front panels, dial
faces, etc. Nameplate qualities for equipment display & front
panels, clock & dial faces, plaques & switch covers.
Tradenames: Relital, Reflectal, Remiral, Peraluman.
Approvals: DIN EN ISO 9001
Notes: A range of rolled products with a variety of surface finishes
mainly for decorative trims & plaques or reflectors.

Alusuisse Allega AG [A/]

Buckhauserstrasse 5, CH-8048 Zürich
Switzerland
Tel: +41 1497 4111, Fax: +41 1497 4344,
Group: Alusuisse-Lonza (CH)
Alloys: 1050A, 1350, 6060, 6101, 6101A, 6101B, 6106, 6063,
6005A, 6081, 6082, 5754, 5454, 5086, 5083, 6262, 2017A,
2011, 7020, 2007, 2030, 2024, 2014, 2014A, 7022, 7075,
7049A. Tempers: not stated
Extrudal 049, Anticorodal 041, Anticorodal 051, Anticorodal 053,
Anticorodal 062, Anticorodal 100, Anticorodal 112, Peraluman
300, Peraluman 260, Peraluman 412, Peraluman, 462,
Anticorodal Pb-109, Avional 102, Dectolital 500, Unidur 102,
Avional Pb-118, Avional 152, Avional 662, Perunal 205, Perunal
215, Super-Perunal 249 Designation systems: USA CEN DIN
Proprietary
Product Types: Wrought alloys Electrical conductors (round, flat,
shaped) 8-15 mm dia. Bars (round, flat, polygonal) 10-300 mm
dia. Solid profiles 10-470mm circumscribed circle, 600x80 mm
max., 150x180mm max. Solid profiles circumscribed circle 20-
440 mm, 570x60 mm max., 480x100 mm max. Tubes (hollow
symmetrical profiles) 12-400 mm max. external dia. Drawn
tubes: bars (round, flat polygonal) 9-90mm dia. Tubes 18-150
mm max. external dia., Plate, Strip, Bar, Tube, Extrusion,

Applications: Numerous. Automatic machine/production
equipment (with moving parts), tools, motor housings, industrial
equipment, mobile cranes, conveyor systems.

Approvals: SQS Norm. 029 100/B; DQAB, CAA, BAe, TUV, FFFV,
Lloyds, DNV, ABB, Racal, Rolls Royce.

Notes: Sales office for Alusuisse Sierre rolled products.
Marketing/development & sales for extruded products produced
at Alusuisse sites in Singen (D), St. Florentin (F), Sierre (CH).

Alusuisse Aluminium Suisse SA [A/]

CH-3965 Chippis
Switzerland
Tel: +41 27 57 51 11, Fax: +41 27 56 23 10,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Sheet, Extrusion,
Applications: Automotive. Sheet & extrusions for power train,
chassis, outer body, inner body
Other Services: Research & development. Customer advice,
engineering & logistics. Approvals: ISO 9001
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division
which, as a whole, employs ~10000 people, annual sales ~ 3
billion DM. It is an interdisciplinary team experienced in the
automotive industries requirements. Important suppliers to the
automotive industry in Europe & the USA. Large manufacturing
capacity in Europe & USA: 3 rolling mills, 4 extrusion plants, 5
composite facilities, 1 die-casting plant).

Alusuisse - Aluminium Suisse SA [A/]

CH-3960 Sierre
Switzerland
Tel: +41 27 457 5111/6550, Fax: +41 27 457 65 15, Contact: U.
Schulte
Group: Alusuisse-Lonza (CH)
Associated Companies: NL, B, D, E, F, I, A, CH, UK.
Scandinavia (via agents; contact Alusuisse-Sierre for details).
Alloys: 1050A, 1350A, 2017A, 2024, 3003, 5005, 5754, 5086,
5083, 6061, 6082, 7020, 7075. Avional 100, Avional 150,
Aluman 100, Peraluman 100 (101), Peraluman 300 (301),
Peraluman 410, Peraluman 460, Anticorodal 080, Anticorodal
110, Anticorodal 120, Unidur 102, Perunal 25, Alplan, Unidal,
Cental, Contal
Tempers (EN 515): O, H111, H112, F, H12, H14, H16, H18,
H19, H22, H24, H26, H28, H32, H34, H36, H38, T4, T451, T36,
T61, T6151, T6, T66, T86, T87, T89, T651, T9, T76, T73,
T7351, T1, T652, T852, O2, O3. Designation systems: USA
CEN DIN Proprietary + CH.
Product Types: Wrought alloys Rolled products (typical sizes):
Coiled sheets- 0.5-4.0 mm thick, 40-2200 mm wide. Corrugated
products - 0.5-1.5 mm thick, 1250mm wide, 15000mm long. Flat
sheets - 0.5-4.0 mm thick, 500-2200mm wide, max. length
10000mm. Shate - 4.0-7.0 mm thick, 500-2000mm wide, 10000
mm long. Tread-plate - 2-9mm thick, 2500 mm wide, 6000-
10000mm long. Sheet (individually coiled rolled) - 3-20mm thick,
3000mm wide, 10000mm long. Note: Maximum dimensions may
vary for a particular alloy. Plate, Sheet, Strip, Extrusion
Applications: Varies with alloy grade. Automotive body panels,
machinery manufacturers, tooling, moulds, leisure & sporting.
Tradenames: Avional, Aluman, Peraluman, Anticorodal, Unidur,
Perunal, Unidal, Alplan, Cental, Contal.
Other Services: Customised variants of standard products (on
request). Approvals: SQS ISO9001, EN29001. BAe, CAA, FFFV,
Lloyds, DNV, ABB, TUV, Rolls Royce.
Notes: Rolling Mill. Close involvement with industry for the
development of 2XXX, 6XXX & 7XXX series quenachable alloys
for thick-plate & wide sheet. High-speed cold-rolling mill (width
2200mm, coils 14T); continuous heat-treatment furnace for
solution treatment of coils with quenching. Integrated stretching
& levelling equipment.

Alusuisse Austria GmbH [A/]

Unterbergstrasse 1, A-5620 Schwarzach
Austria
Tel: +43 6415 62010, Fax: +43 6415 620157,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion.
Notes: Sales office

52 Supplier Addresses & Product Details

Alusuisse Austria GmbH [A/]

Wienerbergstrasse 1
A-1121 Wien
Austria
Tel: +43 1811 47, **Fax:** +43 1811 4777,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion
Notes: Sales office

Alusuisse CMIC SA [A/]

Zone Industrielle, 11 rue Louis Armand, BP 55
F-77330 Ozoir le Ferrière Cédex
France
Tel: +33 1 64 40 05 62, **Fax:** +33 1 64 40 06 47,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion,
Notes: Sales office

Alusuisse Costa srl [A/]

Via del Carrozaio 4
I-40127 Bologna
Italy
Tel: +39 51 53 3506, **Fax:** +39 51 53 8290,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Foil, Extrusion,
Notes: Sales Office

Alusuisse España SA [A/]

Poligono Industrial 'El Pla'
Riera can Pahissa 24A
E-08750 Molins de Rei - Barcelona
Spain
Tel: +34 93 680 2725, **Fax:** +34 93 680 0795/2037
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys girders, bars, Plate, Sheet, Strip,
Extrusion.
Notes: Sales office.

Alusuisse France SA [A/]

Produits Industriels
Route de Tonnerre-Germigny, BP 65
F-89600 Saint-Florentin
France
Tel: +33 3 86 43 56 00, **Fax:** +33 3 86 43 43 05/58 90, **Telex:**
800398 f
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion,
Applications: Automotive extrusions for chassis, inner body &
outer body.
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division,
an interdisciplinary team experienced in automotive industry
requirements. Manufactures extruded products. Sales office.

SA Alusuisse Guy Geisler NV [A/]

Lusambostraat 76
B-1190 Bruxelles (Vorst)
Belgium
Tel: +32 2 332 2900, **Fax:** +32 2 332 0028,
Group: Alusuisse-Lonza (CH)
Product Types: Extrusion
Notes: Sales office

Alusuisse Italia SpA [A/]

Via Gustavo Fara 20
I-20124 Milano
Italy
Tel: +39 2 66 981 962, **Fax:** +39 2 66 982 046,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion,
Notes: Sales Office

Alusuisse-Lonza Holding Ltd. [A/]

Feldeggstrasse 4, CH-8034 Zürich
Switzerland
Tel: +41 13 86 22 22, **Fax:** +41 13 86 25 85,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys
Applications: Packaging
Notes: Swiss Head Office. Holding company for Lawson Mardon
(LM) Packaging, a worldwide operation with companies
producing all types of packaging for all industry sectors, inc.
food-stuffs, beverages, pharmaceuticals, technical uses, litho-
printing. [See: Lawson Mardon Star for aluminium foil products].

Alusuisse-Lonza Hungaria Kft. [A/]

Rackoczi ut 1-3
H-1088 Budapest
Hungary
Tel: +36 1399 2020, **Fax:** +36 1266 4562
Group: Alusuisse-Lonza (CH)
Notes: Sales Office

Alusuisse Nederland B.V. [A/]

Postbus 3381
NL-4800 DJ Breda [Aluminiumstraat 1, NL-4823 AL Breda]
Netherlands
Tel: +31 76 542 5200, **Fax:** +31 76 541 8899,
Group: Alusuisse-Lonza (CH) **Est:** 1970 **Employees:** 50
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion,
Notes: Sales Office

Alusuisse Singen GmbH [A/]

Alusingen-Platz 1, Postfach 160
D-78221 Singen (Hohentwiel)
Germany
Tel: +49 7731 80 0, **Fax:** +49 7731 80 2222/2907,
Group: Alusuisse-Lonza (CH) **Est:** 1940 **Employees:** 9300
Product Types: Wrought alloys . Plate, Sheet, Strip, Extrusion.
Applications: Automotive sheet products, extrusions & formed
parts for power train, chassis, outer & inner body;
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division,
an interdisciplinary team experienced in the automotive
industries requirements. Important suppliers to the automotive
industry in Europe & the USA.

Alusuisse Technology & Management AG [A/]

Bad. Bahnhofstrasse 16/Postfach
CH-8212 Neuhaussen am Reinfall
Switzerland
Tel: +41 5321 9111, **Fax:** +41 5322 6676
Group: Alusuisse-Lonza (CH)
Notes: Research & development. Management organisation only
for Alusuisse Group.

Alusuisse UK Ltd. [A/]

[formerly Anglo-Swiss Aluminium Co. Ltd.]
Mander House, Mander Centre, Wolverhampton WV1 3ND
United Kingdom
Tel: +44 1902 310610, **Fax:** +44 1902 29160,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Plate, Sheet, Strip, Extrusion,
Notes: Sales office

Alutrade SA [A/]

Chaussee de Warneton, 377
B-7784 Bas Warneton
Belgium
Tel: +32 56 55 78 79, **Fax:** +32 56 55 72 12, **Telex:** 820681
Group: Flandria Aluminium (F)
Product Types: Wrought alloys Stock and special profiles from
Flandria Aluminium (F). Extrusion.
Notes: Alternative Name/Address (Flemish): Alutrade NV -
Steenweg op Waasten 377, B-7784 Neerwaasten, België.

Alyn Corporation [MMC]

16761 Hale Avenue
Irvine, California 92606
United States of America
Tel: 714 475 1525, **Fax:** 714 475 1533, **Email:** info@alyn.com,
Internet: http://www.alyn.com, **Contact:** Murray Schrantz -
Manager, Marketing and Communications
Alloys: Boralyn - boron carbide particle reinforced aluminium alloy
Product Types: Wrought alloys, Cast alloys.
Applications: Sports Equipment: Premium golf club heads, shafts,
irons, and putters. High-end bicycle frames and components.
Baseball and softball bats. In-line skate parts. Sports racquet
frames. Computer / Electronics. Antennae. Disk drive plate
substrates. Electronic packaging and chassis. Microprocessor
packaging. Transportation. Aircraft and aerospace components
and structures. Automotive parts and chassis. Engine
components. Power transmission components systems. Pump
 housings and components. Skins, frames, panels, and supports
 Brake Components. Lightweight armour. Robotic structures.
 Neutron radiation shielding.
Tradenames: Boralyn
Other Services: Manufacturing processes include extrusion,
forging, precision casting, stamping, welding, rolling machining,
heat treating and finishing with standard techniques including
plating, anodizing and ball burnishing.
Notes: Designs, develops, and manufactures high-end consumer
and industrial products for original equipment manufacturers
(OEMs) utilizing proprietary metal matrix composite
technologies. Produces Boralyn® in various grades utilizing the
company's proprietary techniques.

AMAG Aluminiumwerk Unna AG [AI]

Postfach 1146/1151
D-59425 Unna [Uelzener Weg 36, D-59425 Unna]
Germany
Tel: +49 2303 206 124/125, **Fax:** +49 2303 206 128, **Telex:**
8229236, **Contact:** Claus Better - Export Manager
Group: AMAG Austria Metall AG (Austria) **Est:** 1914 **Employees:**
370
Alloys: DIN: EAL, Al99.0, Al99.7, Al99.8, Al99.9, AlMnCu
AlMn1, AlMn1Mg, Al99.0Mg0.5, AlMg1, AlMg1.8, AlMg2.5,
AlMg3, AlMg5, AlMg2Mn0.3, AlMg2Mn0.8, AlMg4Mn,
AlMg4.5Mn, AlCuMg2, AlCuMg1, AlCuSiMn. CEN: 1350A,
1050A, 1070A, 3003, 3103, 5005A, 5051A, 5052, 5754, 5154A,
5019, 5251, 5086, 5083, 5058, 2024, 2017A, 2014, 2030, 2007,
6101B, 6060, 6106, 6063, 6005A, 6082, 6061, 6012, 6262,
7020, 7005, 7003, 7022, 7075.
Others (non-DIN or CEN): AlMg3.5A, AlMgPb1.5, AlCu4PbMg,
AlMgSiMn, AlMg0.7Si, AlZn4.5Mg1.5Mn, AlZn6Mg0.8Zr, 1080A,
1090, 3004, 5210, 5049; Valves & pistons: AlSi12CuMgNi (KS
1275), AlZn5SiCuPb (KS 960). Roller tubes: 6063-F22/T6;
Cylinder tubes: 6063-T6/T832(F22/F25). Continuous cast
extrusion-stock billet: 1050A, 2007, 5754, 5083, 6060, 6082,
7020, 7022, 7075. Strip: 1050A, 1350A, 5005A, 5251, 5049,
5754, 3103, 6060, 6082, 4043A, 1080A, 1085, 5010, 5305,
5657, 1090, 5210, 5505. **Designation systems:** CEN DIN
Product Types: Wrought alloys Seamless & port-hole tubes. Thin-
or thick-walled tubes. Extruded tubes (max. OD 270mm); drawn
tubes (max.OD 260mm); round bars (max. OD 160mm); square
& hexagonal bars (max. 140mm); profiles (max. 450mm). Roller
tubes (30-210mm dia. wall thickness 2-15mm - depending on
dia.). Cylinder tubes: 20-250mm ID. Continuously cast billets
(wrought-stock). Strip & coil (various finishes), 0.2-5mm thick, 4-
450mm wide, inc. deep-drawing grades & anodizing grades.
Billet, Strip, Bar, Tube, Extrusion
Applications: Aerospace. Automotive. Ship building. Engineering
components, inc. office equipment, safety equipment. Optical
industry. Electrical/electronics. Roller tubes for textiles,
packaging, printing & plastic foil. Cylinder tubes (pneumatic
industry). Packaging (closures, containers).
Other Services: Production of extruding-stock billets to customer-
order. **Approvals:** DIN ISO 9002, DNV, TUV, CAA, DQS
Notes: Worldwide suppliers of a vast range of aluminium semi-
finished technical products; available in over 50 alloys. Products
produced to European, USA (commercial and federal)
specifications.

AMAG Benelux B.V. [AI]

[No address]
Netherlands
Tel: +31 10 4604499, **Fax:** +31 10 4600809,
Group: AMAG Austria Metall AG (Austria) **Employees:**
Associated Companies: UK, France, NL
Product Types: Wrought alloys, Plate, Sheet, Strip,
Notes: Represents AMAG Aluminium Ranshofen Walzwerk
GmbH, Austria.

AMAG France Sarl [AI]

9 rue Weinemer
F-68000 Colmar
France
Tel: +33 3 89 41 18 40, **Fax:** +33 3 89 23 06 74, **Contact:** Mr.
Etienne Conrad - Assistant commercial
Group: AMAG Austria Metall AG **Est:** 1986 **Employees:** 11
Associated Companies: UK, NL, F
Alloys: Thick sheet: 1050A, 5052, 5754, 5086, 5083, 6061, 6082.
Temper: O, H111, T4, F21, T6, F30, T4, F21, T6, F30.
Nameplate: 1050, 005, 5754, 1085, 1100. Temper: soft to hard.
Treadplate: 1050A, 5052, 5754, 5086, 6082, 6061, 7020
Temper: O, F, H114, T4, T6. Clad (brazing): 1050A/4004,
3003/4104, 3005/4343, 3103/4045. Clad (protection):
1050A/7072, 3003/5005A. Titanal 2xxx & 7xxx series. Temper:
T6 **Designation systems:** USA
Product Types: Wrought alloys Thick sheet: 3-40mm thick.
Nameplate (anodizing, laquering & special grades): 0.3mm to
4.0mm thick, 150-1500mm wide, 300-4000mm length, bright,
mill, satin finish. Tread-plate (pattern-finish): 1.5-10mm thick.
Max. sizes 1550mm wide, 6600mm long. Clad (brazing &
protection) as coil or sheet: 0.3-2.0mm thick (coil), 0.4-8.0mm
thick (sheet), cladding thickness 2-15%, available with one-
or double-side clad, also different alloys each side. Titanal high-
strength (strip 0.4-4.00mm thick, sheet 0.4-10mm thick). **Note:**
Dimensions may vary for alloy type & product forms. Plate
Applications: General engineering. Automotive. Nameplate
(equipment housings, car-badges, signs & clock faces).
Treadplate (walk-ways, ramps, vehicle & ship construction, dairy
& grocery-trade flooring). Clad coil or sheet for brazing &
protection (water & oil coolers for motorbikes & cars, air-
conditioners, industrial heat exchangers, appliances, inc. coffee-
machines, washer-dryers, egg-cookers. Titanal (ski &
snowboard parts, bicycle/motorbike sprocket wheels & gears).
Heavy-loaded engineering & vehicle parts.
Tradenames: Titanal
Approvals: ISO 9001

AMAG Ranshofen Walzwerk GesmbH [AI]

A-5282 Ranshofen
Austria
Tel: +43 7722 801.0/2183, **Fax:** +43 7722 68305, **Telex:** 27 745
mwra a
Group: AMAG Austria Metall AG (Austria)
Associated Companies: UK, F, NL
Designation systems: USA CEN DIN
Product Types: Wrought alloys Reflectors. Signs, panels &
nameplates. Tread-plate. Thick sheet. High-strength alloys.
Brazing sheet (clad). Cathode sheet. Plate, Sheet, Strip.
Applications: General engineering. Automotive.
Tradenames: Titanal
Approvals: ISO 9001
Notes: Annual production ~60 000T of rolled products. Export
world-wide (Europe, Far East, USA).

54 Supplier Addresses & Product Details

AMAG UK Ltd. [AI]

Wyvern House, 1 Church Road
Bookham, Leatherhead KT23 3PD
United Kingdom
Tel: +44 1372 450661, **Fax:** +44 1372 450833, **Contact:** Brian Parish
Group: AMAG Austria Metall AG (Austria)
Associated Companies: UK, Benelux, France
Alloys: Thick sheet: 1050A, 5052, 5754, 5086, 5083, 6061, 6082. Tempers: O, H111, T4, F21, T6, F30, T4, F21, T6, F30. Nameplate: 1050, 005, 5754, 1085, 1100. Tempers: soft to hard. Treadplate: 1050A, 5052, 5754, 5086, 6082, 6061, 7020 Tempers: O, F, H114, T4, T6. Clad (brazing): 1050A/4004, 3003/4104, 3005/4343, 3103/4045. Clad (protection): 1050A/7072, 3003/5005A. Titanal 2xxx & 7xxx series. Temper: T6
Designation systems: USA CEN DIN.
Product Types: Wrought alloys Thick sheet: 3-40mm thick. Nameplate (anodizing, laquering & special grades): 0.3mm to 4.0mm thick, 150-1500mm wide, 300-4000mm length, bright, mill, satin finish. Tread-plate (pattern-finish): 1.5-10mm thick. Max. sizes 1550mm wide, 6600mm long. Clad (brazing & protection) as coil or sheet: 0.3-2.0mm thick (coil), 0.4-8.0mm thick (sheet), cladding thickness 2-15%, available with one- or double-side clad, also different alloys each side. Titanal high-strength (strip 0.4-4.00mm thick, sheet 0.4-10mm thick). **Note:** Dimensions may vary for alloy type & product forms. Plate, Sheet, Strip.
Applications: General engineering. Automotive. Nameplate (equipment housings, car-badges, signs & clock faces). Treadplate (walk-ways, ramps, vehicle & ship construction, dairy & grocery-trade flooring). Clad coil or sheet for brazing & protection (water & oil coolers for motorbikes & cars, air-conditioners, industrial heat exchangers, appliances, inc. coffee-machines, washer-dryers, egg-cookers. Titanal (ski & snowboard parts, bicycle/motorbike sprocket wheels & gears). Heavy-loaded engineering & vehicle parts.
Tradenames: Titanal
Approvals: ISO 9001 (Production & testing: DIN 59600/EN485-3).
Notes: Represents AMAG Aluminium Ranshofen Walzwerk GmbH, Austria. Providing high-quality rolled aluminium products for a variety of applications.

Amalgamet Canada Ltd. [AI Mg Ti Be]

111 Richmond Street West, Suite 418.
Toronto, Ontario M5H 2G4
Canada
Tel: +1 416 366 3954, **Fax:** +1 416 366 0586, **Telex:** 06-217726 amalcontor, **Contact:** M. Naujoks
Group: Div. of Premetalco Inc.
Product Types: Powders Metals, inc. light-alloys. Silicon. Industrial minerals & related chemicals., Ingot.
Other Services: Agents. Distributors (stockists).
Notes: A worldwide marketing non-ferrous metal trading company specialising in light-metals, minerals & alloys.

Ambica Aluminium Company [AI]

No 33/2 A M Road
Kalasipalayam, Bangalore 560002
India
Tel: +91 80 6627782, 626821, **Fax:** +91 80 6602942, **Contact:** Mr. Champalal Jain - Proprietor
Group: Ambica Aluminium Company
Notes: Authorised Dealers of Jindal Aluminium extrusion products. Doors, Windows, Partitions, Pipes, Flats, Angles, Etc., Jindal extrusion-Real Value for Money. Also fabrication work.

AMC - Aerospace Metal Composites [AI MMC]

RAE Road, Farnborough
Hampshire GU14 6XE
United Kingdom
Tel: +44 1252 375001, **Fax:** +44 1252 375002, **Contact:** David J Griffiths - Sales & Marketing Director
Alloys: AMC217xe, AMC225xe, AMC235xe, AMC500sa. AMC640xa. Tempers: T4, T1, T351.
Product Types: Wrought alloys New alloys, inc. Al-Li. Range of metal matrix composites with silicon carbide particulate reinforcement. Sheet, Extrusion, Forgings/Stock.
Applications: Sport (cycle parts, golf clubs, yacht mast & fittings). Motor sport (Formula 1, brake, clutch & engine components). Aerospace, (helicopter & military aircraft forgings, flap/slat drive-shafts, under carriage & engine parts). High-speed machinery (cranks, push-rod, feeder parts, carpet weaving). Automotive (valve trains, cylinder liners, con-rods). Electrical/electronic (racking, thermal control, computer hard-disc parts).
Other Services: Materials development. Testing. Component manufacture. Machining.
Notes: An independent company established to manufacture advanced metals by powder metallurgy techniques. Design new alloys & MMCs for MoD and other end-users. Licencee of technology from UK MoD Defence Research Agency (DRA).

Amefo BV- Advanced Metal Forming [AI]

Ceintuurbaan 30, Postbus 3
NL-8000 M Zwolle
Netherlands
Tel: +31 38 4556700, **Fax:** +31 38 4550900
Group: Hoogovens Groep

American Modern Metals Corp. [AI]

See: AMMCO- American Modern Metals Corp.

AMETEK Specialty Products Division [MMC]

Route 519, Box 427
Eighty Four, PA 15330
United States of America
Tel: +1 412 225 8400, **Fax:** +1 412 225 6622, **Email:** ametek84@nb.net, **Contact:** J.T. Mason
Alloys: HIVOL B, HIVOL C - silicon carbide particle reinforced aluminum alloy matrix.
Product Types: Wrought alloys
Applications: Electronic packaging (thermal management)
Tradenames: HIVOL is a trademark of AEA Technology, Oxfordshire, UK.
Notes: AMETEK (USA) and AEA (UK) are in joint venture to manufacture and market HIVOL in the USA.

AMMCO- American Modern Metals Corp. [AI]

25 Belgrove Drive
Kearny NJ 07032
United States of America
Tel: +1 201 991 2100, **Fax:** +1 201 991 6981, **Contact:** Ted Malinowski/ R. Rodriguez
Alloys: 1100, 3003, 6063, 6061, 6463, 6082, X7046, 7178. Tempers: All. **Designation systems:** USA.
Product Types: Wrought alloys Drawn seamless aluminium tubing, rod, bar, hollow bar (round, square, rectangular, hexagonal & special shapes). Extruded pipe, rod, bar, hollow bar & shapes. All available in a variety of sizes. Tolerances to engineering & government specifications. Sheet, Bar, Tube.
Applications: Engineering structures. Automotive. Aerospace.
Other Services: Engineering advice. Heat-treatment, machining, powder coating, forming. Certification (on request).
Notes: An independent mill with specialized facilities for drawn, seamless semi-finished products. Extensive fabrication facilities.

Anglesey Aluminium Metal Ltd. [AI]

PO Box 4, Penrthos Works
Holyhead, Gwynedd LL65 2UJ
United Kingdom
Tel: +44 1407 76 33 33, **Fax:** +44 1407 76 45 49, **Telex:** 61327,
Contact: Mr. D.H. Roberts - Specialist Production Scheduler
Group: RTZ/KACC Consortium Co.
Alloys: Al99.7, Al99.8, Al99.9, 1xxx series, 3xxx series 6005A, 6061, 6063, 6082 **Designation systems:** USA ISO
Product Types: Wrought alloys Cast alloys 1XXX, 3XXX, 6XXX series alloy ingots, extrusion ingots, sow and rolling slab. Remelt ingot (22kg & 500kg). Ingot, Billet.
Applications: Raw materials for manufacturers of Litho-plates, foil, etc.
Other Services: Custom primary products (on request).
Approvals: ISO 9002.
Notes: Sow: nom. 500 kg ingots. Rolling Ingot: Vertical direct chill cast, sawn to length to suit customer. Billet: AAM cast billet by Airslip method, batch homogenised and sawn to length, diameters: 178, 192, 203, 229, 244 and 254 mm.
Technical enquiries: David Warrington Tel: +44 1407 763333, Fax: +44 1407 762023.

Anglo Blackwells Ltd. [AI]

Ditton Road, Widnes, Cheshire WA8 0NT
United Kingdom
Tel: +44 151 495 1400, **Fax:** +44 151 495 1401
Alloys: Master alloys: AlTiB, AlTi, AlSr, AlB, AlZr.
Product Types: Cast alloys Grain refiners & master alloys for aluminium industry; supplied as ingot or rod. Ingot
Notes: [Information from ALFED].

Apollo Metal SA [AI]

26 rue Fresnel, ZA Pariwest
F-78310 Coignières
France
Tel: +33 1 30 49 42 43, **Fax:** +33 1 30 49 42 49, **Contact:** Fabrice Hendricks - Commerciale
Group: Apollo Metals (UK)
Associated Companies: UK, France, Germany and 37 countries worldwide.
Alloys: AA Alloys: 2007, 2014, 2017, 2024, 2618, 5083, 5754, 6061, 6082, 7010, 7020, 7022, 7075, 7175; NF Alloys: AU4SG, AU4G, AU4G1, AU2GN, AG4.5MC, AG3M, AGSUC, ASGM0.7, AZ6GU, AZ5G, AZ4.5GU, AZ5GU, AU3PB; ALCA PLUS.
Tempers: O, T0, T3, T351, T4, T451, T6, T651, T7351, T851
Designation systems: USA NF
Product Types: Wrought alloys sheet, flats, bars, discs, Plate, Sheet, Strip, Bar,
Applications: aerospace or commercial
Notes: Sheet & plate ranges from 1 to 500 mm thick depending on alloy and condition. Bar from 10 to 500 mm diameter depending on alloy and condition.

Apollo Metall GmbH [AI]

Klockner Strasse 2
D-63110 Rodgau (Nieder-Roden)
Germany
Tel: +49 6106 87020, **Fax:** +49 6106 75048,
Group: Apollo Metals (UK)
Product Types: Wrought alloys

Apollo Metals (UK) Ltd. [AI]

Apollo House
Bordesley Green, Birmingham B9 4SJ
United Kingdom
Tel: +44 121 380 2910, **Fax:** +44 121 359 3712,
Group: Apollo Metals (UK)
Associated Companies: UK (covers all countries except F & D), France, Germany
Product Types: Wrought alloys

APS Chemicals [AI]

7 Business Park Drive
Notting Hill, Victoria 3168
Australia
Tel: +61 3 9558 8800, **Fax:** +61 3 9558 8777, **Contact:** Mike Kelly
Group: Comalco
Notes: Distributor - Aluminium Paste / Flakes

APS Chemicals [AI]

119 Carbine Road
Mt. Wellington, Auckland 6
New Zealand
Tel: +64 9 276 4019, **Fax:** +64 9 276 7231, **Contact:** Mark Aboud
Group: Comalco
Notes: Distributor - Aluminium Paste / Powder

Armco Sarl [Ti]

BP 140, 19, rue Georges Politzer
F-78196 Trappes Cedex
France
Tel: +33 1 30 66 70 80, **Fax:** +33 1 30 51 83 84, **Telex:** 699334 f,
Contact: Frédéric Bourdon - Responsable Assurance Qualité
Group: Armco Inc. (USA) **Est:** 1986 **Employees:** 10
Associated Companies: Letchworth UK, Barcelona E, Brussels B, Oosterhout NL, Cologne D, Genoa I, Trappes F.
Alloys: TA6V (AMS 4928N, etc.), T40 (ASTM B348 RW Grade-2), TA6V ELI (ISO 5832-3, ASTM F136). **Designation systems:** USA ISO NF Aerospace specs.
Product Types: Wrought alloys Bars (3 to 203 mm dia.). **Note:** sizes available varies with grade.
Applications: Aeronautic, automotive, petro-chemical industry, medical (hip implants). Energy (heat-exchangers), desalination plants.
Notes: Supplier of high-technology materials developed by the parent US company, inc. titanium, special steels & nickel alloys.

ASP International Ltd. [AI MMC]

Second Ave. The Pensnett Estate
Kingswinford, West Midlands DY6 7PP
United Kingdom
Tel: +44 1384 291 900, **Fax:** +44 1384 400 344, **Contact:** Ian Quinn - Sales & Marketing Director
Group: ASP Group (UK)
Associated Companies: USA & Europe: France: Mr. Peter Gurney +33 1 40 87 07 87
Product Types: Wrought alloys Cast alloys Wrought & cast MMC/powder met.
Notes: LATE ENTRY - Exclusive representative for innovative producers. Provides support in the supply & development of demanding products & specialist light-metal applications. [Information provided by ALFED].

ASP Spectrulite Ltd. [Mg]

Ham Lane, Kingswinford
West Midlands DY6 7JH
United Kingdom
Tel: +44 1384 291900, **Fax:** +44 1384 400344, **Contact:** Mr. David Robinson
Group: Spectrulite Consortium Inc. (USA)
Product Types: Wrought alloys, Billet, Plate, Sheet, Extrusion, Forgings/Stock, Forgings
Other Services: Agents. Consultants. Distributors (stockists). Machine shop. Tooling
Notes: Development of the market & applications for wrought products. [Information provided by the International Magnesium Association].

56 Supplier Addresses & Product Details

AstroCosmos Metallurgical Inc. [Ti]

3225 West Old Lincoln Way
P.O. Box 1229, Wooster, OH 44691-1229
United States of America
Tel: +1 330 264 8639, Fax: +1 330 264 4316, Contact: Rick Reiter - National Sales Mgr.

Group: AstroCosmos Metallurgical Inc. Est: 1959 Employees: 225

Associated Companies: Additional Sales Office(s):

AstroCosmos (West)
Camarillo, CA United States of America
Tel: +1 805 482 9825; Fax: +1 805 987 7961
Astrolite Alloys
Oxnard, CA United States of America
Tel: +1 800 235 5935; Fax: +1 805 487 9694

Alloys: No details.

Product Types: Wrought alloys, Bar & Rod, Billet & Billet - CP, Clad Products, Column & Towers, Electroplating, Electrodes, Anodes, Equipment, Fabrications, Specialty, Fasteners, Filters, Fittings, Flats, Forgings, Heat Exchangers, Ingot - CP, Medical, Pipe - Seamless, Pipe - Welded, Piping System, Plate, Plate - Clad & CP, Reactors, Rings, Shafts & Agitators, Sheet, Slab & Slab - CP, Strip, Tanks & Vessels, Tube, Tube - Finned, Tube - Welded, Wire & Wire Coil.

Other Services: CAD/CAM, Cold Working, Consulting, Conversion Drawing, Cutting, Cutting - Plasma, Engineering, Equipment Field Services, Fabrication, Field Installations, Inspection, X-Ray, Lathe Turning, Machining, Milling, Research & Design, Sand Blasting, Sawing & Shearing, Stock Holding, Toll Processing, Warehousing, Welding, Wire Conversion

Notes: AstroCosmos Metallurgical is a leading producer of corrosion resistant equipment constructed of titanium, zirconium, tantalum, niobium and Hastelloy®.

Astrolite Alloys [Ti]

See: AstroCosmos Metallurgical - USA

Asturiana de Aleaciones SA [Al]

See: Aleastur

Atech AG [Al]

Sternenfeldstrasse 1, Basel
CH-4127 Birsfelden
Switzerland
Tel: +41 6131 11055, Fax: +41 6131 11107, Contact: Mr. John Richards

Group: British Aluminium Holdings (UK)

Product Types: Wrought alloys.

Notes: Agent for Superform Aluminium (UK).

A.T.M. (Aluminium Technique Moselle) [Al]

Avenue du District
BP 33, Zone Industrielle
F-57380 Falquemont
France
Tel: +33 3 87 94 21 50, Fax: +33 3 87 91 53 01, Contact: Norbert Finck - Director - Usine

Group: Grohmann (D) Est: 1990 Employees: 13

Alloys: NF Alloys: AG3F, AG5S, AS7G, AS10G, AS13, A-U4T, AS9U3; ISO Alloys: Al-Mg3, Al-Mg5S, Al-Si7Mg, Al-Si10Mg(Fe), Al-Si12, Al-Zn10Si8, Al-Cu4Ti, Al-Si9Cu3. Unifont. Designation systems: ISO NF

Product Types: Cast alloys Cast products.

Applications: Aeronautical, Electrical, Food ind. Textile ind. Building and construction, Chemical plant, Heating, Automotive, Electronic, Furniture, Medical equipment, Optical equipment, Decorative.

Other Services: Chemical analysis. Mechanical and non-destructive testing

Australian Magnesium Corporation [Mg]

P.O. Box 226
Level 6, Toowong Tower
9 Sherwood Road, Toowong
Brisbane, Queensland 4006
Australia
Tel: +61 7 3335 8500, Fax: +61 7 3335 8548, Contact: Mr. Richard Hill - General Manager

Group: Queensland Metals Corp.

Product Types: Cast alloys, Ingot.

Notes: A member of the Queensland Metals Corporation/Normandy Mining Group of Companies. AMC plan to pilot a new magnesium production process in Gladstone, Queensland. The pilot plant will begin production of magnesium metal in 1998 at the rate of 1500 tonnes per year. If the pilot plant is successful, AMC plant to build a 90,000 tonnes per year magnesium smelter in Gladstone, beginning production early in 2002.

Austria Metall AG [Al]

See: AMAG

Aviatube [Al]

Rue de Grande-Bretagne, BP 131
F-44471 Carquefou Cedex
France
Tel: +33 2 40 18 47 00, Fax: +33 2 40 18 47 18, Telex: 711 191 f.
Contact: Jean Leroy/Mme. Bouyer

Group: Pechiney

Product Types: Wrought alloys Extruded & drawn tubes; welded tubes, Tube, Extrusion

Applications: Automotive (seamless heat exchanger tubing). Aerospace. Sports equipment.

Notes: Affiliate of Pechiney Rhenalu, specialises in extrusion & drawing of precision tube. Joint operations between Aviatube & Valeo.

AVISMA Titanium-Magnesium Works [Mg Ti]

Permskaya Oblast
Bereznikiy 618421
Russia
Tel: +7 34242 55431/40001, Fax: +7 34242 41111
Notes: Primary magnesium producers. [Information provided by the International Magnesium Association].

Ayrton & Partners Ltd. [Mg]

4 The Sanctuary
Westminster, London SW1P 3JS
United Kingdom
Tel: +44 171 222 2171, Fax: +44 171 222 5862, Telex: 297747 wogan g, Contact: Mr. Douglas Hulse

Group: Wogen

Associated Companies: Moscow, Beijing, Shanghai, Hong Kong, Guangzhou, Tokyo, Sheffield, Madrid.

Alloys: 99.9% Mg and 99.95% Mg ingot and T-bar. AZ91D, AM50A, AM60, etc. die-casting alloys. Designation systems: Product Types: Cast alloys Pure Mg ingot from Russia, China & Ukraine. Also primary alloy & secondary ingot. 8 kg ingots and 250/500 kg T-bars. Magnesium die-casting alloys from Russia & China, Ingot, Billet,

Other Services: Distributors (stockist). Traders/merchants.

Notes: Physical metal traders, specialising in non-ferrous, minor metals. Stocks held in NL, USA, Japan, China.

Supplier Addresses & Product Details 57

B&G Manufacturing Co. Inc. [Ti]

3067 Unionville Pike
P.O. Box 904
Hatfield, PA 19440-0904
United States of America
Tel: +1 215 822 1925, Fax: +1 215 822 9175, Email:
kfaller@bgmfg.com, Internet: www.bgmfg.com, Contact: Kurt
Faller - Technical Sales / Marketing Manager
Est: 1947 Employees: 300
Product Types: Wrought alloys Fasteners, Fittings. Specializes in
bolts, studs, nuts, threaded rod and machined specials.
Applications: petrochemical, power generation, offshore, mining,
transportation, military and commercial applications.
Other Services: Lathe Turning, Machining, Milling
Notes: Manufacturer of specialty fasteners and machined
components for a wide range of industries. Subsidiaries:
Accutech, B&G Nuclear Products Division.

Baco Consumer Products [AI]

Raans Road, Amersham, Bucks. HP6 6JY
United Kingdom
Tel: +44 1494 65 6800, Fax: +44 1494 65 6801
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys Household & catering foil. Foil.
Notes: Best known for Bacofoil brand of cooking foil, also supplies
a comprehensive range of wrap products for household &
catering uses; and plastic-based products. Warehousing
facilities & systems (for supermarket chains). Second operation
in Huddersfield.

Baco Contracts [AI]

Chalfont Park, Gerrards Cross, Bucks SL9 0QB
United Kingdom
Tel: +44 1753 23 3464, Fax: +44 1753 23 3445
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys.
Notes: Design, supply & build service for aluminium structural
applications. Building & civil engineering industries, inc. space-
frames, curtain walling, building overcladding, noise-barriers &
windshielding.

Baco Metal Centres [AI]

Bingley Road, Hoddesdon, Herts. EN11 0NX
United Kingdom
Tel: +44 1992 90 4140, Fax: +44 1992 90 4198,
Group: British Aluminium Holdings (UK)
Associated Companies: UK nationwide branches: Aberdeen,
Bridgend, Bristol, Coventry, Edenbridge, Glasgow, Haydock,
Hoddesdon, Leeds, Leicester, Newcastle, Newtownards (Co.
Down), Norwich, Plymouth, Reading, Southampton, Tipton (+
Export Sales).
Product Types: Wrought alloys,
Other Services: Co-development of custom-extrusions for
customers.
Notes: Distributor of aluminium & other metals with a network of
UK branches. Centralised stock-control & distribution system.
Glazing (window & bars). Head office at Tipton, W. Midlands
(UK)

Baco Metal Centres [AI]

24 Baronald Street, Rutherglen, Glasgow G73 1AF
United Kingdom
Tel: +44 141 531 2600, Fax: +44 141 531 2699,
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys.

Baco Metal Centres (Dublin) Ltd. [AI]

Unit 500 Beech Road, Western Industrial Estate
Naas Road, Dublin 12
Ireland
Tel: +353 1 460 2000, Fax: +353 1 460 2150,
Group: British Aluminium Holdings (UK)

Product Types: Wrought alloys Glazing systems. Engineering
extrusion & sheet., Sheet, Extrusion, glazing systems
Notes: Supplies aluminium & uPVC glazing systems for
architectural (domestic & commercial) uses.

BAI [AI]

See: British Aluminium - Group

P. Balloffet-Technicome [AI]

ZA de Pissaloup, Rue Edouard Branly, BP102
F-78191 Trappes Cedex
France
Tel: +33 1 30 69 15 00, Fax: +33 1 30 69 15 01, Contact: Sylvain
Tudo - Manager - Mechanical
Group: P. Balloffet
Alloys: AA designations: 1050A, 2017A, 2024, 3003, 6005A, 6060
to 6063, 6061, 6082, 6101, 7020, 7075; ISO designations:
Al99.5, AlMn1Cu, AlMgSi0.7, AlMgSi0.5, AlMg1SiCu, AlMgSi1,
AlMgSi0.5, AlCuMg1, AlCuMg2, AlZn4.6Mg1, AlZnMgCu1.5.
Designation systems: USA CEN ISO.
Product Types: Wrought alloys Extrusions up to 350mm
circumscribing circle (larger sizes on request).
Other Services: Machining, anodising, surface treatment,
assembly: coloured anodising, chromic acid anodising, hard
anodising, Alodine treatments, nickel treatments, brushing,
polishing, lacquering.

Barclays Metals [AI]

6th. Floor, 2 Minster Court
London EC 3R 7BB
United Kingdom
Tel: +44 171 621 5351, Fax: +44 171 621 5297, Contact: Sam
Hainsworth
Group: RTZ/KACC Consortium Co.
Notes: Agent for Kaiser Aluminum.

BDW GmbH & Ko KG [AI]

[Bayrisches Druckguss-werk Thurner]
Im Wiegenfeld 10
D-85570 Markt Schwaben
Germany
Tel: +49 81 21 420 0, Fax: +49 81 21 420 419,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Formed parts (automotive)
Applications: Automotive. Formed parts - power train, chassis,
outer body, inner body.
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division,
an interdisciplinary team experienced in the automotive
industries requirements. Important suppliers to the automotive
industry in Europe & the USA.

G & L Beijer - Import och Export AB [Ti]

Birger Jarlsgatan 6
S-10397 Stockholm
Sweden
Tel: +46 8 678 8260, Fax: +46 8 611 0976, Telex: 10664
Group: Deutsche Titan (D)
Notes: Sales office (S) for Deutsche Titan (D).

Bergische Pulverbeschichtungs-Technik GmbH [AI]

Velbert
Germany
Group: Erbslöh AG
Product Types: Wrought alloys.

Bernhard Metals (UK) Ltd. [AI]

Litchurch Lane, Derby DE24 8AA
United Kingdom
Tel: +44 1332 279 788, Fax: +44 1332 294 308
Product Types: Cast alloys Ingots (to BS 1490). Hardeners.
Other Services: Alloys to customer specifications.
Notes: [Information provided by ALFED].

58 Supplier Addresses & Product Details

Bibus Metals AG [Ti]

Hertistrasse 1
CH-8304 Wallisellen
Switzerland
Tel: +41 1 877 54 11, **Fax:** +41 1 918 22 56, **Email:**
bibus@access.ch, **Internet:** http://www.bibus.ch, **Contact:** Felix
Bibus - President

Group: BIBUS Holding AG **Est:** 1979 **Employees:** 15

Associated Companies: Additional Sales Office(s):

BIBUS Metals: A-4812 Pinsdorf,
Tel: +43 7612 71446, **Fax:** +43 7612 66398

BIBUS Inco Alloys GmbH, D-40211 Düsseldorf
Tel: +49 211 17314 0, **Fax:** +49 211 17314 40

Product Types: Wrought alloys Alloys, Forgings, Pipe - Welded,
Strip, Bar & Rod, Ingot, Plate, Tube, Fasteners, Ingot - CP, Plate
- CP, Tube - Welded, Fittings, Pipe - Seamless, Sheet, Wire &
Wire Coil, Flats, Ingot, Plate, Sheet, Bar, Tube, Wire,

Other Services: Cutting, Reforging, Cutting - Plasma, Sawing,
Cutting - Waterjet, Shearing, Laser Drilling & Cutting, Stock
Holding

Notes: Distributor and stockholder of titanium (CP and alloys) and
nickel alloys with our own service center.

Bihar Extrusion Co Ltd [AI]

7, Lenin Sarani, 3rd Floor
Calcutta 700013
India

Tel: +91 33 228 0035, 1256, 1087, **Fax:** +91 33 2281036,

Contact: Mr Pankaj Shah - Managing Director

Product Types: Wrought alloys, Extrusion.

Notes: Manufacturer of Aluminium Extrusions For Architectural,
Transport, Electrical and Other Allied Industries.

Blackwells [AI]

See: Anglo Blackwells Ltd.

Boal UK Ltd. [AI]

Ashby Road East, Shepshed
Loughborough, Leicestershire LE12 9BS
United Kingdom

Tel: +44 1509 600012, **Fax:** +44 1509 507847, **Contact:** Mark
Rathjen - Technical Manager

Group: Boal

Alloys: BOAL designations: AM62, AM65, AM68; AA
designations: 6060 to 6063, 6063A. **Temper:** F, F25, T4, T5,
T6. **Designation systems:** CEN ISO BS.

Product Types: Wrought alloys Extrusions in 6xxx series
aluminium: max. circumscribing circle 140mm, max. width
120mm, max height 65mm, min wall 1.0mm, max. weight per
metre 3.5 kg/m, min. weight per metre 0.1 kg/m, min. cut length
0.7m, max cut length 8.0m. For products outside of these limits
consult the Chief Engineer or Technical Manager.

Other Services: Anodising, decorative anodising, painting,
polishing, chemical brightening.

Brabant Alucast International BV [AI]

Rijnstraat 19, Postbus 585
NL-5340 AN Oss
Netherlands

Tel: +31 412 681444, **Fax:** +31 412 681481

Group: Hoogovens Groep

Brandau y Compania SA [AI Mg Ti]

Rafael Calvo 18-5D, Apartado 6118
E-28010 Madrid
Spain

Tel: +34 1 419 1845, **Fax:** +34 1 410 6909, **Telex:** 27 485,

Group: Metallurg (USA)

Product Types: Powders

BRASMAG [Mg]

Companhia Brasileira de Magnésio
Distrito Industrial de Bocaiúva
CEP 39.391-000 - Bocaiúva/Minas Gerais
Brazil
Tel: +55 38 251 1100, **Fax:** +55 38 251 1598
Group: RIMA (Brasil)

Bright Metals [AI]

13/1, Govt Place East
Calcutta 700069
India

Tel: +91 33 2208601, **Contact:** Mr G S Chopra - Partner

Group: Bright Metals

Notes: Stockist & Consignment Agent of Indal. Dealer of:
Aluminium Coils. Sheets. Foils. Corrugated Sheets. Chequered
Plates. Ladders. Extrusions. **Showroom:** 85/b Colootolla St Cal-
73. **Tel:** 25-4188, 25-8238.

British Alcan Aluminium plc [AI]

Chalfont Park, Gerrards Cross, Buckinghamshire SL9 0QB
United Kingdom

Tel: +44 1753 233 200, **Fax:** +44 1753 233 299

Group: Alcan

Associated Companies: World-wide: Europe (A, DK, SF, F, D, H,
Eire, I, NL, N, E, P, S, CH, UK)

Product Types: Wrought alloys Cast alloys Range of Alcan
products include: Foil, semi-rigid containers, packaging
materials, automotive castings, extrusions, extruded
architectural & glazing systems. Alumina refining & alumina
chemicals.

Notes: Wholly-owned subsidiary consisting of two main operating
companies: Alcan Aluminium UK Ltd. & Alcan Chemicals Ltd.
Corporate Resource Group. Holding company & central
services. Alcan's European operations include primary smelting
(UK), large rolling mills (plants in G, I, CH & UK), recycling &
secondary metal production.

British Aluminium Extrusions [AI]

Southam Road, Banbury, Oxfordshire OX16 7SN
United Kingdom

Tel: +44 1295 45 4444, **Fax:** +44 1295 45 4674/4683, **Contact:**
Sales Office

Group: British Aluminium Holdings (UK)

Alloys: Alloys 1XXX & 6XXX-series. [Standard extrusions alloys:
1050A, 1350, 2017A, 2024, 3003, 5083, 5754, 6005A, 6063,
6060, 6063A, 6082, 6101A, 7075]. **Designation systems:** USA
CEN DIN NF.

Product Types: Wrought alloys Mill finish, painted & anodised
custom-design profiles. **Max.** circumscribed circle: 180mm, max.
width 210mm, weight 0.08-4.00kg/m. Extrusion.

Applications: Transport (wagons, body parts for drop-side,
refrigerated & box vans, luggage rails, trim). Building (window &
door frames, shop fronts & fittings, partitioning, greenhouse,
conservatory, roof structures, parapits, curtain walling).
Automotive. (sun-roof frames, roof-rails, structural & semi-
structural components). Caravan & public service vehicles (door
& window frames, exits, trim & body parts). Marine/Offshore
(helicopter deck & structure, stair-towers, walkways, fire-rated
doors & windows, bridges, accommodation modules). Electrical.
General Manufacturing, inc. ladders, stadium seating, road
signs, access equipment.

Other Services: To customer specification. In-house die making,
CAD/CAM systems. **Approvals:** ISO 9002, CAA BCAR A8-4B2,
BAe. (ISO 9001, QS 9000 in progress), RG 2000.

Notes: Over 60 years of extrusion experience. One of 3 BA UK
extrusion companies. Comprehensive range of solid, hollow &
multi-hollow extrusions in a range of alloys (to international &
customer-specification).

British Aluminium Ltd. [Al Mg]

Head Quarters
The Victoria, Harbour City
Salford Quays, Manchester M5 2SP
United Kingdom
Tel: +44 161 911 8800, Fax: +44 161 911 8838, Contact: Janet McCook
Group: British Aluminium Holdings (UK)
Associated Companies: British Aluminium has sales agencies in over 40 countries world-wide. Details available from any BAI site.
Product Types: Wrought alloys, Plate, Sheet, Foil, Tube, Wire, Extrusion.
Applications: All industry sectors, including general engineering, aerospace & defence.
Notes: An international group of businesses that specialise in the design, manufacture & supply of high-performance engineering materials, alloys & semi-fabricated components to the manufacturing industry world-wide.

British Aluminium Plate [Al]

P. O. Box 383, Kitts Green Road
Kitts Green, Birmingham B33 9QR
United Kingdom
Tel: +44 121 252 8000, Fax: +44 121 252 8001/8010
Group: British Aluminium Holdings (UK)
Associated Companies: British Aluminium has sales agencies in over 40 countries world-wide. Details available from any BAI site. USA: BA Plate (N. American distributor) St. Louis, Missouri.
Alloys: Aerospace alloys: 2014A, 2214, 2618A, 2219 (V% 05-15), 2419 (V% 05-15), 2024, 2124, 6061, 6082, 7010, 7050, 7150, 7075, 7175, 7475, 8090 (2.2-2.7&Li), BS L95. Tempers: TXX51 (stress relief/controlled stretch), TXX52 (on request). Defence alloys: 7017, 7018, 7019, 7020, 7039, 5083. Tempers: T7651, T651, H115. General Engineering: 1050A, 1200, 5251, 5052, 5454, 5754, 5086, 5083, 2014A, 2017A, 2024, 6061, 6082, 7020, 7075. Tooling: Alumec 79, Alumec 89. Tempers: Fully treated, stress-relieved. **Designation systems:** USA CEN BS DIN NF Defence. Customer.
Product Types: Wrought alloys Strong alloy plate & cast forging stock. Aerospace alloys, max. dimensions in TXX51 temper: 155mm thick, 3200mm wide, 16000mm long. Tolerances to aerospace specifications. Tooling (Alumec) plate: 6.35-305mm thick; round bar 200mm max. dia. Non-heat treated plate, stretched & heat-treated plate, stress relieved by controlled stretch: 6.35-200mm thick, 3200mm max. width, 16000mm max. length. Non heat-treated plate, as-cast or part rolled, unstretched: <305mm (max. width & length, on request). Heat-treated plate: <305mm thick, <1200mm wide, <300mm long. Tolerances to specified standards. Shipbuilding plate to authorities regulations, e.g. Lloyds, DNV, etc. Pressure vessel plate to BS EN, ASME, TUV requirements. Plate.
Applications: Aerospace (civil & military planes, inc. airframes, helicopter). Defence (armoured vehicles & portable bridge structures). Tooling (plastic mould tooling, inc. blow-mould tools, housings, technical mouldings for automotive, appliances, electronics industries). Engineering grades: road transport vehicles (bodies, tankers & trailers). Rail transport (mass-transport, trams, hoppers). Marine (fast-ferries, work boats, offshore rigs). Bulk storage (silos, static tanks, chemical & food plants). Electrical (busbar, heat-sinks). Industrial heat-exchangers.
Tradenames: Alumec
Approvals: Various aerospace, marine & engineering body requirements.
Notes: Sole UK plate mill. Producing traditional alloy plate, Al-Li, aerospace alloys, mould & tooling plate. Armour plate. Export ~50%.

British Aluminium Speciality Extrusions [Al]

Lillyhall, Workington, Cumbria CA14 4JY
United Kingdom
Tel: +44 1900 32 2500, Fax: +44 1900 32 2501, Contact: Gregory A. Davis - Export Sales
Group: British Aluminium Holdings (UK)
Alloys: 1200, 1350A, 2014, 2014A, 2214, 2017, 2017A, 2024, 2025, 2031, 2618, 2618A, 4032, 5056A, 5083, 5086, 5154A, 5251, 5454, 5754, 6061, 6063, 6082, 6101A, 7010, 7014, 7017, 7019, 7020, 7022, 7039, 7049A, 7050, 7075, 7150, 7175, 7475, 8090. **Designation systems:** USA CEN.
Product Types: Wrought alloys Cast alloys High- & medium-strength alloy extrusions in a wide range of alloys. Billet (cast & machined): 190-510mm dia. (as-cast). Bar (round): max. dia 350mm for high-strength, 380mm for medium-strength. Bar (rectangular, hexagonal). Standard (T, I, Z, top hat & channels). Hollows (seamless, porthole, single-&multi-hollow). Section & profile dimensions: 360mm circumscribing circle (CCD), rectangle 380x100mm. Min. wall thickness >1.5mm (CCD/60). Max solution treated length 17m (20m for press water quench). Billet, Bar, Extrusion, Forgings/Stock.
Applications: Power (parts of turbines, nuclear industry). Engineering (forge-stock bar). Transport (deck & hull construction of high-speed ferry). Construction. Aerospace (Airbus wing-stringer). Defence (bridges, armoured personnel carrier). Automotive (racing car pistons, motorcycle frames & arms).
Other Services: Design. Custom-profiles. R&D (alloys/new materials, processes, products). Heat-treatment, homogenising/scalping billets. Controlled-stretch <330sq.cm.
Approvals: BS EN ISO 9002. MoD, AQAP4, CAA, Qualifas, (Rolls-Royce, Boeing, Aerospatiale, Agusta).
Notes: Large dimensional capacity. Approved suppliers for several major aerospace companies world-wide. Foundry, with latest degassing & filtration techniques. Extrusion presses (direct & indirect) 1600T to 5000T. Vertical & horizontal furnaces (solution treatment & aging). Largest European extrusion stretching facilities. Testing & inspection (NDT, mechanical & environmental testing).

British Aluminium Tubes Ltd. [Al]

Studley Road, Redditch, Worcs. B98 7HN
United Kingdom
Tel: +44 1527 48 4500/4578, Fax: +44 1527 48 4502/4501, Contact: John E. Blackham - Sales Manager
Group: British Aluminium Holdings (UK)
Associated Companies: British Aluminium has sales agencies in over 40 countries world-wide. Details available from any BAI site.
Alloys: Extruded & Drawn Tubes: 1050A, 1200, 1350, 2014A, 2017A, 2024, 3003, 5005, 5052, 5083, 5154, 5154A, 5251, 5754, 6005A, 6060, 6061, 6063A, 6063, 6070, 6082, 6101A, 6181, 7075. Process pipe: 5083, 5086, 5154, 5154A, 5454, 6061, 6063 Tempers: O, F, H32, H12, H14, T6. Pneumatic cylinders: 6063, (6061, 6082 + others on request). Tempers: T6 (BS), T832 (DIN), F22 (DIN), T7 (Alcan inhouse temper). **Designation systems:** USA BS DIN.
Product Types: Wrought alloys Seamless extruded & drawn tubes in over 26 alloys. Products classed as: Extruded seamless (30-320mm OD, wall 3-34mm). Extruded porthole (12-100mm OD, wall 1.2-12.5mm). Drawn seamless (5-550mm OD, 0.5-19mm wall) Drawn porthole (5-80mm OD, 0.5-11mm wall). Tolerances to BS or customer requirements. Process pipe: Nominal bores & wall thicknesses to ANSI. Pneumatic: Extruded, then drawn to close-tolerance, cylindrical tube. Range of standard sizes: 29mm OD, 25mm ID to 264mm OD, 250mm ID. Tolerances to ISO 6537. Surface finish: anodized (15-25 microns), non-anodized, scurfed, drawn-finish. Bore: anodized, drawn, honed. Tube, Extrusion, Seamless (extruded or drawn).
Applications: Bus-bar, engineering components, structural applications. Missiles. Sporting goods. Process pipework for petrochemical industry, cryogenic & oil industry. Photocopier drums. Pneumatic cylinder bodies.
Other Services: Fabrication, inc. machining, bending, welding.
Approvals: BS 5750, ISO 9002, EN29002, MoD AQAP4, CAA. Company approvals: Rolls-Royce, BAe, Westlands, BNF.
Notes: Extensive range of extruded & drawn tubes (seamless & porthole). Direct & indirect extrusion techniques.

60 Supplier Addresses & Product Details

British Aluminium Wire [AI MMC]

Port Tennant, Swansea, West Glamorgan SA1 8PS
United Kingdom
Tel: +44 1792 49 2400, **Fax:** +44 1792 49 2499, **Telex:** 48191,
Contact: Gareth Hyde - Sales Manager
Group: British Aluminium Holdings (UK)
Associated Companies: West Bromich (UK)
Alloys: 1050A, 1080A, 2011, 2014A, 2017, 2117, 2024, 3103, 4043A, 4047A, 5052, 5056A, 5154A, 5183, 5251, 5356, 5554, 5556A, 5754, 6061, 6063, 6082, 7050, 7075. DIN A199.5Ti.
Tempers: O, M, H2, H4, H6, H8, TB, TF, TD, TH. **Designation systems:** USA BS.
Product Types: Wrought alloys Aluminium wires, conductors & strips. Drawn wires (to BS1475): 0.5mm-19mm dia. in various tempers. Straight lengths 75-4000mm, close-straightness control. Welding filler wire 0.8-6.0mm dia. 0.5kg, 6.5kg, 16kg reels + TIG packs. Duralcan 90/10, an Al-10% alumina MMC wire, for wear-resistant coating, by flame- or arc-spraying. Coated tiles (300x300mm) available from Metallisation Services. Wire, Fastener stock.
Applications: Engineering (general machined components; fastener industry, inc. rivets for aerospace & automotive use; nails for construction industry, roofing hooks; bolts for container-makers). Welding wire (MIG, TIG & Gas) Metal-spraying, arc- & flame-spraying (anti-corrosion protection, wear & non-skid coatings). Paper & film packaging. Zip-fastener manufacture. Tea-bag staples. Electricity supply industries (BAI conductors).
Tradenames: Duralcan 90/10.
Other Services: To customer specification, inc. other alloys, tolerances, shapes & strip. **Approvals:** CAA.TUV (Wien), TUV (Rhein-West.), Lloyds ISO 9002, DNV, DB, ABS (USA).
Notes: Two UK manufacturing plants. Producing a wide range of wire products to meet customer requirements. Electrical wire from British Aluminium Conductor (Swansea).

Ronald Britton & Co. [AI]

Wallhead Mill, Kingsway, Rochdale, Lancashire OL16 5AF
United Kingdom
Tel: +44 1706 43761/2, **Fax:** +44 1706 42759, **Telex:** 63276
mknmet g, **Contact:** Elizabeth Lindley - Customer Services.
Group: Wolstenholme International Ltd. (UK) [Comalco]
Product Types: Wrought alloys, Powders Aluminium (and many other materials) powder and foil-flake products for decorative purposes, glitters, reflective paints, metallic inks, etc., Foil, Shape foil flakes. **Approvals:** ISO 9002

The Brock Metal Company [AI]

Walsall Road, North Canes, Cannock, Staffordshire WS11 3NR
United Kingdom
Tel: +44 1543 276 666, **Fax:** +44 1543 276 418
Product Types: Cast alloys, ingot.
Other Services: Technical support. **Approvals:** ISO 9002.
Notes: Manufactures Al-alloy ingot to national specifications or to customer requirements. [Information from ALFED].

Brush Wellman GmbH [Be]

Motorstrasse 34
D-70499 Stuttgart
Germany
Tel: +49 711 830 93 0, **Fax:** +49 711 833 822, **Telex:** 7252271,
Contact: Karl Ludwig Rausch
Group: Brush Wellman (USA) **Est:** 1981 **Employees:** 27
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Tube, Extrusion.

Brush Wellman Inc. [Be]

Beryllium Metals Plant, 14710 West Portage River Road South
Elmore, Ohio 43416
United States of America
Tel: +1 419 862 2745, **Fax:** +1 419 862 4174
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Fastener stock.
Notes: Main enquiry point for Brush Wellman group.

Brush Wellman Inc. [Be]

Corporate Offices
17876 St. Clair Avenue
Cleveland, Ohio 44110
United States of America
Tel: +1 216 486 4200, **Fax:** +1 216 383 4091
Group: Brush Wellman (USA) **Est:** 1921
Associated Companies: Sales and technical services worldwide, including: Elmore, Ohio (USA); Reading, Pennsylvania (USA); Delta, Utah (USA); Detroit, Michigan (USA); Los Angeles, California (USA); Fairfield, New Jersey (USA); Elmhurst, Illinois (USA); Theale (UK); Stuttgart (D); Tokyo (J).
Alloys: "Pure Beryllium":- Powders: Vac. SP65, SP200F, IP-70. Hot pressed: S-65B, S200F, I-70A, I-220B, I-400. Optical grades: I-70B, I-220B, S-200F, O-50. Foil: IF-1, PF-60. Flat rolled grades: SR200, PR200. HIP grades: S-200FH, O-50, I-250. Extruded: S-200.
Beryllium Alloys:-
AM162H (Al38-Be62), AlBeMet HIPped, rolled or extruded.
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Near-net shapes & special processing routes.
Applications: Very wide ranging but specialised. Aerospace, satellites, defence, missiles, nuclear, radar/RF systems, precision and micro-engineering, high stability optical systems, mirrors, data storage systems, electronics.
Tradenames: AlBeMet
Notes: Enquiries handled by Elmore Ohio division.

Brush Wellman Inc. [Be]

180 Passiac Avenue
Fairfield, New Jersey 07004
United States of America
Tel: +1 201 227 2552, **Fax:** +1 201 227 2649
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Fastener stock.

Brush Wellman Inc. [Be]

18720 Crenshaw Blvd.
Torrence, CA 90504
United States of America
Tel: +1 310 715 2422, **Fax:** +1 310 715 2316
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Fastener stock.
Notes: USA service centre.

Brush Wellman Inc. [Be]

27555 College Park Drive
Warren, Michigan 48093
United States of America
Tel: +1 810 772 2700, **Fax:** +1 810 772 2472
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Fastener stock.

Brush Wellman Inc. [Be]

606 Lamont Road, Elmhurst, Illinois 60126
United States of America
Tel: +1 630 832 9650, **Fax:** +1 630 832 9657
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion, Fastener stock.

Brush Wellman (Japan) Ltd. [Be]

Dai-ichi Marusan Bldg., 9 Kanda Jinbo 3-chome
Chiyoda-ku, Tokyo 101
Japan
Tel: +81 3 3230 2961, **Fax:** +81 3 3230 2908
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar, Tube, Extrusion.

Supplier Addresses & Product Details 61

Brush Wellman Ltd. [Be]

Units 4 & 5 Ely Road, Theale Commercial Estate
Theale, Reading, Berkshire RG7 4BQ
United Kingdom
Tel: +44 1734 303733, **Fax:** +44 1734 303635, **Email:**
patricia_murphy@brushwellman.com, **Internet:**
www.brushwellman.com, **Contact:** Pat Murphey (Be); Mark
Basford (Be-Cu).
Group: Brush Wellman (USA)
Product Types: Wrought alloys, Powders, Ingot, Billet, Plate,
Sheet, Strip, Foil, Bar, Tube, Extrusion.

Gerard de Bruyn BV [Ti]

Postbus 107
NL-2900 AC Capelle a/d IJssel [Kompasstraat 7, NL-2901 AM
Capelle a/d IJssel]
Netherlands
Tel: +31 104 514 455, **Fax:** +31 104 500 539, **Contact:** Ph.J.
Aeckerlin
Est: 1893 **Employees:** 11
Approvals: NEN-EN-ISO 9002:1994
Notes: Metal trader. Agent for Inco Alloys, Hereford - UK.

Bunting Titanium Ltd [Ti]

34 Middlemore Industrial Estate
Smethick, Birmingham, West Midlands B21 2EE
United Kingdom
Tel: +44 121 558 5814, **Fax:** +44 121 558 8072, **Contact:** Balkar
Singh - Sales Manager
Group: Langley Forge plc **Est:** 1964
Alloys: ASTM designations: Ti-1, Ti-2, Ti-3, Ti-4, Ti-7, Ti-64, other
alloys on request.
Product Types: Wrought alloys Round bar, billet, plate, welding
wire, sheet pipe. Also finished components (fasteners, valves,
tubes, flanges, heat exchangers, tanks & vessels)., Billet, Plate,
Sheet, Bar, Tube, Wire, Pipework fittings, valves, flanges, nuts &
bolts, etc.
Applications: General engineering. Chemical. Nuclear.
Petrochemical.
Approvals: ISO 9002

C.A.D. - Clermont Auvergne Developpment [Mg]

See: PREDIMAG

Calder Aluminium (Automotive) [Al]

Automotive & Special Alloys Divisions
Repton Road, Willington, Derbyshire DE 6EW
United Kingdom
Tel: +44 1283 703383, **Fax:** +44 1283 704399
Group: Distributorcap (UK)
Product Types: Cast alloys Secondary aluminium ingots.

Calder Aluminium (Processing) [Al]

Processing Division
Unit 15, Marchington Ind. Estate
Marchington, Uttoxeter ST14 8LP
United Kingdom
Tel: +44 1283 821300, **Fax:** +44 1283 821444,
Group: Distributorcap (UK)

Calder Aluminium Ltd. [Al]

Repton Rd.
Willington, Derby DE65 6EW
United Kingdom
Tel: +44 1283 703383, **Fax:** +44 1283 703873, **Contact:** Mr. David
Ward - Sales Director
Group: Distributorcap (UK)
Product Types: Cast alloys Secondary aluminium ingots; master
alloys.
Other Services: ISO 9002
Notes: Manufacturing sites in UK & France. [Information from
ALFED].

Capalex - Capital Aluminium Extrusions Ltd. [Al]

Cleator Moor Industrial Estate
Cleator Moor, Cumbria CA25 5QB
United Kingdom
Tel: +44 1946 811 771, **Fax:** +44 1946 813 681, **Contact:** Paul
Doren
Product Types: Wrought alloys. Extrusions made to order.
Other Services: Custom profiles. Small & large quantities. Rapid
turn-round (existing dies). Surface finishing (mill or anodised).
Fabrication facilities.
Notes: Small but independent specialist manufacturer of small
aluminium profiles; to customer order. [Information from ALFED].

Capital Aluminium Extrusions Ltd. [Al]

See: Capalex - Capital Aluminium Extrusions Ltd.

Cardinal Aluminium Co. [Al]

6901 Preston Hwy, PO Box 19987
Louisville, KY 40259-0987
United States of America
Tel: +1 502 969 9302, **Fax:** +1 502 968 4269
Product Types: Wrought alloys, extrusions.
Other Services: Metal Finishing, Powder Coatings, Protective
Coatings, Etched Products.

Carl Schreiber GmbH [Al]

Kölner Straße 56
D-57290 Neunkirchen
Germany
Tel: +49 2735 769 0, **Fax:** +49 2735 769 22, **Telex:** 875835,
Contact: Klaus Fischbach
Est: 1837 **Employees:** 60
Alloys: AA designations: 1050A, 1080A, 1350A, 2014, 2017A,
2024, 3003, 3103, 5005A, 5049, 5052, 5056A, 5083, 5754,
6061, 6082, 7020, 7022, 7075. DIN designations: Al99.5, Al99.8,
E-Al, AlCuSiMn, AlCuMg1, AlCuMg2, AlMnCu, AlMn1, AlMg1,
AlMg2Mn0.8, AlMg2.5, AlMg5, AlMg4.5Mn, AlMg3, AlMgSiCu,
AlMgSi1, AlZn4.5Mg1, AlZnMgCu0.5, AlZnMgCu1.5.
Product Types: Wrought alloys Metal sheets, bands, strips. Ring
segments. Anodes. Custom-parts. Clad materials. Plate, Strip,
anodes, circular blanks, rings, punched shapes, turned &
machined parts.
Applications: Electrical. Mechanical. Chemical (desalination
plants, chimney gas desulphuration). Aerospace. Haberdashery.
Other Services: Rolling, stretching, glowing, heat treatments,
sawing, cutting, splitting, punching, pickling, inspection.

Cedar Tools [Al]

See: Hydro Aluminum Cedar Tools Inc.

Cegedur [Al]

23 rue Balzac, BP 787.08
F-75360 Paris Cedex 08
France
Tel: +33 1 45 61 61 61, **Fax:** +33 1 45 61 50 00, **Telex:** pech x
290503 f
Group: Pechiney
Product Types: Wrought alloys.

Century [Al]

See: Hydro Aluminium Century Ltd.

Cezus [Ti Zr]

Tour Manhattan, Courbevoise Cedex 21
F-92087 Paris La Defense
France
Contact: Paul Quinton
Group: Pechiney **Employees:** 1000
Product Types: Ti & Zr.
Notes: Compagnie Européenne du Zirconium - Pechiney (50%).

62 Supplier Addresses & Product Details

CFP - Cold Formed Products Ltd. [AI]

24, St. Mary's Road
Plaistow, London E13 9AD
United Kingdom
Tel: +44 181 471 2727, Fax: +44 181 470 1076, Email:
100663,124@compuserve.com, Contact: Andrew Palmer -
Managing Director

Est: 1962

Alloys: 1050A to 6082

Product Types: Wrought alloys Specialist impact extrusions & cold forgings. Extrusion, impact extrusion & forged items.

Applications: Engineering components. Aerospace (waveguides, oil coolers, decoy flare casings, detonator cases). Automotive (diesel fuel inlet unions, brake-pistons, ferrules, anti-vibration mountings). Cookware (flameguards, handle fixings). Electrical (cable ferrules, screening cans).

Other Services: Product development. Approvals: MoD AQAP 4. Royal Ordnance, BAe (defence), USAF.

Notes: Manufacture a wide range of aluminium components by cold-forging & impact extrusion. Export ~50% to Europe, USA, Pacific basin.

Chadwicks of Bury Ltd. [AI]

Villiers Street, Bury, Lancashire BL9 6BS
United Kingdom
Tel: +44 161 797 9679, Fax: +44 161 761 3954

Group: SAPA

Product Types: Wrought alloys, Foil.

Other Services: Printing of foils.

Notes: Aluminium foil lids and closures for the dairy, food and chemical industries.

Châteauroux Fonderies [AI]

Route de Châtre
F-36028 Châteauroux
France
Tel: +33 2 54 60 40 40, Fax: +33 2 54 60 40 73
Group: Groupe Valfond Est: 1968 Employees: 260

Alloys: AS9U3, Z3 - Z5, AS7G03

Product Types: Cast alloys, Castings.

Applications: Automotive, aerospace, defence, public phone components.

Christensen AS [AI]

See: Aage Christensen AS

Cirex BV [AI]

Bornsestraat 365, Postbus 81
NL-7600 AB Almelo
Netherlands
Tel: +31 546 540400, Fax: +31 546 816365
Group: Hoogovens Groep

CLAL-MSX [Ti]

BP 1
F-60540 Bornel
France
Tel: +33 3 44 08 25 25, Fax: +33 3 44 08 49 11,
Alloys: Suppliers of titanium to customer requirements.
Product Types: Bars, wire, sheet,

CMIC [AI]

See: Aluisse CMIC SA

Cold Formed Products Ltd. [AI]

See: CFP - Cold Formed Products Ltd.

Coleshill Aluminium Ltd. [AI]

Gorseley Lane, Coleshill, Warwickshire B46 1JU
United Kingdom
Tel: +44 1675 463 170, Fax: +44 1675 463 748,
Product Types: Cast alloys Primary & secondary., Ingot,
Approvals: BS 5750, ISO 9002, NAMAS, CAA.
Notes: Primary & secondary aluminium to UK, European & World specifications. Stock-holding. [Information from ALFED].

Comalco New Zealand Limited [AI]

Level 2, Building 5, Central Park, 666 Great South Road
Penrose, Auckland
New Zealand
Tel: +64 9 579 5251, Fax: +64 9 579 1559, Contact: Peter Ambler
Group: Comalco

Comalco Smelting [AI]

2/441 St. Kilda Road, Melbourne 3004
Australia
Tel: +61 3 9869 9333, Fax: +61 3 9869 9399, Contact: Melissa
Hutchinson - Sales Administration Officer
Group: Comalco
Notes: Head Office. Comalco Aluminium Powder has been manufacturing and exporting quality aluminium powders and pastes for over 25 years. Comalco Aluminium Powder offers a wide range of aluminium particulate products including; Aluminium powders and granules/shot with various size fractions, purities and alloys available. The SILVERAL™ pigment range of aluminium pigment pastes in leafing or non leafing form, The AC range of aluminium pastes and powders for Aerated Lightweight Concrete (ALC) manufacture. From supplying the local Australian market in 1968, Comalco Aluminium Powder has grown to offer a large range of powder, granule/shot and flake products to a worldwide customer base. The bulk of the current production is sold throughout Australia, Asia and Europe, worldwide sales network. To meet the increasing demand for Comalco Aluminium Powder's products, an extensive international network of sales agents and distributors has been established to ensure the reliable supply of particulate aluminium to a global market. Comalco Aluminium Powder products are transported throughout the world utilising the considerable resources of Comalco and the Rio Tinto group, as part of the 140,000 tonnes of aluminium produced and exported from the Comalco Bell Bay smelter each year.

Comeca [AI Mg Ti]

8, rue de l'Industrie, Zone Industrielle
F-78210 Saint Cyr l'Ecole
France
Tel: +33 1 34 60 05 84, Fax: +33 1 30 58 56 40, Contact: Mr. P. G.
Seur - Director
Est: 1969 Employees: 10
Alloys: Magnesium: AZ31B, AZ31BTP
Product Types: Wrought alloys, Sheet, Bar, Tube, Extrusion,
Notes: Supply a wide range of non-ferrous, ferrous & composite materials; including cathodic protection (Mg, Zn).

Comercial e Industrial Minero Metallurgica SA [AI Mg Ti]

Eucken 16-302
Colonia Anzures, Mexico 11590, DF
Mexico
Tel: +52 5 254 6986, Fax: +52 5 254 3362, Telex: 1763016,
Group: Metallurg (USA)
Product Types: Powders

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Comhan Holland BV [AI]

Joh. Enschedeweg 11
NL-1422 DR Uithoorn
Netherlands
Tel: +31 2975 671 11, Fax: +31 2975 685 49
Group: SAPA
Applications: Signs, etc.
Notes: Distributor of extruded and rolled products.

Conalco - Consolidated Aluminium Corp. [AI]

11960 Westline Industrial Drive
St Louis, MO 63146-3217
United States of America
Tel: +1 314 878 6950, Fax: +1 314 878 0562,
Group: Alusuisse-Lonza (CH)
Product Types: Wrought alloys, Sheet,
Applications: Automotive. Sheet for outer & inner body.
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division,
an interdisciplinary team experienced in the automotive
industries requirements. Important suppliers to the automotive
industry in Europe & the USA.

Concentric sari [AI]

6 ave Charles de Gaulle, Halle A
F-78150 Le Chesney
France
Tel: +33 1 39 54 55 11, Fax: +33 1 39 54 00 20, Contact: Pierre
Baumes
Group: Concentric

Consolidated Aluminium Corp. [AI]

See: Conalco - Consolidated Aluminium Corp.

Conzinc Asia India [AI]

128/1 Ulsoor Rd
Bangalore 560 042, Karnataka
India
Tel: +91 80 559 8080, Fax: +91 80 559 1042, Contact: Navin
Kesavan
Group: Comalco

Conzinc Asia (Philippines), Inc. [AI]

Suite 72-A Zeta II Building, Salcedo St, Legaspi Village
Makati, Metro Manila
Philippines
Tel: +63 2 813 4256, Fax: +63 2 816 6685, Contact: J.D. Cruz
Group: Comalco

Conzinc Asia (Korea) Limited [AI]

21st floor, Kyobo Building
#1 Chongno 1-ka, Chongno-ku, Seoul 110-714
South Korea
Tel: +82 2 738 4561, Fax: +82 2 737 8350, Contact: Hyun Joon
(Jay) Lee
Group: Comalco

Conzinc (Malaysia) Sdn Bhd. [AI]

Unit A 202-3 2nd Floor West Wing, Wisma Tractors
7 Jalan SS16/1, Subang Jaya, 47500 Petaling Jaya
Malaysia
Tel: +60 3 736 0993, Fax: +60 3 736 9028, Contact: Wong Wai
Ming
Group: Comalco

Costa [AI]

See: Alusuisse Costa srl

Ets. Robert Creuzet [AI Ti MMC]

Route de Beyssac
F-47200 Marmande
France
Tel: +33 5 53 20 45 00, Fax: +33 5 53 20 45 20, Contact: Jacques
Barillot Creuzet
Group: Robert Creuzet (F) Est: 1934 Employees: 400
Alloys: Aerospace aluminium grades: 2024, 2214, 7075, etc.
Titanium alloys: TA6V. MMC's: AMC (UK) materials: AMC217xe,
AMC225xe, AMC225xh, AMC235xe, AMC500sa.
Product Types: Wrought alloys Aluminium extrusions, 3D forming
of special extrusions, light alloy forgings, titanium turbine vanes,
electrochemical machining, MMC 'fabricators', Extrusion,
Forgings, post-formed extruded products, sub-assemblies.
Applications: Aerospace and defence.
Other Services: Design, machining, full aeronautical engineering
service. Approvals: RAQ2 (AQAP4), QUALIFAS Level A.
Notes: Extrusion presses: 6 x 400T, 6 x 700T, 2 x 1000T, 1 x
4000T (max. circumscribing circle: 300mm). Heat treatment
furnaces: 3 x 8m long horizontal salt baths, 1 x 7m high vertical
salt bath, precipitation hardening furnaces, stretching benches, 6
x extrusion forming presses + hot forming furnace, 7 x precision
forging presses (up to 4000T, max. 800sq.cm. projected area,
max. 1m length).

CYCO International Pty Ltd. [AI Mg MMC]

1297 Nepean Highway, Cheltenham, Victoria 3192
Australia
Tel: +61 395 843522, Fax: +61 395 845194, Contact: Mr. Graham
Withers - President.
Product Types: Low-cost Al-based MMC.
Applications: Automotive. Railroad. Marine. Aircraft. General
engineering (strength/weight ratio & wear-resistance).
Tradenames: ULTALITE - low cost aluminium MMC.
Notes: Research company specialising in the development of
advanced low-cost, light-weight MMC materials; including
processing equipment. [Information provided by the International
Magnesium Association].

D.B.S. Metals, Inc. [Ti]

2817 Dollarton Highway, North Vancouver, BC, V7H 1B1
Canada
Tel: +1 604 929 1340, Fax: +1 604 929 1322, Contact: Wendell J.
Kirk - President
Est: 1995 Employees: 3
Associated Companies: Additional Sales Office(s):
Papeteo Technical Service Ltd.
97 Hequn 1 Malu, Guangzhou, Guangdong 510100 China
Tel: +86 20 3873202, Fax: +86 20 3848425
Gary Lai - Principal Associate & Managing Director
Tel: +86 20 3873202, Fax: +86 20 3848425
Product Types: Wrought alloys Commercial Products, Sporting
Goods, Flats, Plate, CP, Fabrications, Specialty, Forgings,
Sheet, Fasteners, Pipe - Seamless, Tube, Fittings,
Other Services: Applications Technology, Consulting
Notes: Sales, marketing, purchasing, consultants, fabrication,
application. Specializing in CP Ti- & high-performance metals.

De Globe/Globon BV [AI]

Witveldweg 40, Postbus 4021, NL-5950 M Belfeld
Netherlands
Tel: +31 77 3769444, Fax: +31 77 3734848
Group: Hoogovens Groep

Dead Sea Magnesium Ltd. [Mg]

Potash House, P.O. Box 75, Beer Sheva 84100
Israel
Tel: +972 7 465380, Fax: +972 7 236 871, Contact: Mr. Ran
Olami
Product Types: Cast alloys Primary (pure & alloy) + secondary
ingot.
Notes: Produce magnesium-based chemicals. New plant, to
become active in 1997, to produce pure Mg & Mg-alloys. Other
plant located at Sdom, Israel.

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Dead Sea Magnesium Ltd.

[Mg]

POB 75, Be'er Sheva, ZIP 84100
Israel

Tel: +972 7 6465 399, 638, **Fax:** +972 7 6465505, **Contact:** Daniel Rosing - Vice President Marketing

Group: Dead Sea Works / Volkswagen

Product Types: Cast alloys, Ingot

Notes: Dead Sea Magnesium Ltd. is a joint venture between Dead Sea Works Ltd. Israel (65%) and Volkswagen AG Germany (35%). DSM's magnesium production facility in Sdom produces pure magnesium in grades of 9980A and 9990A, as well as alloys, mainly of the AZ and AM families for die casting purposes, according to ASTM specifications. The production is in the form of ingots of different sizes and weights. It is also intended to produce T-bars in different weights for applications in the aluminium industry. DSM's first stage of production will gradually reach a capacity of 25,000 tons per year. At the second stage, which is expected to begin three years later, the capacity will double to 50,000 tons. Magnesium Alloys Ingots. Pure Magnesium Ingots.

Deeside Aluminium Ltd.

[Al]

Bridge Road, Wrexham Industrial Estate
Wrexham, Clywd. LL13 9PS
United Kingdom

Tel: +44 1978 660 231, **Fax:** +44 1978 661 125, **Contact:** Wayne Fidler

Alloys: 1xxx, 3xxx, 5xxx, 6xxx series alloys.

Product Types: Wrought alloys Extrusion billet (15 Wagstaff Airslip diameters up to 6m length) & rolling ingot (to 7.5m & 20T). Billet, Plate.

Notes: Annual capacity 45 000T of rolling ingot & extrusion billet. [Information from ALFED].

Deutsche Titan GmbH

[Ti]

Altendorfer Straße 104
D-45143 Essen
Germany

Tel: +49 201 188 2245, **Fax:** +49 201 188 2720, **Telex:** 857752 tikru d, **Contact:** Rolf Hirschegger - Managing Director

Group: AST / Titania, Italy **Est:** 1958 **Employees:** 70

Associated Companies: Krupp VDM (D)

Alloys: DTG Tikrutan grades: RT12, RT15, RT18, RT20, RT12Pd, RT15Pd, RT18Pd, LT24, LT25, LT26, LT27, LT31, LT33, LT34, LT35; DIN grades: Ti1, Ti2, Ti3, Ti4, Ti1Pd, Ti2Pd, Ti3Pd; Wk. Numbers: 3.7025, 3.7035, 3.7055, 3.7065, 3.7225, 3.7235, 3.7255, 3.7105, 3.7145, 3.7155, 3.7165, 3.7175, 3.7185, 3.7110; Aerospace LW numbers 3.7024, 3.7034, 3.7064, 3.7144, 3.7124, 3.7154, 3.7164, 3.7024, 3.7174, 3.7184. Annealed or with appropriate heat treatments. **Designation systems:** DIN

Product Types: Wrought alloys Cast alloys Alloys & CP, Bar & Rod, Billet, Forgings, Ingot, Pipe - Seamless, Plate, Rings, Scrap - Recycle & Sell, Turnings, Shafts & Agitators, Sheet, Slab, Strip, Wire & Wire Coil, Ingot, Billet, Plate, Sheet, Strip, Bar, Tube, Wire, Forgings/Stock.

Applications: Aerospace:

Engines - Compressor discs and blades, fan rings, spacer rings, bolts, discs and blades, casings, hydraulic piping, hot air piping, burner outer panels, flanges, helicopter rotor heads.

Frames - Fittings, bolts, undercarriage parts, wing boxes, fuselage frames, guides for landing flaps and slats, brake accessories, aircraft skin sheet, engine mountings, landing gear components, wing bearing bushes, seaplane stringers, fire walls, panelling, hydraulic piping, de-icing piping, SPF shapes.

Satellites, rockets - Rocket engine housings, fuel tanks and valves.

Chemical Industry: Vessels, agitators, pumps, columns, racks, screens, fabric, mixers, valves, pressure reactors, fittings, filters, piping, heat exchangers, electrodes and anode baskets for electroplating (Cu, Ni, Co, Zn), electrodes for electrochemical production of chlorine and caustic soda, nitric acid tankers, tanks for sodium chlorate and calcium chloride.

Energy production and storage: Combustion and nuclear power plants - Condensers, coolers, piping, turbine discs and blades, generator-retaining rings, rotor-groove wear parts.

Seawater energy - Evaporators, condensers, piping.

Geothermal wells - Heat exchangers, piping.

Liquefied gas storage - Heat exchangers, coolers

Sour gas storage - Piping

Cooling units: Plate and tube heat exchangers

Marine engineering: Shipbuilding - Heat exchangers, condensers, piping, propellers, rudder posts, propeller shafts, instrument housings, gyro compasses, jet pumps, lifeboat parts, mast-head radar components, minesweepers, equipment for racing yachts, anodes for cathodic protection, hydrofoils, hydrofoil boats. Underwater equipment - Deep-sea submersibles, diver pressure hulls, submarines, accessories.

Seawater desalination - Vapour heaters, condensers, thin-walled piping. Off-shore engineering - Coolers, condensers, heat exchangers, piping, fire-extinguishing equipment, flanges, deep well risers, pipe strings, flexible risers, manifold stations, desulphurization equipment, catalytic crackers, seawater pipes for fire boats, sour water strippers, regenerators.

Medical engineering: Hip joint endoprostheses, knee joint prostheses, bone splints, bone pegs, bone screws, pacemaker housings. Heart valves, instruments, dentures, hearing aids, high-speed blood centrifuges, wheelchairs.

Flue gas desulphurization: Linings for limestone spray towers

Deep drilling: Pipe strings, risers, oil country tubulars, pipe linings, stress joints, instrument housings, wire.

Auto Industry: Connecting rods and connecting rod bolts, valves, valve springs, valve discs, crankshafts, camshafts, drive shafts, torsion bars, wheel suspensions, helical springs, bolts, clutch components, exhausts, ball joints, gearboxes, synchromeshes.

Mechanical engineering: Flexible pipe joints, protective tubing, instrumentation and controls.

Food Industry: Tanks (dairies, drinks industry), heat exchangers, packaging machinery parts.

Paper Industry: Bleaching towers, pumps, piping.

Jewellery Industry: Jewellery, timepieces

Optical Industry: Spectacle frames, camera shutters and bodies.

Creative art: Sculptures, fountain basins, ornaments, doorplates.

Sport: Bicycle frames, wheel hubs and axles, tennis rackets, golf club heads and shafts, mountaineering gear (icescrews, climbing hooks), sleds, bob structures, horseshoes, fencing foils.

Construction Industry: Sheet panels for roofs and facades, concrete reinforcement, monument rehabilitation (Acropolis), titanium anodes for cathodic protection of steel in concrete.

Personal protection: Armouring of vehicles (helicopters, cars, trucks, fighter planes) helmets, waistcoats, protective gloves.

Transport: Drive sets for high-speed trains, wheel tyres.

Printing and weaving machines: Fast moving special parts with wear-reducing protective coatings, e.g. high-speed print heads.

Others: Fans: Fan blades. High-speed centrifuges: Rotors.

Cutlery: Shears, knives, pincers. Radioactive waste disposal: Containers. Musical Instruments: Harmonica reeds, bells.

Superconduction: Wires of Nb-Ti alloy for the manufacture of strong magnets used at low temperatures in energy transfer, research and medical engineering. Memory alloys: Springs, flanges of Ni-Ti alloy. Hydrogen storage and transport: Ti-Fe and Ti-Mn alloy granulate. Miscellaneous: Recording instruments, nameplates, telephone relays, fish farming equipment, environmental measuring stations, titanium linings for large salt bath tanks for nitriding steel products, sonotrodes for ultrasonic welding of plastics.

Tradenames: Tikrutan

Other Services: Alloy Development, Applications Technology, Cold Working, Consulting, Cutting, Grinding, Grit Blasting, Heat Treating, In-House Captive, Hot Working, Inspection, Lathe Turning, Machining, Melting, Milling, Pickling, Recycling, Reforging, Research & Design, Sand Blasting, Sawing, Shearing, Toll Processing.

Notes: DTG is one of Europe's most experienced integrated manufacturers. They produce a wide range of grades in commercially pure titanium and titanium alloys used in many applications.

D'Halluin

[Al]

See: Ets. Georges D'Halluin

Supplier Addresses & Product Details 65

Daeboong Corporation [AI]

4th Floor, Kwansesa Hoikwan Building
209-9, Nonhyun-Dong, Kangnam-Ku, Seoul
South Korea
Tel: +82 2 515 6671, Fax: +82 2 515 8209, Contact: Mr. Kwang-
Woo Lee - Vice President
Group: Comalco
Notes: Distributor - Aluminium Powder / Granules

Diemakers Inc. [AI Mg]

801 Second Street
Monroe MO 63456-0278
United States of America
Tel: +1 573 735 4577, Fax: +1 573 735 2978
Group: Diemakers Inc. (USA)
Product Types: Cast alloys, castings (die & high-pressure)
Notes: Information from International Magnesium Association IMA

Diemakers Ltd. [Mg]

111 Whitby Road, Slough, Berks. SL1 3DR
United Kingdom
Tel: +44 1753 691169, Fax: +44 1753 692604, Contact: Mr. Peter
D. Caton.
Group: Diemakers Inc. (USA)
Product Types: Cast alloys High-pressure die castings.
Applications: Automotive, commercial, electronics & computer
industries.
Other Services: Design consultancy & product development.
Prototyping & production. Machine-shop.
Notes: European division of Diemakers Inc. (USA). Precision
magnesium diecastings, machined components & fully finished
assemblies.

Distributorcap Ltd. [AI]

Repton Road, Willington, Derbyshire DE 6EW
United Kingdom
Tel: +44 1283 703383, Fax: +44 1283 704399,
Group: Distributorcap (UK)
Notes: Head company of group containing Aldevienne, Calder &
EMP.

D M Company [AI]

32 Ezra Street South Block, 2nd Floor Room 205/212
Calcutta 700001
India
Tel: +91 33 250605, Fax: +91 33 5307676, Contact: Mr D D
Singhi
Notes: Stockists of electrical grade aluminium bus bar temper &
alloy, sheet, rods, plates, etc.

Dorlec France [AI]

16, place Vendôme
F-75001 Paris
France
Tel: +33 1 42 60 15 90, Fax: +33 1 42 61 99 57, Telex: 680464 f,
Contact: Mme. Petit
Est: 1975 Employees: 10
Product Types: Extrusions (electronic housings).
Notes: Late entry.

Dow Canada [Mg]

PO Box 1012, Sarnia, Ontario N7T 7K7
Canada
Internet: <http://www.dow.com>
Group: Dow
Notes: Toll free Tel: +1 800 363 3500.

Dow Chemical Company [Mg]

2020 Dow Center
Midland, MI 48674
United States of America
Tel: +1 517 636 9138, Fax: +1 517 638 9615, Email:
usdowps3@ibmail.com, Internet: <http://www.dow.com>, Contact:
Mr. Frank Petitti
Group: Dow
Associated Companies: World-wide.
Product Types: Extruded anodes. Extrusion- & forging billet.
Chips & turnings. Extrusions. Pure & alloy primary ingot.
Secondary ingot. Welding rod & electrode.
Notes: Headquarters of Dow organisation.

Dow Chemical Company [Mg]

2301 N. Brazosport Blvd B-1406
Freeport TX 77541-3257
United States of America
Tel: +1 409 238 2758, Fax: +1 409 238 0855, Internet:
<http://www.dow.com>, Contact: James H. Hillis - Ass. Dev.
Scientist - Magnesium Tech. Services.
Group: Dow

Dow Europe [Mg]

Wollgrasweg 23
D-70599 Stuttgart
Germany
Tel: +49 711 45 82 0
Group: Dow
Notes: Sales office for Dow Europe S.A.

Dow Europe S.A. [Mg]

Bachtobelstrasse 3
CH-8810 Horgen
Switzerland
Tel: +41 1 728 21 11, Fax: +41 1 728 30 23, Internet:
<http://www.dow.com>, Contact: Guenther Eberhard - Marketing
Manager
Group: Dow
Notes: European headquarters.

Dow Japan Ltd. [Mg]

6&7/F, Hibiya Chunchi Building
1-4, Uchisaiwaicho 2-chome, Chiyoda-ku, Tokyo 100
Japan
Tel: +81 3 503 3361, Internet: <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow Pacific Ltd.

Dow Japan Ltd. [Mg]

Daisan Horiuchi Building, 8/F., 6-23 Meieki 4-chome, Namura-ku
Nagoya-shi, Aichi-ken 450
Japan
Tel: +81 52 563 1821, Internet: <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow Pacific Ltd.

Dow Japan Ltd. [Mg]

10/F, Sumitomo Shinsaibashi Building
10-19 Minamimemba 3-chome, Chuo-ku, Osaka 542
Japan
Tel: +81 6 2810971, Internet: <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow Pacific Ltd.

Dow Latin America [Mg]

Puerto Rico
Tel: +1 809 781 1122, Internet: <http://www.dow.com>,
Group: Dow

66 Supplier Addresses & Product Details

Dow Latin America [Mg]

2333 Ponce de Leon Blvd., Suite 900,
Coral Gables, FL 33134
United States of America
Internet: <http://www.dow.com>,
Group: Dow
Notes: Area Headquarters.

Dow Magnesium [Mg]

Aurora Service Center, 3595 Moline Street
Aurora, Colorado 80010
United States of America
Tel: (+1 800 525 7572), **Internet:** <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow Magnesium.

Dow Magnesium [Mg]

2020 Dow Center
Midland, MI 48674
United States of America
Tel: (+1 800 447 4369), **Fax:** +1 517 638 9615, **Internet:**
<http://www.dow.com>
Group: Dow **Est:** 1916
Associated Companies: World-wide. Dow European HQ in CH;
Dow Pacific (area HQ) in Hong Kong.
Alloys: ASTM designations: AZC0ML, AZ21X1, AZ31B, AZ61A,
AZ80A, ZK60A, ZK40, AZ91B, AZ91D, AZ91E, AM60B, AS41B,
AE42X1, AE42X2, 380 A1. **Designation systems:** USA.
Product Types: Wrought alloys Cast alloys Pure & alloy primary
ingot. Secondary ingot. Sticks of various weights and forms.
Extruded anodes. Extrusion- & forging-billet. Chips & turnings.
Extrusions. Welding rod & electrode. Ingot, Billet, Bar, Tube,
Wire, Extrusion, Forgings/Stock, Extruded anodes, welding rods.
Notes: The Dow Group manufacture & supply a wide range of
alloys with various product shapes, sizes and uses.

Dow Pacific [Mg]

47E, Sun Hung Kai Centre, 30 Harbour Road, Wanchai
Hong Kong
Tel: +852 879 7333, **Internet:** <http://www.dow.com>,
Group: Dow

Dow Quimica S.A. [Mg]

PO Box 9037
01065 São Paulo SP
Brazil
Internet: <http://www.dow.com>,
Group: Dow

Dow USA [Mg]

Suite 415, 8002 Discovery Drive
Richmond, VA 23288
United States of America
Tel: +1 804 288 1601, **Internet:** <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow USA.

Dow USA [Mg]

Suite 100, Detroit Dow Center, 26200 American Drive
Southfield, MI 48034
United States of America
Tel: +1 313 358 1300, **Internet:** <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow USA.

Dow USA [Mg]

Suite 444, Great Northern Corp. Ctr., 25000 Country Club Blvd.
North Olmsted, OH 44070
United States of America
Tel: +1 216 734 8600, **Internet:** <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow USA.

Dow USA [Mg]

Suite 485, 12647 Olive Boulevard
St Louis MO 63141
United States of America
Tel: +1 314 434 4100, **Internet:** <http://www.dow.com>
Group: Dow
Notes: Sales Office, Dow USA.

Drahtwerk Elisental - W. Erdmann GmbH & Co. [Al]

PO Box 12 60
D-58804 Neuenrade [Werdohler Str. 40, D-58809 Neuenrade]
Germany
Tel: +49 23 92 697 0, **Fax:** +49 23 92 620 44, **Telex:** 826452
Est: 1919
Associated Companies: UK Agent: Alcodan Metals Ltd.
Alloys: DIN designations: Al99.999 to Al >99.9999, Al99.98R,
Al99.9, Al99.8, Al99.5, Al99.5Ti0.6, E-Al, Al99.9Mg0.5,
Al99.9Mg1, Al99.9MgSi, AlFeSi, AlFeMg, AlMn1, AlMg1,
AlMg1.8, AlMg2.5, AlMg3, AlMg3.5, AlMg5, AlMg2Mn0.3, E-
AlMgSi, AlMgSi0.5, AlMgSi1, AlMg1SiCu, AlCuBiPb,
AlCu2.5Mg0.5, AlCuMg1, AlCuMg2, AlCuSiMn, AlZn4.5Mg1,
AlZnMgCu1.5; Werkstoffe numbers: 3.0385, 3.0305, 3.0285,
3.0255, 3.0257, 3.3308, 3.3318, 3.3208, 3.0915, 3.0315, 3.3315,
3.3326, 3.3523, 3.3535, 3.3555, 3.3526, 3.2305, 3.3206, 3.2315,
3.3211, 3.1855, 3.1305, 3.1325, 3.1355, 3.1255, 3.4335, 3.4365;
AA designations: 1090, 1080A, 1050A, 1350A, 6443, 8011A,
3103, 5005, 5051A, 5052, 5754, 5154, 5056A, 5251, 6101A,
6060, 6082, 6061, 2011, 2117, 2017A, 2024, 2014, 7020, 7075.
Tempers (AA): O, H12, H14, H16, H18, T4, T6; (DIN): W7, W18,
F9, F10, F11, F13, F16, F19, F20, F21, F22, F24, F25, F26,
F27, F28, F30, F31, F32, F35, F36, F37, F38, F40, F43, F44,
F46, F47, F50, F51, F52. **Designation systems:** USA CEN BS
DIN NF.
Product Types: Wrought alloys Round wire (0.1 to 18mm dia.),
Flat wires (wide range of dimensions), Round & profile rods (1 to
15mm dia, up to 6m lengths). Custom alloys & products. Spools
& coils from 100g to 800kg. Wire, Fastener stock.
Applications: Fastener stock, packaging wire, metal spraying,
vacuum metallization, bending, shaping & machining stock,
welding wire & rod. Braid, mesh & woven material. Deep
drawing. Knitting needles, crochet hooks. Timber industry.
Medical. Precision engineering. Cables. Staples.

DSM [Mg]

[See: Dead Sea Magnesium]

Dufalco NV [Al]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302111, **Fax:** +32 15 302682
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Rolled Products Duffel.

The Duriron Company [Ti]

Titanium Castings Operation, 2200 East Monument Ave.
Dayton, OH 45402
United States of America
Contact: Grant Felzien - Manager
Group: The Duriron Company **Est:** 1912 **Employees:** 3900
Associated Companies: Company Subsidiaries: Valtek, Atomac,
Automax, Durametall.
Product Types: Cast alloys Alloys, Castings, Centrifugal Pumps,
Commercial Products, Marine Hardware, Electrodes,
TiAluminide, Furnaces, Investment Castings, Furnaces, Vacuum
Induction, Ingot, Ingot, TiAluminide, Scrap - Buy & Sell.
Other Services: Engineering, Melting, Custom, Test, Toll
Processing.
Notes: Duriron's Titanium Castings Operation melts and pours
reactive alloys using its patented Induction Skull Melting (ISM)
process. Titanium castings are the main products. Titanium
Aluminides and other reactive alloys are formulated and made
into castings, electrodes, and ingots.

Supplier Addresses & Product Details 67

Dynamet Incorporated [Ti]

195 Museum Road, Washington, PA 15301
United States of America
Tel: +1 412 228 1000, Fax: +1 412 228 2087, Contact: Robert J. Torcolini - President

Group: Dynamet Inc. (USA) Est: 1967 Employees: 270

Associated Companies: Additional Sales Office(s):
Dynamet Incorporated
Stanton, CA United States of America
Tel: +1 714 890 1410, Fax: +1 714 893 6291

Alloys: All grades.

Product Types: Wrought alloys All Titanium Grades, Bar & Rod, Billet & Billet - CP, Medical, Rolled Shapes, Scrap, Turnings, Wire & Wire Coil, Billet, Bar, Wire, Fastener stock.

Other Services: Applications Technology, Chemical Milling, Coatings / Anodizing, Cold Finishing, Cold Working, Conversion Drawing, Grinding, Hot Working, Inspection, CMM, Research & Design, Toll Processing, Wire Conversion.

Notes: Dynamet Incorporated was founded to produce titanium bar and wire for the aircraft specialty fastener industry. Other products include commercial and rotor quality bar, weld wire, fine wire, shapes, and metallurgical testing services. Dynamet serves customers on an international basis, concentrating on the aerospace, medical industries, and sports.

Dynamet Technology Inc. [Ti MMC]

Eight A Street, Burlington, MA 01803
United States of America
Tel: +1 617 272 5967, Fax: +1 617 229 4879, Contact: Stanley Abkowitz - President

Est: 1972 Employees: 15

Product Types: Wrought alloys, Powders Automotive, Medical, Bar, Hollow Pipe, Seamless, Clad Products, Plate - Clad, Commercial Products, Marine Hardware, Powder, Commercial Products, Sporting Goods, Powder - High Purity, Composites, Powder - Low Chloride, Extrusions & Extruded Shapes, Powder, Parts, Filters, Tanks & Vessels, Fittings, Tube, Ingot, TiAluminide, Plate, Sheet, Bar, Tube, Extrusion.

Tradenames: Cermeti®

Other Services: Alloy Development, Hot Isostatic Pressing (HIP), Applications Technology, Research & Design, Cold Working, Toll Processing, Cold Isostatic Pressing (CIP).

Notes: Manufactures near-net shape components of advanced materials by cold isostatic pressing of blended elemental powders. Specializing in titanium alloys and titanium matrix composites (Cermeti®). Dynamet Technology's materials and processes offer cost savings over conventional manufacturing methods and enhanced mechanical properties.

EA - Erbslöh Aluminium [Al]

Jean-Philippe Dreyfus, 52 bis rue du 11 novembre
F-51400 Sept-Saulx
France

Tel: +33 3 26 03 96 28, Fax: +33 3 26 03 95 72, Contact: Jean-Philippe Dreyfus

Group: Erbslöh AG

Alloys: AA: 1090, 1085, (5657-type), 6463, 1080A, 1050A, 1350A, 1200, 3103, 5005A, 5051A, 5754, 6060, (6060/6063), 6063, 6101C, 6181, 6005A, 6082, 7020.

Erbslöh: Al99.9 (1003), Al99.9Mg0.5 (5053), Al99.9Mg1 (5103), Al99.85 (1002), Al99.85Mg0.5 (5052), Al99.85Mg1 (5102), Al99.85MgSi (6032/6042/6052), Al99.8 (1001), Al99.5 (1050), E-Al (1057), Al99 (1100), AlMn1 (3100/3120), AlMg1 (5100), AlMg1.8 (5200), AlMg3 (5300), AlMgSi0.3 (6030), AlMgSi0.5 (6040), AlMgSi0.5 (6060), E-AlMgSi0.5 (6047), AlMgSi0.8 (6080), AlMgSi0.7 (6070), AlMgSi1 (6100), AlZn4.5Mg1 (7120).
Designation systems: USA DIN NF.

Product Types: Wrought alloys Extruded profiles/sheet Mill-finish & semi-finished components. Surface finishes (bright, matt, anodized, laquered). Extrusions (solid & hollow): 5-260 mm circumscribed circle, 280x50mm. Tube: 5-150mm dia. 0.4-5.0mm wall thickness. Sheet, Tube, Extrusion.

Applications: Automotive (engine & break parts, interior & exterior body trim, seat components, structural parts).

Approvals: DIN EN ISO 9001 (62 196-02). TUV WO/TRD 100. EURAS 'Qualanod'.

East-West Trading Corp. [Mg]

See: Shen Wei East-West Trading Corp. Ltd.

Eckart Switzerland [Mg]

Zurcher Strasse 20
CH-4332 Stein (AG)
Switzerland

Tel: +41 62 873 3264, Fax: +41 62 873 1205, Contact: Mr. Hermann Schillerwein

Group: Shen Wei

Product Types: Cast alloys, Ingot.

Eckart-Werke [Mg]

Light Metal Div., Kaiserstrasse 30
D-90763 Fürth
Germany

Tel: +49 911 99 780, Fax: +49 911 99 78391, Contact: Mr. Gert Rohrseitz

Group: Eckart

Associated Companies: Velden (D), St. Georgen (A).

Alloys: No details

Product Types: Powders Chips & turnings. Powder. Chunks & granules.

Applications: Chemical industry. Pyrotechnics. Metallurgical. Decorative/paints.

Notes: Provide an wide range of Mg powders, granules & turnings to recognised standards or to customer requirements. Details provided by International Magnesium Association.

Ecumet (UK) Ltd. [Mg]

6 Paddockhall Road, Haywards Heath, West Sussex RH16 1HH
United Kingdom

Tel: +44 1441 4952, Fax: +44 1441 4958, Contact: Mr. Ron Wafer

Group: Shen Wei

Product Types: Cast alloys, Ingot.

Egyptian Aluminium Products Co. [Al]

See: Alumisr

Ekonal Bausysteme GmbH & Co. KG [Al]

Velbert

Germany

Group: Erbslöh AG

Product Types: Wrought alloys, Extrusion.

Applications: Architectural (window & façade).

Ekonal España SA [Al]

Lepanto 406
E-08025 Barcelona
Spain

Tel: +34 93 4331544, Fax: +34 4559734

Product Types: Wrought alloys Profiles. Extrusion.

Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Ekonal Italia sri [Al]

Bozen

Italy

Group: Erbslöh AG

Product Types: Wrought alloys, Extrusion

Applications: Architectural (window & façade).

Elektrometallurgie [Al Mg Ti]

See: Gesellschaft fur Elektrometallurgie mbH

Elisental - W. Erdmann GmbH & Co. [Al]

See: Drahtwerk Elisental - W. Erdmann GmbH & Co.

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Elval - Hellenic Aluminium Industry SA [AI]

Athens-Lamia National Road (57th km)
GR-32011 Inofita-Viotia
Greece
Tel: +30 262 32269/31503, Fax: +30 262 32236/32237, Telex: 601-299324
Group: Elval - Hellenic Aluminium Industry SA (GR) Est: 1973
Employees: 470
Alloys: Standard range: 1050, 1200, 1100, 3003, 3150, 3004, 3005, 5005, 5251, 5049, 5052, 5754, 5083. Also: 8050, 8011, 8079. Tempers: H12, H22, H32, H14, H24, H34, H16, H26, H36, H18, H28, H19, O, F Designation systems: USA BS DIN NF JIS.
Product Types: Wrought alloys nonferrous Plain sheets (standard sizes): 1000mm-1500mm wide, 0.4-5mm thick; non-standard 4000mm long. Coils (standard sizes): 15-1500mm wide, 0.2-3mm thick. Closure sheet/coil: 0.18-0.3mm thick. Finishes: Mill-finish, painted (polyester, metallic, polyamid, PVdF. Laquer. Chemically-treated (chromate-phosphate). Stucco-embossed. Can-stock coil: 0.285mm thick. Narrow coils: 0.15-1.5mm thick, 10-450mm wide. Venetian blind strip: 15mm min. width. Hot-rolled plates/sheets/coils: 4-12mm thick (coils), 4-8mm (sheet). General purpose foil: 0.020-0.200mm thick. Multi-purpose/household foil: 0.007-0.025mm thick. Food container foil: 0.035-0.150mm thick. Foil ducting stock: 0.060-0.180mm thick. Foil (laminating): 0.080-0.200mm thick. Circles: 0.4-10mm thick, min dia. 50mm. Slugs (for extrusion). Billet, Sheet, Strip, Foil, Extrusion stock (slug).
Applications: Beverage cans (body, lid & tab stock), Foil. Closures (bottle-top foils, food-cans). Corrugated roofing sheets. Tread-plate (patterned). Litho-graphic coils. Venetian blinds. Foil (general purpose, packaging). Converter foil (domestic, multi-purpose). Foil food containers. Ducting (flexible venting pipes). Laminating to plywood. Traffic signs.
Other Services: Non-standard product sizes (on customer request). Approvals: DNV EN 29002. ISO 9002. BS 5750-2.
Notes: Rolled non-heat treatable aluminium alloys. Hot-rolled coil. Annual production (sheet & coil) 100000T. Export to over 60 countries.

EMP Technologies [AI]

Automotive & Special Alloys Divisions
Repton Road, Willington, Derbyshire DE 6EW
United Kingdom
Tel: +44 1283 703383, Fax: +44 1283 704399,
Group: Distributorcap (UK)

Emprasas Dow [Mg]

Brazil
Tel: +55 1 546 9122, Internet: <http://www.dow.com>,
Group: Dow

Erbslöh Aluminium [AI]

See also: EA - Erbslöh Aluminium (F)

Erbslöh Aluminium AG [AI]

Julius & August Erbslöh GmbH & Co.
Postfach 15 01 60
D-42520 Velbert (Nevides)
[Seibeneicker Straße 235, D-42553 Velbert (Nevides)]
Germany
Tel: +49 2053 95 0, Fax: +49 2053 95 1281, Telex: 8516685 jae d
Group: Erbslöh AG Est: 1842 Employees: 1300
Alloys: AA: 1090, 1085, (5657-type), 6463, 1080A, 1050A, 1350A, 1200, 3103, 5005A, 5051A, 5754, 6060, (6060/6063), 6063, 6101C, 6181, 6005A, 6082, 7020.
Erbslöh: Al99.9 (1003), Al99.9Mg0.5 (5053), Al99.9Mg1 (5103), Al99.85 (1002), Al99.85Mg0.5 (5052), Al99.85Mg1 (5102), Al99.85MgSi (6032/6042/6052), Al99.8 (1001), Al99.5 (1050), E-Al (1057), Al99 (1100), AlMn1 (3100/3120), AlMg1 (5100), AlMg1.8 (5200), AlMg3 (5300), AlMgSi0.3 (6030), AlMgSi0.5 (6040), AlMgSi0.5 (6060), E-AlMgSi0.5 (6047), AlMgSi0.8 (6080), AlMgSi0.7 (6070), AlMgSi1 (6100), AlZn4.5Mg1 (7120).

Product Types: Wrought alloys. Extruded profiles. Mill-finish & semi-finished components. Surface finishes (bright, matt, anodized, laquered). Sheet, Extrusion.

Applications: Automotive (engine & break parts, interior & exterior body trim, seat components, structural parts).

Other Services: Machining & forming. Approvals: DIN EN ISO 9001 (62 196-02). TUV WO/TRD 100. EURAS 'Qualanod'.

W. Erdmann GmbH & Co. [AI]

See: Drahtwerk Elisental - W. Erdmann GmbH & Co.

ESM II Inc. [Mg]

3801 Highland Ave., PO Box 368
Niagara Falls NY 14302
United States of America
Tel: +1 716 278 8896, Fax: +1 716 278 8911

Alloys: No details

Product Types: Powders Prime Mg metal powder. Mg-based desulphurisation reagents. Chips & turnings. Powder. Chunks & granules.

Other Services: Material handling machinery manufacture for major steel producers (desulphurisation injection).

Notes: Information from International Magnesium Association.

Est-Alu [AI Ti]

18-28, Avenue de Président Kennedy
F-91170 Viry Chatillon
France
Tel: +33 1 69 24 40 26, Fax: +33 1 69 45 61 62, Telex: 601575 est-alu f, Contact: Mr. J. C. Janecki - Technico-commercial
Group: Est-Alu Est: 1938 Employees: 100
Alloys: A5, A-M4, A-U4NT, A-U5GT, A-U8S, A-U10G, A-U10S4, A-S2U, A-S4G, A-S5U3, A-S7G, A-S7G03, A-S7G06, A-S9KG, A-S10G, A-S10UG, A-S12N2G, A-S12UN, A-S13, A-S20U, A-S22UNK, A-G3T, A-G4Z, A-G6, A-Z5G Designation systems: NF
Product Types: Cast alloys, Castings, Fabrications
Applications: Defence, electronics, aerospace, nuclear, transport, medical.
Other Services: Machining. Approvals: AFAQ, GE, ISO 9002, BS EN 9002, ANSI/ASQC Q9002, S.I.AR RAQ-2.

Eural Gnutti S.p.A. [AI]

Via S. Andrea, 3
I-25038 Rovato (Brescia)
Italy
Tel: +39 3077 2174, 02053, Fax: +39 30 7702847, Email: eural@eural.com
Group: Eural Gnutti
Alloys: 2011 - DIN Al Cu Bi Pb, 2030 - DIN Al Cu Mg Pb, 2017 - DIN Al Cu Mg1, 2024 - DIN Al Cu Mg2, 6012 - DIN Al Mg Si Pb, 6082 - DIN Al Mg Si1, 6262, 7075 - DIN Al Zn Mg Cu 1,5.
Product Types: Wrought alloys Cast alloys, Extrusion.
Notes: Eural works with many aluminium extrusion alloys. Aluminium sections for pneumatic automation. Aluminium for road transport. New developments to achieve a better weight-strength ratio in modern transport and communication. Aluminium for the mechanical industry. Extruded products using various alloys for many technical applications. Aluminium in electrical construction. Low weight and high conductivity lead to the choice of alluminium. The production structure of Eural Gnutti consist of a foundry and an aluminium semis plant.

Eurofoil S.A. [AI]

Zone Industrielle Reidchen, Boite Postale 91
L-3401 Dudelange
Luxembourg
Tel: +352 51 86 64 1, Fax: +352 51 86 64 210, Telex: 2148 granges lu, Contact: Mr. Francois Coeffic - Administration Manager
Group: ITW Employees: 299
Product Types: Wrought alloys. Al foils for car industry, building and packaging. Foil.

Europalu [Al Mg]

ZI Reyrieux, BP 207
F-01602 Trévoux Cedex
France
Tel: +33 4 74 00 69 69, Fax: +33 4 74 00 67 67, Telex: 380866,
Contact: C. Seleg/C. Leger - R&D
Group: Groupe Valfond Est: 1989 Employees: 190
Designation systems: BS NF.
Product Types: Cast alloys casting alloys (Mg & Al), Die castings.
Applications: Automotive, power tools.

Exact Extrusion Division [Al]

1521 East Hawthorne
Albert Lea, MN 56007
United States of America
Tel: +1 507 373 6487, Fax: +1 507 373 5116
Alloys: No details.
Product Types: Wrought alloys heat-sinks, components, etc.
Extrusion.

EXPA [Al]

See: Hydro Aluminium EXPA S.A.

Expal [Al]

See: Hydro Aluminium Expal

Fabrications Lémaniques d'Outils [-]

ZI de la Genevrière, Noyer
F-74200 Allinges
France
Tel: +33 4 50 70 54 40, Fax: +33 4 50 70 54 06
Group: Groupe Valfond Est: 1990 Employees: 28
Notes: Design and fabrication of die-casting tools for the whole
Fonlem branch of the Valfond group.

Estabelecimentos Manuel Ferreira Lda. [Al]

Av. 5 de Outubro, 75 - 5
P-1050 Lisboa
Portugal
Tel: +351 1 35 23 901, Fax: +351 1 35 23 012
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.
Notes: Extrusions for the building industry.
Distribution/stockist/agent in Portugal.

Ferrolegeringer [Al Mg Ti]

See also: Aktiebolaget Ferrolegeringer

Ferrolegeringer Aktiengesellschaft [Al Mg Ti]

Bellerivestrasse 34, Postfach 131
CH-8034 Zürich
Switzerland
Tel: +41 1252 6844, Fax: +41 1252 6817
Group: Metallurg (USA)
Product Types: Powders.

Flandria Aluminium [Al]

40 Route de Deülémont
F-59560 Warneton
France
Tel: +33 3 20 14 61 60, Fax: +33 3 20 14 61 61, Telex: 820681 f,
Contact: Mr. Lortheoer
Group: Flandria Aluminium (F) Est: 1991 Employees: 195
Associated Companies: Alutrade sa/nv, Belgium
Alloys: NF designations: A5L, AGS, ASG0.5, ASGM0.7; AA
designations: 1050A, 6060/6063, 6005A, 6082; DIN: Al99.5,
AlMgSi0.5, AlMgSi0.7, AlMgSi1, 3.0257, 3.3206, 3.2316, 3.2315.
Designation systems: USA CEN ISO DIN NF.
Product Types: Wrought alloys Wide range of solid and hollow
stock shapes, and special profiles. 2 x 2000T presses, 1 x
2500T press. Aluminium extrusions up to 280mm circumscribing
circle. Extrusion.
Other Services: Design and diemaking.

Fonderie Fine de Précision [-]

1 Avenue Rondu
F-94607 Choisy-Le-Roi Cedex
France
Tel: +33 1 48 53 61 80, Fax: +33 1 48 53 61 81
Group: Groupe Valfond Est: 1955 Employees: 40
Product Types: Cast alloys.
Notes: Zinc die castings.

Fonderies de Léman [Al]

ZI de Vongy, BP 141
F-74204 Thonon Cedex
France
Tel: +33 4 50 71 29 50, Fax: +33 4 50 71 51 41, Telex: 385540
Group: Groupe Valfond
Designation systems: NF
Product Types: Cast alloys, Die castings.
Applications: Automotive.

Fonlem Centre [Al]

Chaumont, Vergongheon
F-43360 Arvant
France
Tel: +33 4 71 76 96 36, Fax: +33 4 71 76 96 84
Group: Groupe Valfond Est: 1989 Employees: 50
Alloys: AS9U3 Designation systems: NF
Product Types: Cast alloys, Die castings.
Applications: Automotive, etc.

Fonlem Industries [Al Mg]

100-102, rue de Villiers
F-92309 Levallois Perret Cedex
France
Tel: +33 1 47 58 26 26, Fax: +33 1 47 57 04 79, Contact:
Christian Bart - General Commercial Manager
Group: Groupe Valfond Employees: 900
Alloys: Al: AS9U3, AS12, AS7G03, AS7G06, AS17U4G, Silafont
36. Mg: AZ91D, AM60 Designation systems: NF
Product Types: Cast alloys Aluminium and magnesium alloys and
castings from 10 subsidiary companies in France. Ingot, Liquid
metal by road transport. Castings.
Applications: Automotive, domestic appliances, electrical, etc.
Notes: Main company of the light alloys side of the Valfond group
(F). Alloys from subsidiary "Vanalp Industrie" (F).

Forge Eclair [Ti Zr]

7, rue des Jardies
F-92190 Meudon
France
Tel: +33 1 46 26 30 05, Fax: +33 1 46 26 92 03, Telex: 270745 f
Product Types: Ti + Zr
Notes: Late entry.

70 Supplier Addresses & Product Details

Formtech [AI]

See: Hydro Aluminium Formtech a.s

Freire Hermanos SA [AI]

Joaquin Planelles Riera 104
E-15008 A Coruña - La Coruña (E-15080 A Coruña)
Spain
Tel: +34 981 243955, Fax: +34 981 245282
Product Types: Cast alloys, ingots
Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Friguia Guinea [AI]

P.O. Box 334, Conakry
Guinea
Fax: +22 441 35 22
Group: Norsk Hydro

Fuchs [AI Mg Ti]

See: Otto Fuchs

Fundo [AI]

See also: Hydro Aluminium Fundo a.s

Fundo AB [AI]

Emterudsvägen 3, P.O. Box 55
S-673 22 Charlottenberg
Sweden
Tel: +46 57 128300, +46 19 136400, Fax: +46 57 128375, +46 19 113243
Group: Norsk Hydro
Product Types: Cast alloys, castings (automotive).
Notes: Casting company which supplies engine components & structural parts to the automotive industry. Previously (before 1995) part of 'Norsk Hydro Magnesium'.

Futuretools [AI]

See: Hydro Aluminium Futuretools Ltd.

Garfield Alloys Inc. [Mg]

4878 Chaincraft Road, Garfield Heights
Cleveland OH 44125
United States of America
Tel: +1 216 587 4843, Fax: +1 216 587 3764, Contact: Mr. Mike Slovich
Product Types: Cast alloys, Powders Primary & secondary ingot. Die & sand casting alloys. Mg-Al powder/flake. Chunks & granules. Hardener alloys. Anodes. Experimental alloys. Rare-earth alloys. High-potential anodes & AZ63. Ingot, anodes.
Applications: Pyrotechnics. Arc welding. Refractories. Chemistry & munitions. Corrosion protection.
Other Services: Consultancy (scrap handling). Trollers, Casting service (to customer specifications).
Notes: World's largest secondary magnesium smelter, handling all types of Mg scrap to produce a variety of Mg products. Co-venture with MagCorp to manufacture MagMax range of high-potential anodes. [Information provided by International Magnesium Association].

Guy Geisler [AI]

See: Aluisse Guy Geisler

Genecos SA [AI]

2 rue Lyautey
F-75016 Paris
France
Tel: +33 1 45 27 07 54, Fax: +33 1 45 27 07 08, Contact: Parick Malleret
Group: Elval - Hellenic Aluminium Industry SA (GR)
Associated Companies: UK, D.
Alloys: Standard range: 1050, 1200, 1100, 3003, 3150, 3004, 3005, 5005, 5251, 5049, 5052, 5754, 5083. Also: 8050, 8011, 8079. Tempers: H12, H22, H32, H14, H24, H34, H16, H26, H36, H18, H28, H19, O, F.
Product Types: Wrought alloys Plain sheets (standard sizes): 1000mm-1500mm wide, 0.4-5mm thick; non-standard 4000mm long. Coils (standard sizes): 15-1500mm wide, 0.2-3mm thick. Closure sheet/coil: 0.18-0.3mm thick. Finishes: Mill-finish, painted (polyester, metallic, polyamid, PVdF. Laquer. Chemically-treated (chromate-phosphate). Stucco-embossed. Can-stock coil: 0.285mm thick. Narrow coils: 0.15-1.5mm thick, 10-450mm wide. Venetian blind strip: 15mm min. width. Hot-rolled plates/sheets/coils: 4-12mm thick (coils), 4-8mm (sheet). General purpose foil: 0.020-0.200mm thick. Multi-purpose/household foil: 0.007-0.025mm thick. Food container foil: 0.035-0.150mm thick. Foil ducting stock: 0.060-0.180mm thick. Foil (laminating): 0.080-0.200mm thick. Circles: 0.4-10mm thick, min dia. 50mm. Slugs (for extrusion). Billet, Plate, Sheet, Strip, Foil, Extrusion, extrusion (slugs).
Applications: Beverage cans (body, lid & tab stock), Foil. Closures (bottle-top foils, food-cans). Corrugated roofing sheets. Tread-plate (patterned). Litho-graphic coils. Venetian blinds. Foil (general purpose, packaging). Converter foil (domestic, multi-purpose). Foil food containers. Ducting (flexible venting pipes). Laminating to plywood. Traffic signs.
Approvals: DNV EN 29002. ISO 9002. BS 5750-2.
Notes: Agent for several companies, including ELVAL rolled products & ETEM extruded profiles (standards & specials) for building/architectural use. Also ETEM Etalbond, aluminium-polyethylene sandwich sheet.

General Extrusions, Inc [AI]

P.O. Box 2669
Youngstown, OH 44507
United States of America
Tel: +1 216 783 0270, Fax: +1 216 788 1250
Product Types: Wrought alloys, Bar, Tube, Wire, Extrusion
Other Services: Milling, Metal Finishing, Powder Coatings.

Generation Metals International Ltd. [AI Ti]

Unit 3 Bridgewater Close, Reading, Berkshire RG3 1JT
United Kingdom
Tel: +44 1734 588066, Fax: +44 1734 503346, Contact: Andy Green
Notes: Late entry.

Gesellschaft fur Elektrometallurgie mbH [AI Mg Ti]

Grafenberger Allee 159
D-40237 Düsseldorf
Germany
Tel: +49 211 688 30, Fax: +49 211 688 3380
Group: Metallurg (USA)
Product Types: Powders.

Girebronze [AI Ti]

See: SENPOF Girebronze

Supplier Addresses & Product Details 71

Gleich GmbH [Al Ti]

Metallplatten Service
Borsigstraße 3, Postfach 12 61
D-24560 Kaltenkirchen
Germany
Tel: +49 41 91 80020, **Fax:** +49 41 91 4781, **Contact:** Mr. Günter Gleich - Managing Director - Sales
Group: Gleich (D) **Est:** 1980 **Employees:** 30
Associated Companies: D, A, H, SLO, CZ, SK, P, F, NL, DK, S, SF, Jena & Aurozlmünster (MEKO) A
Alloys: Toplate C250 (5083-type), 5083 (cast), 5083 (rolled), 6082, 7075, Certal (7022-type), TiAl6V4.
Product Types: Wrought alloys Toolplates. Cast toolplates
Toplate C250: precision milled, roughness <= 0.1 micron Ra. 5-100mm thick, 1330x3220mm + longer. 5083 (cast) 600mm max. thickness, 4400mm long. 5083 (rolled), 6082, 7075, Cerbal: 5-80mm thick. Certal (forged) to 400mm thick. Titanium alloy plate (special product). Plate, tooling plates (machined).
Applications: Toolmakers. Car industry. Electrical & electronic industry. Machinery producers.
Tradenames: Toplate. Certal.

Global Titanium Inc. [Ti]

19300 Filer Avenue
Detroit, MI 48234-2881
United States of America
Tel: +1 313 366 5300, **Fax:** +1 313 366 5305, **Email:** info@globaltitanium.com, **Internet:** http://www.globaltitanium.com, **Contact:** Robert L. Swenson - President.
Est: 1984 **Employees:** 40
Product Types: Wrought alloys, Powders Alloying Additives, Alloys, Briquettes, Feedstock, Bulk Weldables, Plate, Powder, Buy, Recycle & Sell, Scrap, Turnings, Sheet, Slab, Sponge, Plate, Sheet.
Other Services: Cutting, Grit Blasting, Recycling, Shearing, Toll Processing.
Notes: Global Titanium Inc. purchases, processes, and sells all types of titanium products, scraps, and by-products. Sells recycled products to the titanium industry; and alloying additives to the aluminum, steel, stainless steel, and superalloy industries. Produce cobbles, processed turnings, recycled solids, feedstock, weldable, briquettes, and all other forms.

Globe (De) [Al]

See: De Globe/Globon BV

Globon [Al]

See: De Globe/Globon BV

Glynwed Metal Services [Al]

Head Office, Amari House, 52 High Street
Kingston-upon-Thames, Surrey. KY1 1HH
United Kingdom
Tel: +44 181 549 6122, **Fax:** +44 181 549 0637, **Telex:** 262937,
Contact: Carole Orr - Marketing Department
Group: Glynwed International.
Associated Companies: UK: Aberdeen, Belfast, Birmingham, Chepstow, Dyfed, Glasgow, Hull, Leeds, Liverpool, Manchester, Newcastle, Norwich, Nottingham, Plymouth, Slough, Southampton, Stoke, Swanley.
Alloys: Extrusion: 6063, 6063A, 6082, 2011, 6262. Tempers: T6, T3, T9. Sheet 1050, 5251, 4015, 6082. Tempers H14, H22, H12, T651. Stucco-sheet: 1050. Treadplate: 5754, 3003. Temper: H14, H111, H22. Shate: 5251, 6082, 1050A. Tempers: H22, T651, H14. Plate: 6082, 5083. Temper: T651, O. **Designation systems:** USA BS.
Product Types: Wrought alloys Standard stock extrusions: Round bar, 0.25-16 inch dia. & 16mm, 20mm 35mm dia.; Flat-bar 0.375x0.25 inch to 6x1inch; Square bar 0.25inch to 4 inch). Box-section 0.5inchx0.5inch 16swg to 4x4inch, 0.25inch wall.; 1.5x0.75 inch, 16swg to 6x3 inch, 0.375inch wall. Tube 0.375 inch OD, 16swg to 6.5 inch OD, 0.25inch wall. Channel section (base x leg x base thickness x leg thickness)

0.375x0.375x0.0625inch wall to 6x3x0.25x0.375 inch. T-section (upright x cross-piece x thickness) 0.75x0.75x0.125 inch to 3x3x0.25 inch. Equal angle 0.5x0.5 inch x 0.0625 inch thick to 6x6x0.5mm. Unequal angle: 0.75x0.5x0.0625 inch to 6x3x0.375 inch. Sheet (1050 alloy): 2000x1000x0.5mm to 4000x2000x3.0mm. Note: Dimensions vary for other sheet alloys. Stucco-sheet: 2000x1000x0.5mm to 2500x1250x1.2mm. Tread-plate (3-patterns available): thickness 1.2mm, 1.5mm, 2.0mm, 3.0mm, 4.5mm, 6.0mm (varies with pattern). Shate: 2000x1000x4mm to 2500x1250x6.35mm. Plate (both metric & imperial thickness): 0.375 inch, 0.5 inch, 0.625 inch, 0.75 inch, 1 inch, 1.25 inch, 1.5 inch, 1.75 inch, 2 inch, 2.25 inch, 2.5 inch, 2.75inch, 3 inch, 4 inch, 5 inch, 6 inch; 8mm, 10mm, 12mm, 15mm, 16mm, 20mm, 30mm, 35mm, 40mm, 60mm, 70mm, 80mm, 90mm. Full plate sizes: 2500x1250mm, 3000x1500mm, 4000x2000mm. Plate, Sheet, Bar, Tube, Extrusion, Tread-plate.

Applications: General engineering.

Other Services: Cutting to length (extrusions); cutting to size (plate). Custom-extrusions (to customer design) & special products for specific industries.

Notes: Provides a range of AALCO standard extruded section in a wide range of imperial dimensions. Extensive metal stockists outlets in UK. GMS operates through a number of well-known brands inc. aalco, Amari, Cashmores, Hub & Non-ferrous, Feralco.

GM Metal [Al]

F-86150 Le Vigeant
France
Tel: +33 5 49 84 98 84, **Fax:** +33 5 49 84 98 54, **Contact:** Gérard Moebis - President
Group: GM Metal (F) **Est:** 1989 **Employees:** 4
Alloys: Mother Alloys: AG10, AG20, AG25, AS25, AS35, AlSb10, AlSr5, AlSr10, AlSr10Ca3.
Product Types: Cast alloys inc. extra-pure alloys Mother alloys for adding alloying elements to aluminium alloy melts. Ingot.

Gnutti [Al]

See: Eural Gnutti S.p.A.

Goedlicht BV [Al]

Gouden Rijder 15, Postbus 412, NL-4870 AK Etten Leur
Netherlands
Tel: +31 1608 133 52, **Fax:** +31 1608 224 50
Group: SAPA
Product Types: Roof lights for industrial buildings and aluminium porch systems.

Goodfellow Cambridge Ltd. [Al Mg Ti Be MMC]

Cambridge Science Park, Milton Road, Cambridge, CB4 4DJ
United Kingdom
Tel: +44 1223 568068, **Fax:** +44 1223 420639, **Email:** enq@goodfellow.com, **Internet:** http://www.goodfellow.com,
Contact: Mrs. Deanna Raven
Group: Goodfellow
Alloys: Various grades of pure Al, Mg, Ti, Be, Aluminium AA 5052 (honeycomb). MMC's: Aluminium/Copper MMC (Al77.9, SiC17.8, Cu3.3, Mg1.2, Mn0.4), Aluminium/Lithium MMC (Al81, SiC15, Li2, Cu1.2, Mg0.8).
Product Types: Wrought alloys, Powders Aluminium: foil, microfoil, microleaf, honeycomb, sputtering targets, foam, mesh, wire, powder, rod, tube, lump/granule, single crystal. Magnesium: foil, microfoil, microleaf, sputtering targets, wire, powder, rod. Titanium: foil, microfoil, sputtering targets, mesh, wire, rod, tube, powder, lump/granule. Beryllium: foil, sputtering targets, mesh, wire, powder, flake. MMC (AlCu): sheet, rod, tube. MMC (AlLi): sheet, tube. Sheet, Foil, Bar, Tube, Wire, Microfoil, honeycomb, sputtering targets, foam, mesh, single crystal, lump/granule.
Other Services: Technical services. Electroplating, heat treatment, ion implantation, laser machining, machining, multi-layer & single coatings, photo etching, polishing, powder particle analysis, precision slitting, rolling, spark erosion, stamping, vapour deposition, wire forming, cutting & straightening.
Notes: Mainly laboratory and research materials.

72 Supplier Addresses & Product Details

Goodfellow Corporation [Al Mg Ti Be MMC]

800 Lancaster Avenue, Berwyn, PA 19312-1780
United States of America
Tel: +1 610 640 1612, Fax: +1 610 993 8065, Email:
inq@goodfellow.com, Internet: http://www.goodfellow.com
Group: Goodfellow
Product Types: Wrought alloys, Powders, Sheet, Foil, Bar, Tube,
Wire.

Goodfellow GmbH [Al Mg Ti Be MMC]

Postfach 13 43
D-61213 Bad Nauheim
Germany
Tel: +49 60 32 40 34, Fax: +49 60 32 47 65, Email:
anfrage@goodfellow.com, Internet: http://www.goodfellow.com
Group: Goodfellow
Product Types: Wrought alloys, Powders, Sheet, Foil, Bar, Tube,
Wire.

Goodfellow SARL [Al Mg Ti Be MMC]

76 Blvd. J-B Lebas
F-59000 Lille
France
Tel: +33 3 20 85 17 51, Fax: +33 3 20 52 14 25, Email:
demand@goodfellow.com, Internet: http://www.goodfellow.com
Group: Goodfellow
Product Types: Wrought alloys, Powders, Sheet, Foil, Bar, Tube,
Wire.

Gottschol Alucuilux S.A. [Al]

Rue de Lentzweiler, Boite Postale 9
L-9701 Clervaux
Luxembourg
Tel: +352 94 91 94, Fax: +352 94 91 50, Telex: 1393 alcuil u,
Contact: Mr. Wolfgang Zoller - Technical Director
Est: 1961 Employees: 150
Product Types: Cast alloys Al. smelter. Ingots. Granules, etc.
Other Services: Machining.

Gredmann China Ltd. [Al]

Flat D. 23F Grand Tower, 54 Taojin Rd, Guangzhou
China
Tel: +86 20 8357 5868, Fax: +86 20 8357 1683, Contact: Dick Li
Group: Comalco

Gredmann Taiwan [Al]

9F, No 170, Sec 3, Min Chuan East Road, Taipei 10436
Taiwan
Tel: +886 2 719 3456, Fax: +886 2 716 5500, Email:
gredmann@ms1.hinet.net, Contact: Louis Liu
Group: Comalco

Gredmann Thailand Co. Limited [Al]

36/14 Soi. Simitr, Ramkhamhaeng 24, Bangkok 10240
Thailand
Tel: +66 2 318 3225, Fax: +66 2 318 0790, Contact: Siri
Tungpaitoonsakul
Group: Comalco
Notes: Distributor - Aluminium Powder

Ets Griset [Al]

[No Address]
France
Tel: +33 3 44 66 34 00, Fax: +33 3 44 66 34 47, Contact: Mr.
David Lecoq
Est: 1760 Employees: 250
Notes: Late entry.

Ets. Georges D'Halluin [Al]

Rue de la Louvière, CRT Lille-Lesquin, BP 304
F-59813 Lesquin Cedex
France
Tel: +33 3 20 96 66 00, Fax: +33 3 20 96 66 19, Contact: Mr.
Robin
Group: D'Halluin (F) Est: 1890
Associated Companies: France: SMH (Champagne-Ardenne)
Alloys: Sheet: 1050A, 5005. Tread-plâte: 5086, 5754. Extruded
section (profiles): AGS, NF: A 5, AG 06, AG4 MC, AG3, AGS
Designation systems: USA NF
Product Types: Wrought alloys Sheet: 0.6-5mm thick,
1000x2000, 1250x2500, 1500x3000mm. Anodised & coated-
sheet: 1.5mm thick. Tread-plate 1.5-7mm thick. Extruded
profiles: flats 20x2mm to 200x10mm. Angles (equal):
15x15x1.5mm to 100x100x10mm. Angles (unequal):
25x15x2mm to 100x25x2mm. Channels: 15x15x15x1.5mm to
50x100x50x5mm. Solid square bar: 8mm to 40mm Solid round
bar: 6mm to 50mm dia. T-section 20x20x2mm to 50x50x5mm.
Round tubes: 8mm dia. 1mm wall to 80mm dia. 2mm wall.
Square tubes: 20x20mm, 2mm wall to 80x80mm, 2mm wall.
Rectangular tubes: 35x20mm, 2mm wall to 100x50mm, 3mm
wall. Surface finishes: mill, anodized & white laquered. Glazing
profiles/kits. Suspended ceiling profiles. Perforated sheet, inc.
grills. Industrial hand-rails sections/kits. Plate, Sheet, Bar, Tube,
Extrusion, tread-plate
Applications: Building & construction industry. General
engineering.
Other Services: Cutting to length. Building material advice &
consultancy. Custom surface finishes. Non-standard item
sourcing.
Notes: Member of COMACIER, group SOCODA. Specialist metal
stockist for the building/construction & general engineering
industries. Supply both semi-finished standard products &
finished items, e.g. hand-rail kits; profile sections/kits for
conservatories, greenhouses, etc.

Harrisons Trading (Peninsular) Sdn Bhd. [Al]

No. 9, Jalan 222, 46100 Petaling Jaya, Selangor Darul Ehsan
Malaysia
Tel: +60 3 756 7266, Fax: +60 3 757 7994, Contact: Andrew Tan
Group: Comalco
Notes: Distributor Aluminium Pastes / Flakes

Harvey Titanium Ltd. [Ti]

1330 Colorado Avenue
Santa Monica, CA 90404-3313
United States of America
Tel: +1 310 664 0040, Fax: +1 310 664 1960, Contact: Barry
Harvey - President
Est: 1978 Employees: 38
Associated Companies: Additional Sales Office(s):
Harvey Titanium Ltd., International Division
Hampshire, UK: Tel: +44 1962 878030, Fax: +44 1962 851590
Product Types: Wrought alloys Alloys, Bar & Rod, Bar: Hollow,
Billet CP & 6AL-4V, Extruded Shapes, Flats, Forgings:
Conventional, Custom, Open Die, Ingot, Pipe - Seamless, Pipe -
Welded, Plate CP & 6AL-4V, Rings, Rolled Shapes, Scrap, Buy
& Sell, Sheet CP & 6AL-4V, Slab CP & 6AL-4V, Strip, Tube,
Wire & Wire Coil, Plate, Sheet, Bar, Tube, Wire, forgings
Other Services: Cutting, Cutting - Waterjet, Grinding, Lathe
Turning, Reforging, Sawing, Warehousing
Notes: A complete metal service centre and intermediate
producer. Products include virtually all the premium alloys used
in high technology applications. Supply custom orders of high
temperature and high-strength nickel base alloys, vacuum
melted stainless steels and other exotic alloys, as well as
titanium. These materials are used in major military and
commercial aircraft, in nuclear submarines, bicycles,
petrochemical and biomedical applications. Supporting and long-
term agreements for just-in-time shipments with major
aerospace companies and their subcontractors.

Supplier Addresses & Product Details 73

Haynes International [Ti]

Z.I. des Béthunes, 10 rue de Picardie
Saint Ouen l'Aumône, BP 9535
F-95061 Cergy Pontoise Cedex
France
Tel: +33 1 34 48 31 00, **Fax:** +33 1 30 37 80 22, **Telex:** 605373 f,
Contact: Mr. L. Parin - Technico-commercial
Group: Haynes International Inc. (USA) **Employees:** 15
Alloys: Haynes Ti-3Al-2.5V (Ti94) **Designation systems:** USA
NF Aerospace.
Product Types: Wrought alloys Seamless drawn tube. Tube.
Applications: Hydraulic systems. Heat-exchangers.
Tradenames: Haynes
Other Services: Technical advice. Cutting to size. **Approvals:**
Various Aerospace company approvals.
Notes: High-performance alloys (mainly Ni-, Co-, Fe-based
superalloys). Manufacturing plants in Indiana & Louisiana
(USA), Manchester (UK).

HDA [Al Mg Ti MMC]

See: High Duty Alloys - HDA Forgings Ltd.

Heat Transfer Tønder a.s. [Al]

Hydrovej 6, P.O. Box 50
DK-6270 Tønder
Denmark
Tel: +45 74 72 03 04, **Fax:** +45 74 72 33 13
Group: Norsk Hydro
Tradenames: HYCOT (nylon coated aluminium tubes)
Notes: Heat-transfer parts found in air conditioning tubing, fluid
return lines, radiator cores, manifolds for condensers, air-
conditioning compressors. HYCOT (nylon coated aluminium
tubes) automotive fuel- & break-lines.

Heera Metals Ltd [Al]

79&80 Colootola Street, Calcutta 700073
India
Tel: +91 33 254667, **Fax:** +91 33 2157555, **Contact:** Mr Vikram
Jhunjhunwala
Product Types: Wrought alloys, Plate, Sheet, Extrusion.
Notes: Deals in: Aluminium Extruded Sections, Corrugated
Sheets, Coils, Plain Sheets, Chequered Plate, Pattern Sheet,
Closure, etc.

Hellenic Aluminium Industry SA [Al]

See: Elval - Hellenic Aluminium Industry SA

Heraeus Silica & Metals Ltd. [Be]

1 Craven Court
Canada Road
Byfleet
Essex KT14 7JL
United Kingdom
Tel: +44 1932 349315, **Contact:** Rex Oldridge
Notes: Late entry.

High Duty Alloys - HDA Forgings Ltd. [Al Mg Ti MMC]

Windsor Road, Redditch, Worcestershire B97 6EF
United Kingdom
Tel: +44 1527 64211, **Fax:** +44 1527 591760
Alloys: Al-alloys (Hyduminium Alloy Number): HDA 66, HDA 75,
HDA 77, HDA 81, HDA 89. BS: 2L77, L103, L161, L162, DTD
6094A, DTD 5104A. EN2382, EN2383, EN2486, EN2688, EN
2690, EN2681, EN2682, EN2683, EN2685, EN2686, EN2380,
EN 2386, EN2488. AA: 2014A, 2214, 7050, 7014, 7010, 7075,
7175. Aluminium-Lithium: 8090, 8091. Titanium: Ti6Al4V. BS
2TA13, EN2531; AMS 4928L, AMS 4967E. Magnesium:
MgZn3.02r0.6, BS L514. BS3372-MAGF-151M. AECMA:
MGP43. **Designation systems:** USA CEN BS Proprietary.
Aerospace.

Product Types: Wrought alloys Aluminium forging-stock to
500mm dia. Forged components in Al-, Ti-, Mg-alloys. Al-Li
(development), MMC (development). Forgings/Stock, Forgings.
Applications: Airframe forgings. Aerospace components, inc.
impellers, blades & vanes, rings, casings, propellers & root
spars, etc.

Approvals: AQAP4, MIL-I-42508A, BS 5750-2, ISO 9002, EN
29002, CAA.

Notes: Over 50 years experience producing aerospace forgings.
CAD/CAM manufacture of dies & tools. Press capacity 12000T.
Components to 5.8m long; plan area 2850 sq. cm. Heat-
treatment facilities. Metallurgical & mechanical testing. NDT
(ultrasonic, dye-penetrant). Coordinate measurement.
Development of forging processes for Al-Li alloys and MMCs.

High Performance Alloys, Inc. [Ti]

444 Wilson Street, P.O. Box 40, Tipton, IN 46072
United States of America
Tel: +1 765 675 8871, **Fax:** +1 765 675 7051, **Email:**
russ@netusa1.net, **Contact:** Russ Kirchner - President
Applications: Providing materials to aerospace, military, nuclear
chemical and petro-chemical industries.

High Tech Tubes Ltd. [Al Ti]

Industrial Estate, Monavalley, Tralee, Co. Kerry
Ireland
Tel: +353 66 34232, **Fax:** +353 66 34314
Group: High Tech Tubes
Associated Companies: Byfleet, Surrey (UK).
Alloys: See: High Tech Tubes Ltd. Byfleet, Surrey UK.
Product Types: Wrought alloys small dia, thin-walled, tube.

High Tech Tubes Ltd. [Al Ti]

Unit 15F, Wintersells Business Park
Wintersells Road, Byfleet, Surrey KT14 7LF
United Kingdom
Tel: +44 1932 355440, **Fax:** +44 1932 355441, **Contact:** Mr. Jim
Whiteley - Director
Group: High Tech Tubes
Associated Companies: Co. Kerry (Ireland)
Alloys: Aluminium: 1050A, 5251, 5154A, 5083, 2014A, 3003,
6063. Titanium ASTM Grade 2 **Designation systems:** USA BS
DIN NF.
Product Types: Wrought alloys Seamless drawn tubes of small
diameter & thin wall: 0.4mm OD, wall 0.4mm to 9.5mm dia.
0.8mm OD. Tube, seamless, small dia. thin wall.
Other Services: Custom sizes/tolerances. Other alloys on
request.
Notes: Specialist producer of small diameter, thin walled tubes in
Al-alloys, Ti-alloy + Ni-, Cu-based alloys & Stainless Steel.
Drawing facilities to meet customer requirements. Certification to
BS, DIN, ASTM, etc.

Hitchiner Manufacturing Co. Inc. [Al MMC]

Milford, New Hampshire 03055
United States of America
Tel: +1 603 673 1100, **Fax:** +1 603 673 7960
Group: Hitchiner Manufacturing Co. Inc. **Est:** 1946 **Employees:**
2000
Associated Companies: Hitchiner S.A. de C.V. - Mexico

74 Supplier Addresses & Product Details

Hitchiner Manufacturing Co. Inc. [AI MMC]

Nonferrous Division, O'Fallon, Missouri 63366
United States of America
Tel: +1 314 272 6176, Fax: +1 314 272 6180
Group: Hitchiner Manufacturing Co. Inc. Est: 1969
Alloys: Metal Matrix Composites - aluminum alloys with up to 40 percent silicon carbide reinforcement using countergravity investment casting.
Product Types: Cast alloys Aluminium alloy castings and Metal Matrix Composites.
Applications: Aircraft, helicopter, satellite, spacecraft and missiles. Castings for advanced automotive applications, such as electric cars and electronic fuel-injected motorcycles.
Notes: Specializes in producing complex, thin-walled configurations in aluminum alloys and MMC's.

Hogstad Aluminium AB [AI]

Box 245, S-595 23 Mjölby
Sweden
Tel: +46 142 189 00, Fax: +46 142 192 90
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Notes: Independent company within Sapa group - produces window and architectural systems using Sapa extrusions.

Hoogovens Aluminium - Sidal GmbH [AI]

Postfach 12 01 65
D-46101 Oberhausen [Fahnhorststraße 3, D-46117 Oberhausen]
Germany
Tel: +49 208 69 03 0, Fax: +49 208 69 03 111, Contact: Wolfgang Bräuer
Group: Hoogovens Groep Est: 1970 Employees: 67
Notes: Hoogovens Aluminium Distribution & Service Centre.

Hoogovens Aluminium Bausysteme GmbH [AI]

Postfach 10 03 31
D-56033 Koblenz
Germany
Tel: +49 261 8910, Fax: +49 261 82038
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Building Systems.

Hoogovens Aluminium Building Systems Ltd. [AI]

Haydock Lane, Haydock, St. Helens, Merseyside WA11 9TY
United Kingdom
Tel: +44 1942 272152, Fax: +44 1942 272136
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Building Systems.

Hoogovens Aluminium Building Systems NV [AI]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302111, Fax: +32 15 302920
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Building Systems.

Hoogovens Aluminium BV [AI]

Vondellaan 10, Beverwijk, Postbus 10000
NL-1970 CA IJmuiden
Netherlands
Tel: +31 251 499105, Fax: +31 251 470220
Group: Hoogovens Groep

Hoogovens Aluminium Danmark A/S [AI]

Helgeshøj Allé 24
DK-2630 Taastrup
Denmark
Tel: +45 42 52 70 15, Fax: +45 42 52 79 79, Telex: 33494 hoogal dk, Contact: Freddy Lund
Group: Hoogovens Groep Est: 1923 Employees: 13
Notes: Hoogovens Aluminium Distribution & Service Centre.

Hoogovens Aluminium España S.A. [AI]

Avenida Puerta del Angel 40
E-08002 Barcelona
Spain
Tel: +34 3 318 6998, Fax: +34 3 302 1160
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre.

Hoogovens Aluminium España S.A. [AI]

Monte Esquinza, 44-1
E-28010 Madrid
Spain
Tel: +34 1 319 67 81, Fax: +34 1 308 21 58
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Sales for Hoogovens Aluminium Waltzprodukte - Koblenz.

Hoogovens Aluminium Europe Srl. [AI]

Via F. Russoli 1
I-20143 Milan
Italy
Tel: +39 2 891 20333, Fax: +39 2 891 21395
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre & Sales for Hoogovens Aluminium Waltzprodukte - Koblenz (D).

Hoogovens Aluminium France SA [AI]

2, blvd. Georges Clémenceau, BP 65
F-92404 Courbevoie Cédex
France
Tel: +33 1 46 67 10 70, Fax: +33 1 46 67 10 79, 80, Telex: 630822, Contact: Denis Clichet
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution & Service Centre.

Hoogovens Aluminium GmbH [AI]

Carl-Spaeterstraße 10, Postfach 920
D-56070 Koblenz
Germany
Tel: +49 261 8910, Fax: +49 261 891342, Telex: 86253559
Group: Hoogovens Groep
Alloys: AA grades: 1050, 1050A, 1070, 1070A, 1200, 1350, 3103, 3003, 3003 Alclad, 3005 Alclad, 3004, 3004 Alclad, 5005, 5052, 5454, 5086, 5083, 6063, 6061, 2017, 2017A, 2024, 2014, 7075, 7079. Hoogovens Al designations: 1070, 1000, 1001, 1010, 3000, 3000 plaque, 3530, 3530 plaque, 3560 plaque, 3540, 3540 plaque, 3541, 5010, 5020, 3010, 5520, 5030, 5400, 5503, 5510, 6630 plaque, 6010, 6560, 2170, 2240, 2140, 7350, 7750, 7790; DIN: Al99.7, Al99.5, E-Al, Al99, AlMn1, AlMn1 plaque, AlMnCu, AlMnCu plaque, AlMn1Mg0.5 plaque, AlMn1Mg1, AlMn1Mg1 plaque, AlMn1Mg1, AlMg1, AlMg1.8, AlMg2Mn0.8, AlMg2.5, AlMg3, AlMg2.7Mn, AlMg4Mn, AlMg4.5Mn, AlMgSi0.5 plaque, AlMgSi1, AlMg1SiCu, AlCuMg1, AlCuMg2, AlCuSiMn, AlZn4.5Mg1, AlZnMgCu1.5, AlZnMgCu0.5; Wk. Numbers: 3.0275, 3.0255, 3.0257, 3.0205, 3.0515, 3.0517, 3.0525, 3.0526, 3.0526, 3.3315, 3.3326, 3.3527, 3.3523, 3.3535, 3.3537, 3.3545, 3.3547, 3.2315, 3.3211, 3.1325, 3.1355, 3.1255, 3.4335, 3.4365, 3.4345; NF: A7, A5, A5L, A4, A-M1, A-MG 0.5, A-M1G, A-M 1 G, AG 0.6, A-G3M, A-G4MC, A-GS, A-SGM, A-U4G, A-U4G1, A-U4SG, A-Z5G, A-Z5GU; Aerospace grades: Air 9048; NF 50451, 50751; BS 2L93, 2L97; DTD 5120, 5130; S07-1213; DAN 26, 422; VFN 13314, 13327, 13912; FED QQ-A 250/4, 250/11, 250/12, 250/29; AMS 4050, 4089 etc. Other alloys on request.
Designation systems: USA CEN ISO BS DIN NF Aerospace.
Product Types: Wrought alloys. Strip, sheet & plate.
Applications: Tanks and pressure vessels, building and construction, parabolic antennae, automotive and coachwork, rail transport, shipbuilding, aerospace, mechanical engineering, food industry.
Tradenames: KAL-BAU, KAL-ZIP (building products).
Approvals: ISO 9001.
Notes: Sheet: 0.2 to 8mm thick, max width 1.5m, max coil dia. 1.35m. Plate: 4 to 175mm thick, up to 3.5m wide/22m long.

Supplier Addresses & Product Details 75

Hoogovens Aluminium GmbH [AI]

Büro Neuss, Europadamm 2, Postfach 10 15 23
D-41415 Neuss
Germany
Tel: +49 2131 1868 21, Fax: +49 2131 1868 24
Group: Hoogovens Groep

Hoogovens Aluminium Hüttenwerk GmbH [AI]

Postfach 10 11 54
D-46549 Voerde [Schleusenstraße, D-46562 Voerde]
Germany
Tel: +49 281 94210, Fax: +49 281 9421264, Telex: 812730,
Contact: Dipl. Vw. Dieter Stahmann
Group: Hoogovens Groep Est: 1968 Employees: 505
Notes: Hoogovens Aluminium Distribution & Service Centre.

Hoogovens Aluminium International NV [AI]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302111, Fax: +32 15 302021
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre.

Hoogovens Aluminium Italia SpA [AI]

Via Pacinotti 50/50a
I-20094 Corsico (Milan)
Italy
Tel: +39 2 451 00014, Fax: +39 2 447 5933
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre.

Hoogovens Aluminium Japan Ltd. [AI]

10th Floor. Takoh Bldg. Kudan
8-5 Iidabashi 2-chome, Chiyoda-ku, Tokyo 102
Japan
Tel: +81 3 3288 7281, 82, Fax: +81 3 3288 7283
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Rolled Products, Koblenz.

Hoogovens Aluminium Metall GmbH [AI]

Europadamm 2, Postfach 10 15 23
D-41415 Neuss
Germany
Tel: +49 2131 18680, Fax: +49 2131 186814
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Primary Products.

Hoogovens Aluminium NV [AI]

A. Stocletlaan, 87
B-2570 Duffel
Belgium
Tel: +32 15 30 21 11, Fax: +32 15 30 27 95
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Hoogovens Aluminium Rods & Hard Alloys.

Hoogovens Aluminium NV [AI]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302111, Fax: +32 15 302794 / 302797
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Hoogovens Aluminium Rolled Products Duffel.

Hoogovens Aluminium NV filial Sverige [AI]

Odinsgatan 13, P.O. Box 308
S-40125 Goteborg
Sweden
Tel: +46 31 806990, Fax: +4631 150420
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Rolled Products Duffel.

Hoogovens Aluminium NV Profiel Centrum [AI]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302220, Fax: +32 15 302235
Group: Hoogovens Groep
Product Types: Wrought alloys, Extrusion.
Notes: Hoogovens Aluminium Extrusion Products.

Hoogovens Aluminium Portugal Lda. [AI]

Avenida Alvares Cabral 5, 1
P-1200 Lisboa
Portugal
Tel: +35 1 3877763, Fax: +35 1 3886773
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Hoogovens Aluminium Rolled Products Duffel &
Hoogovens Aluminium Waltzprodukte - Koblenz (D).

Hoogovens Aluminium Primary Products [AI]

Vondellaan 10, Beverwijk, Postbus 10000
NL-1970 CA Ijmuiden
Netherlands
Tel: +31 251 499105/499102, Fax: +31 251 470220
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Primary Products.

Hoogovens Aluminium Profieltechnik GmbH [AI]

Werk Koblenz, Postfach 10 03 31
D-56033 Koblenz [Carl-Spaeter-Straße 10, D-56070 Koblenz]
Germany
Tel: +49 261 8910, Fax: +49 261 801631, Contact: Dr. Werner J.
Graf
Group: Hoogovens Groep Est: 1991 Employees: 850
Product Types: Semi-finished Al sections.
Notes: Hoogovens Aluminium Extrusion Products.

Hoogovens Aluminium Profieltechnik GmbH [AI]

Werk Vogt, Postfach 11 55
D-88264 Vogt [Bergstraße 17, D-88267 Vogt]
Germany
Tel: +49 7529 9990, Fax: +49 7529 999271
Group: Hoogovens Groep Est: 1991 Employees: 850
Notes: Hoogovens Aluminium Extrusion Products.

Hoogovens Aluminium Profitechnik Bitterfeld GmbH [AI]

Zorbigerstraße, Postfach 1307
D-06731 Bitterfeld
Germany
Tel: +49 3493 72251, Fax: +49 3493 72333
Group: Hoogovens Groep
Product Types: Wrought alloys, Extrusion.
Notes: Hoogovens Aluminium Extrusion Products.

Hoogovens Aluminium Quebec & Co Ltd. [AI]

2020 University Street, Suite 1334, Montreal QC H3A 2A5
Canada
Tel: +1 514 9877640, Fax: +1 514 9877641
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Primary Products.

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Hoogovens Aluminium Sales BV [AI]

Kolenbranderstraat 20-d
NL-2984 AT Ridderkerk
Netherlands
Tel: +31 180 48 29 29, Fax: +31 180 46 19 99
Group: Hoogovens Groep
Product Types: Wrought alloys
Notes: Sales for Hoogovens Aluminium Waltzprodukte – Koblenz.

Hoogovens Aluminium Sales BV [AI]

Vlierboan 19, Postbus 5062
NL-2900 EB Capelle a/d IJssel
Netherlands
Tel: +31 10 2586114, Fax: +31 10 4508786
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre.

Hoogovens Aluminium Service Center NV [AI]

A. Stocletlaan 87
B-2570 Duffel
Belgium
Tel: +32 15 302111, Fax: +32 15 311101
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre.

Hoogovens Aluminium UK Ltd. [AI]

Swallowdale Lane, Hemel Hempstead, Hertfordshire, HP2 7PU
United Kingdom
Tel: +44 1442 60133, Fax: +44 1442 62522, Contact: Peter Simpson
Group: Hoogovens Groep
Product Types: Rolled & extruded products.
Notes: Hoogovens Aluminium Distribution & Service Centre.

Hoogovens Aluminium UK Ltd. [AI]

Prudential Buildings, 5, St. Phillip's Place, Birmingham B3 2PW
United Kingdom
Tel: +44 121 236 5777, Fax: +44 121 233 3176
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Sales for Hoogovens Aluminium Waltzprodukte - Koblenz.

Hoogovens Aluminium USA Corp. [AI]

101, Venture Way, P.O. Box 2127
Secaucus, N.J. 07096
United States of America
Tel: +1 201 8667776, Fax: +1 201 8666146
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Distribution and Service Centre & Sales for Hoogovens Aluminium Waltzprodukte - Koblenz (D).

Hoogovens Aluminium Verkauf GESMBH [AI]

Laaerstraße 7-9/2/1
A-2100 Korneuburg
Austria
Tel: +43 2262 64544, Fax: +43 2262 64545
Group: Hoogovens Groep
Product Types: Wrought alloys
Notes: Hoogovens Aluminium Rolled Products Duffel.

Hoogovens Aluminium Waltzprodukte [AI]

Børge Brand, Bodegård
DK-3050 Humlebaek
Denmark
Tel: +45 4919 0011, Fax: +45 4919 1560
Group: Hoogovens Groep
Product Types: Wrought alloys.
Notes: Hoogovens Aluminium Waltzprodukte - Koblenz (D).

Hoogovens Aluminium Walzprodukten GmbH [AI]

Carl-Spaeter-Straße 10, Postfach 10 03 31
D-56033 Koblenz
Germany
Tel: +49 261 8910, Fax: +49 261 891342
Group: Hoogovens Groep
Alloys: AA designations: 2014, 2024, 2024 Alclad, 2124, 2214, 2219, 2618A, 5083, 5383, 5456, 6061, 7010, 7020, 7050, 7075, 7075 Alclad, 7150, 7175, 7475; France AIR designations: 9048-610, 9048-620, 9048-630, 9048-640, 9048-660, 9048-670, 9048-680, 9048-690, 9048-700, 9048-710, 9048-720, 9048-730; Germany Wk. Numbers: WL 3.1354, WL 3.1924, WL 3.3214, WL 3.4144, WL 3.4364, WL 3.4384, WL 3.4394; UK BS 2L.93, 2L.95, 2L97; DTD 5010, DTD 5120, DTD 5130; USA AMS: 4027, 4029, 4037, 4045, 4050, 4078, 4089, 4090, 4101, 4201, 4202, 4204, 4205; FED QQ-A-250/4, 250/5, 250/11, 250/12, 250/13, 250/24, 250/29, 250/30; Space Launcher Specifications for: Aerospatiale, Cryospace, LPSC, Mitsubishi Heavy Ind. Zepelin; Tempers: F, O, T3, T351, T37, T37A, T4, T451, T6, T651, T7351, T73651, T7451, T7651, T851, T87, W51. Company specifications: Aerospatiale ASN-A3009, ASN-A3011, ASN-A3050, ASN-A3098, ASN-A3101, ASN-A3355, DSN 1105, DSN 1106; Boeing BMS 7-323; Bombardier / Canadair CMS 516-01, CMS 516-02, CMS 516-03; British Aerospace ABM 1-1005, ABM 1-1006, ABM 3-1029, ABM 3-1030, ABM 3-1031, BACM 39E, BACM 200B, BAEM 1033, BAEM 1213, BAEM 1218, BAEM 1219, MM 0533; DASA Group DAN 422 3.1354, DAN 422 3.1924, DAN 422 3.3214, DAN 422 3.4144, DAN 422 3.4364, DAN 422 3.4384, DAN 422 3.4394, MBBN6012; Dassault C.R.1.1.0.31, C.R.1.1.0.36; Fokker TH 5.312, TH 5.313, TH 5.316/3, TH 5.316/5; Grumman GM2007; IPTN NMS 7-323; Lockheed FMS-3004; McDonnell Douglas DMS 1580, DMS 2184, DMS 2233, MMS 159, MMS 1420; Saab STD 113627, STD 113637, STD 113643, STD 113644; SABCA SM 9102, SMS 003. Hoogovens ALUSTAR.
Product Types: Wrought alloys. Rolled aircraft, aerospace and shipbuilding products. Plate, Sheet, Strip.
Applications: Aerospace, shipbuilding, silos & storage tanks.
Approvals: Bundesamt für Wehrtechnik und Beschaffung (BWB) AQAP-120, AQAP-130. Bureau Veritas Quality International (BVQI) EN ISO 9001. Civil Aviation Authority (CAA) AI/8802/82. Det Norske Veritas (DNV) A 142/SOLL/BIA. Lloyds Register of Shipping (LRS) MAT/06/GFR 040. Technischer Überwachungsverein (TUV) WO/TRD 100.
Notes: Hoogovens Aluminium Rolled Products Koblenz (D).

Hoogovens Beheermaatschappij Industriële Producten BV [AI]

Gebouw Nieuw Transwijk, Rooswijkweg, Postbus 11
NL-1950 M Velsen-Noord
Netherlands
Tel: +31 251 499200, Fax: +31 251 470230
Group: Hoogovens Groep

Hoogovens Corporate Services BV [AI]

Vondellaan 10, Beverwijk, Postbus 10000
NL-1970 CA IJmuiden
Netherlands
Tel: +31 251 499111, Fax: +31 251 470057
Group: Hoogovens Groep

Hoogovens Hylite BV [AI]

Postbus 10000
NL-1970 CA IJmuiden
Netherlands
Tel: +31 251 491708, Fax: +31 251 470257
Group: Hoogovens Groep

Hoogovens Research & Development [AI]

Postbus 10000
NL-1970 CA IJmuiden
Netherlands
Tel: +31 251 495778, Fax: +31 251 470114
Group: Hoogovens Groep

Supplier Addresses & Product Details 77

Hoogovens Technical Service do Brasil Ltda. [AI]

Avenida Paulista 1471, 11 andar, cj. 1117
CEP 01211-927 São Paulo SP
Brazil
Tel: +55 11 283 1715, Fax: +55 11 288 1978
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Hoogovens Technical Services [AI]

Inspection Systems BV
Uraniumweg 27, Postbus 8499
NL-3503 RL Utrecht
Netherlands
Tel: +31 30 2478478, Fax: +31 30 2412480
Group: Hoogovens Groep

Hoogovens Technical Services BV [AI]

Postbus 10.000
NL-1970 CA Ijmuiden
Netherlands
Tel: +31 251 498600, Fax: +31 251 470030
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Hoogovens Technical Services China [AI]

Suite 405, CATIC Plaza, 18 Beichen E. Road
Beijing, 100101
China
Tel: +86 10 4940496, Fax: +86 10 4940497
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Hoogovens Technical Services India [AI]

Liaison Office, Rajendra Bhawan (3rd floor)
210 Deen Dayal Upadhyay Marg, New Delhi 110 002
India
Tel: +91 11 323 0857, Fax: +91 11 323 1809
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Hoogovens Technical Services Poland [AI]

ul. 1 Maja 11
40-224 Katowice
Poland
Tel: +48 32 587934, Fax: +48 32 589124
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Hoogovens Technical Services, Technological & Operational Assistance [AI]

4210 South Service Road
Burlington, Ontario L7L 4X5
Canada
Tel: +1 905 6316166, Fax: 1 905 6316160
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

Howmet Corporation [Ti]

555 Benston Road
Whitehall, MI 49461-1899
United States of America
Tel: +1 616 894 7183, Fax: +1 616 894 7354, Contact: Stan Gillish - Business Center Manager
Group: Howmet Corporation
Associated Companies: Additional Sales Office(s):
Titanium Ingot
Reno, NV United States of America
Tel: +1 702 972 0563, Fax: +1 702 972 0575
Product Types: Wrought alloys Cast alloys Bar & Rod, Billet, Castings, Castings, Investment, Electrodes, TiAluminide, Forgings, Furnaces, Investment Castings, Furnaces, Vacuum Arc, Ingot, CP Ingot, TiAluminide, Scrap, Recycle, Billet, castings.
Other Services: Alloy Development, Coatings/Anodizing, Hot Isostatic Pressing (HIP), Melting, Custom Melting, Test Melting Sawing, Shearing, Toll Processing.
Notes: The titanium ingot plant of Howmet Corp. specializes in the manufacture of titanium ingots in both conventional and aluminide composition. The capabilities of this plant also include triple and double melt rotating ingot.

HTS Energy & Environment BV [AI]

Postbus 10.000
NL-1970 CA Ijmuiden
Netherlands
Tel: +31 251 498600, Fax: +31 251 470030
Group: Hoogovens Groep
Notes: Hoogovens Technical Services.

HTS Technological & Operational Assistance BV [AI]

Postbus 10.000
NL-1970 CA Ijmuiden
Netherlands
Tel: +31 251 498600, Fax: +31 251 470030
Group: Hoogovens Groep
Notes: Hoogovens Technical Services

Hycast a.s [AI]

Industriveien 25, P.O. Box 225
N-6601 Sunndalsøra
Norway
Tel: +47 71 69 38 00, Fax: +47 71 69 00 65
Group: Norsk Hydro

Hycot [AI]

See: Hydro Aluminium HYCOT a.s

Hydal [AI]

See: Hydro Aluminium Hydal AS

Hydeq AS [AI]

P.O. Box 93
N-5870 Øvre Årdal
Norway
Tel: +47 57 66 21 00, Fax: +47 57 66 21 80
Group: Norsk Hydro

Hydro Alluminio Atessa SpA [AI]

Contrada Saletti Z.I.
I-66040 Atessa (CH)
Italy
Tel: +39 872 89 41, Fax: +39 872 89 42 13
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.
Notes: Extrusion plant dedicated to the building industry sector. Remelt facilities within extrusion plant.

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Hydro Alluminio Ornago SpA [AI]

Via A. Ciucani n. 8
I-20060 Ornago. Milano
Italy
Tel: +39 39 66 581, Fax: +39 39 60 10 214
Group: Norsk Hydro Est: 1989 Employees: 263
Product Types: Wrought alloys extrusions.
Notes: Remelt facilities within extrusion plant.

Hydro Aluminio Portalex S.A. [AI]

São Marcos
P-2735 Cacém
Portugal
Tel: +351 1 42 68 100, Fax: +351 1 42 68 128
Group: Norsk Hydro Employees: 200
Product Types: Wrought alloys, Extrusion.
Notes: Extrusion plant with 3 presses & a remelt plant.

Hydro Aluminium [AI]

Zandhovenstraat 12, P.O. Box 6814
NL-4802 HV Breda
Netherlands
Tel: +31 76 587 22 77, Fax: +31 76 571 28 42
Group: Norsk Hydro

Hydro Aluminium Alupluss [AI]

Drammensveien 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 75 60
Group: Norsk Hydro
Notes: Part of the Finished Products business; a group of Norwegian companies.

Hydro Aluminium Alupres Ltd. [AI]

Pantglas Industrial Estate, Bedwas, Newport, Gwent NP1 3DR
United Kingdom
Tel: +44 1222 867 311, Fax: +44 1222 863 728, Contact: Stephen Bradley
Group: Norsk Hydro
Product Types: Wrought alloys. Extrusion.
Approvals: BS 5750
Notes: Three extrusion presses with a range of 0.1kg/m to 9kg/m + 200mm dia. and 13 m length. In-house anodizing, painting & fabricating. [Information from ALFED].

Hydro Aluminium Aluserv a.s [AI]

Tangenvegen, P.O. Box 175
N-5875 Ardalstangen
Norway
Tel: +47 57 64 90 00, Fax: +47 57 64 97 94, Telex: 42610
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

R&D Materials Technology, P.O. Box 219
N-6601 Sunndalsøra
Norway
Tel: +47 71 69 34 55, Fax: +47 71 69 36 02
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

R&D Materials Technology, Karmøy
N-4265 Håvik
Norway
Tel: +47 52 85 40 00, Fax: +47 52 85 43 80, Telex: 42270
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Teknologisenter Årdal, P.O. Box 303
N-5870 Øvre Årdal
Norway
Tel: +47 57 64 90 00, Fax: +47 57 64 95 16, Telex: 42610
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Årdal metallverk, P.O. Box 303
N-5870 Øvre Årdal
Norway
Tel: +47 57 64 90 00, Fax: +47 57 64 98 88, Telex: 42610
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Drammensveien 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 79 30, Telex: 72948
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Hydroserv, Mail: P.O.Box 114
N-5901 Høyanger
Norway
Tel: +47 57 71 50 00, Fax: +47 57 71 52 73, Telex: 42584
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Høyanger metallverk, P.O. Box 114
N-5901 Høyanger
Norway
Tel: +47 57 71 50 00, Fax: +47 57 71 29 67, Telex: 42584
Group: Norsk Hydro

Hydro Aluminium a.s [AI]

Årdal Karbon, P.O. Box 175
N-5875 Ardalstangen
Norway
Tel: +47 57 64 90 00, Fax: +47 57 64 95 55, Telex: 42610
Group: Norsk Hydro

Hydro Aluminium a.s. [AI]

Drammensveien 264, Vækerø, Postboks 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 79 30, Telex: 72948
Group: Norsk Hydro

Hydro Aluminium A/S [AI]

Rolled Products Head Office
Postboks A
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 14 81, Telex: (8) 320093 noral
Group: Norsk Hydro
Associated Companies: N, S, DK, SF, UK, D, NL, B, F, CH, A, USA.
Product Types: Wrought alloys, Sheet, Coil.

Hydro Aluminium A/S - AluCoat [AI]

Kirkeveien 1, Postboks 273
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 34 20
Group: Norsk Hydro
Product Types: Wrought alloys Coils & sheets laquered products.
Sheet, Coil.
Applications: Canning. Buildings.

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Hydro Aluminium A/S - Holmestrand Mill [A/]

Weidemannsgate 8, Postboks A
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 12 16, Telex: (8) 320093
noral
Group: Norsk Hydro
Associated Companies: N, S, DK, SF, UK, D, NL, B, F, CH, A,
USA.
Alloys: 1050A, 1070, 1100, 1200, 1200A, 8011 (AA 8011A), 3003,
3101, 3103A, 3005, 3105, 3207, 5005, 5050. Tempers: Not
stated. Designation systems: USA CEN BS DIN NF Sweden
(SIS).
Product Types: Wrought alloys Hot-rolled products: 1xxx-series
alloy sheet: 0.50-4.00mm thick, 790-1250mm wide, 500-
4000mm long. 3xxx-series alloy sheet (not 3005): 0.50-3.20mm
thick, 790-1000mm wide, 500-4000mm long. 3005 & 5005
alloys: 0.50-3.20mm thick, 790-1220mm wide, 500-4000mm
long. Stucco-sheets (1050, 3003, 3103, 3103A): 0.50-1.00mm
thick, 790-1220mm wide, 500-3900mm long. Coil: 0.20-2.00mm
thick, 20-1270mm wide. Stucco coils 0.50-1.00mm thick, 790-
1220mm wide. Sheet, Coil. Stucco sheet.
Notes: One of two Norwegian manufacturing plants for rolled
products (Holmestrand Mill for hot-rolled & Karmøy Mill for cold-
rolled). Recycled materials. 60000T annual capacity.

Hydro Aluminium a.s - Hydro Trans [A/]

Bygnes
N-4250 Kopervik
Norway
Tel: +47 52 85 27 00, Fax: +47 52 85 11 96
Group: Norsk Hydro
Notes: Part of the Finished Products business. Supplies systems
for truck bodies.

Hydro Aluminium a.s Karmøy Metallverk [A/]

N-4265 Håvik
Norway
Tel: +47 52 85 40 00, Fax: +47 52 85 25 29
Group: Norsk Hydro

Hydro Aluminium A/S - Karmøy Mill [A/]

N-4265 Håvik
Norway
Tel: +47 52 85 43 09, Fax: +47 52 85 43 50, Telex: 42270 hydro n
Group: Norsk Hydro
Associated Companies: N, S, DK, SF, UK, D, NL, B, F, CH, A,
USA.
Alloys: 1050A, 1070, 1100, 1200, 8011 (AA 8011A), 8111, 3003,
3103, 3103A, 3005, 3105, 5010. Tempers: Not stated.
Product Types: Wrought alloys Cold-rolled sheet & coil, Sheet
Notes: One of two Norwegian manufacturing plants for rolled
sheet & coil (Holmestrand Mill- hot-rolled & Karmøy Mill - cold-
rolled). 50000T sheet & strip annual capacity at Karmøy.
Continuously cast strip for cold-rolling stock.

Hydro Aluminium A/S - Nordisk Aviation Prod. [A/]

Weidemannsgate 8, Postboks 173
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 20 13, Contact: Jan Helge
Nielsen - Marketing Director
Group: Norsk Hydro
Applications: Aviation parts: air-freight pallets, F-16 drop tanks;
Anodizing.
Notes: Part of the Finished Products business. Manufactures
airfreight containers & pallets. World-wide distribution centre.

Hydro Aluminium a.s Rolled Products [A/]

Weidemannsgt. 8, P.O. Box A
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 14 81
Group: Norsk Hydro

Hydro Aluminium a.s Sunndal [A/]

Romsdalsveien 4, P.O. Box 51
N-6601 Sunndalsøra
Norway
Tel: +47 71 69 30 00, Fax: +47 71 69 37 00
Group: Norsk Hydro

Hydro Aluminium Auto Accessories AS [A/]

Weidemannsgt. 8, P.O. Box 193
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, Fax: +47 33 05 21 62
Group: Norsk Hydro
Applications: Car accessories.
Notes: Part of the Finished Products group. In-house developed
aluminium car accessory rack for transporting bicycles/skis. 90%
export to European countries.

Hydro Aluminium Automotive Structures a.s [A/]

Kærgårdsvej 5
DK-6270 Tønder
Denmark
Tel: +45 74 72 66 66, Fax: +45 74 72 66 77
Group: Norsk Hydro
Product Types: Wrought alloys
Applications: Automotive.
Notes: Automotive development centre (space-frame) and
production facility, e.g. production of space-frames for Renault
Spider sports car; bonded extrusion structure of Lotus Elise
sports car.

Hydro Aluminium Bellenberg GmbH [A/]

Am Mühlholz 1
D-89287 Bellenberg
Germany
Tel: +49 73 06 783 0, Fax: +49 73 06 783 13
Group: Norsk Hydro
Alloys: No details
Product Types: Wrought alloys, Extrusion.
Notes: Extrusion plant dedicated to the building industry sector.

Hydro Aluminium Century Ltd. [A/]

Blackaddie Road, Sanquhar, Dumfriesshire. DG4 6DD
United Kingdom
Tel: +44 1659 50481, Fax: +44 1659 50488
Group: Norsk Hydro
Alloys: 6060, 6063, 6063A, 6082, 6005A. Temper T4, T6
Product Types: Wrought alloys Profiles: max. width 300mm;
profile weights 0.100kg/m to 20kg/m. Standard lengths: 620mm
to 8m (others on request). Extrusion.
Applications: Architectural components. Glazing bars & window
frames. Windscreen sections. Road & rail transport. Scaffolding.
Bridges. Cranes. Access equipment. Construction.
Approvals: BS 5750, ISO 9002.
Notes: In addition to manufacturing, provide design & R&D.
Surface treatment (anodizing - natural or coloured - to BS1615 &
BS3987; thickness 5-25 microns, typically); lengths 2-6.4m.
Painted to BS 6496 (approved for Interpon D); matt to gloss
finish. Paint plant environmentally approved to BS 7750. Thermal-
breaks (by resin fill & debridging process).

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Hydro Aluminium Century Ltd. [A/]

Durham Rd., Birtley, Chester-le-Street, County Durham DH3 2AH
United Kingdom
Tel: +44 191 301 1200, **Fax:** +44 191 301 1234
Group: Norsk Hydro
Alloys: 6060, 6063, 6063A, 6082, 6005A. Temper T4, T6
Designation systems: USA
Product Types: Wrought alloys Profiles to a max. width of 300mm & profile weight range 0.100kg/m to 20kg/m. Standard length range: 620mm to 8m (others on request). Extrusion.
Applications: Architectural components. Glazing bars & window frames. Windscreen sections. Road & rail transport. Scaffolding. Bridges. Cranes. Access equipment. Construction.
Approvals: BS 5750, ISO 9002
Notes: In addition to manufacturing, provide design & R&D. Surface treatment (anodizing - natural or coloured - to BS1615 & BS3987; thickness 5-25 microns, typically); lengths 2-6.4m. Painted to BS 6496 (approved for Interpon D); matt to gloss finish. Paint plant environmentally approved to BS 7750. Thermal-breaks (by resin fill & debridging process).

Hydro Aluminium Châteauroux s.n.c. [A/]

Z. I. Le Buxerieux, Avenue Pierre de Coubertin
F-36000 Châteauroux Cedex
France
Tel: +33 2 54 29 22 00, **Fax:** +33 2 54 29 22 22, **Telex:** 750443 hydroal f, **Contact:** Jacques Lacroix
Group: Norsk Hydro **Est:** 1985 **Employees:** 155
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Chrzanów Sp.z.o.o [A/]

ul. Hydro 1
PL-32-500 Chrzanów
Poland
Tel: +48 35 34 205, **Fax:** +48 35 32 082
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium CIS a.s [A/]

Norsk Hydro Moscow
33/7 Ulitsa Usatcheva, bld. 7
RU-119 048 Moscow
Russian Federation
Tel: +7 095 244 4406, **Fax:** +7 095 246 4948
Group: Norsk Hydro

Hydro Aluminium Clervaux S.A. [A/]

Rue de Lentzweiler, L-9748 Clervaux Eselborn
Luxembourg
Tel: +352 94 95 95 1, **Fax:** +352 94 93 73
Group: Norsk Hydro

Hydro Aluminium Conductors A/S [A/]

Rustadbrygga 1, Postboks 186, N-3192 Horten
Norway
Tel: +47 33 04 41 71, **Fax:** +47 33 04 12 36
Group: Norsk Hydro
Product Types: Cables.

Hydro Aluminium Conductors AB [A/]

Östra Ringvägen 4
S-721 88 Västerås
Sweden
Tel: +46 21 19 84 90, **Fax:** +46 21 18 64 87
Group: Norsk Hydro

Hydro Aluminium Deutschland GmbH [A/]

Am Schimmersfeld 7, P.O.Box 101363
D-40883 Ratingen/Düsseldorf
Germany
Tel: +49 2102/746 0, **Fax:** +49 2102/746 500
Group: Norsk Hydro

Hydro Aluminium EXPA S.A. [A/]

Die & tool, Siebeponisweg 12
B-4700 Eupen
Belgium
Tel: +32 87 89 90 90, **Fax:** +32 87 89 03 47
Group: Norsk Hydro
Notes: Extrusion die production.

Hydro Aluminium EXPA S.A. - Remelt [A/]

Waldstrasse 54
B-4730 Raeren
Belgium
Tel: +32 87 85 31 57, **Fax:** +32 87 85 31 60
Group: Norsk Hydro
Product Types: Wrought alloys. Extrusion.
Notes: Remelt facilities within extrusion plant.

Hydro Aluminium Expal [A/]

42, rue de la Beauce, BP 89
F-28112 Lucé Cedex
France
Tel: +33 2 37 30 64 00, **Fax:** +33 2 37 35 52 23, **Telex:** 760606 f hydroaluc, **Contact:** Jean-Michel Bouillard
Group: Norsk Hydro **Est:** 1986 **Employees:** 231
Notes: Coating & anodizing.

Hydro Aluminium Expal (Pinon) s.n.c. [A/]

Rue du 7ème B.C.A., BP 51
F-02320 Pinon
France
Tel: +33 3 23 25 30 00, **Fax:** +33 3 23 25 30 30, **Telex:** 140520 hydroalpin f, **Contact:** Mme Marquis
Group: Norsk Hydro **Est:** 1986
Notes: Coating & anodizing.

Hydro Aluminium Extrusion [A/]

Mail: Route de Chavannes 31
CH-1007 Lausanne
Switzerland
Tel: +41 21 621 83 83, **Fax:** +41 21 621 83 43
Group: Norsk Hydro

Hydro Aluminium Extrusion Service sarl [A/]

42, rue de la Beauce, BP 77
F-28112 Lucé Cedex
France
Tel: +33 2 37 25 13 00, **Fax:** +33 2 37 35 98 22, **Telex:** 760403 f, **Contact:** Marcel Houbrexhe
Group: Norsk Hydro **Est:** 1989 **Employees:** 91
Notes: Coating & anodizing. Extrusion die production. Dedicated remelt facilities for French extruders. Heat-treatment facilities.

Hydro Aluminium Extrusion Tools a.s [A/]

Mail: Østrem Industriområde
N-4250 Kopervik
Norway
Tel: +47 52 85 1899, 1990, **Fax:** +47 52 85 14 96
Group: Norsk Hydro
Notes: Extrusion die production.

Hydro Aluminium Formtech a.s [A/]

Weidemanns gt. 8, P.O. Box 193
N-3081 Holmestrand
Norway
Tel: +47 33 05 42 00, **Fax:** +47 33 05 21 62
Group: Norsk Hydro
Notes: Part of the Finished Products group. Specialise in projects within industrial finished products. Management of hospital beds business unit.

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Hydro Aluminium France s.n.c. [A/]

9, Avenue Alexandre-Maistrasse, P.O. Box 202
F-92502 Reuil-Malmaison Cedex
France
Tel: +33 1 47 52 12 22, Fax: +33 1 47 32 25 34
Group: Norsk Hydro

Hydro Aluminium Fundo a.s [A/]

P.O. Box 34
N-5901 Høyanger
Norway
Tel: +47 57 71 54 00, Fax: +47 57 71 20 70
Group: Norsk Hydro
Product Types: Cast alloys, wheels.
Notes: Part of the 'Automotive Structures' group. Manufactures & markets aluminium wheels. Production capacity: ~800 000 cast wheels.

Hydro Aluminium Fundo AS, Sales Vækerø [A/]

Drammensvn. 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 76 23
Group: Norsk Hydro

Hydro Aluminium Futuretools Ltd. [A/]

Southbrook Place, Southbrook Road, Gloucester GL4 7YY
United Kingdom
Tel: +44 145 238 28 88, Fax: +44 145 238 25 55
Group: Norsk Hydro
Notes: Extrusion die manufacturers.

Hydro Aluminium HYCOT a.s [A/]

Industrivej 20
DK-6240 Løgumkloster
Denmark
Tel: +45 74 94 94 94, Fax: +45 74 74 56 71
Group: Norsk Hydro
Tradenames: HYCOT (nylon coated aluminium tubes).
Notes: Part of the Heat Transfer business.

Hydro Aluminium Hydal AS [A/]

N-4265 Håvik
Norway
Tel: +47 52 85 47 04, Fax: +47 52 85 48 90
Group: Norsk Hydro
Notes: Part of the Finished Products business. Manufactures aluminium cabinets for electrical & electronic equipment.

Hydro Aluminium Hydro Utvikling Sogn [A/]

Verksvn. 1, P.O. Box 175
N-5875 Ardalstangen
Norway
Tel: +47 57 64 90 00, Fax: +47 57 64 93 60
Group: Norsk Hydro

Hydro Aluminium I.T.C. s.n.c. [A/]

42, rue de la Beauce, P.O. Box 21
F-28111 Lucé Cedex
France
Tel: +33 2 37 30 41 00, Fax: +33 2 37 30 89 45
Group: Norsk Hydro

Hydro Aluminium Jamaica [A/]

Mail: Alpart, Stur Tree P. O.
Manchester W.1
Jamaica
Tel: +1 809 962 3251, Fax: +1 809 962 3332
Group: Norsk Hydro

Hydro Aluminium Kiev Office [A/]

Vladimirskaia st. 61/11, flat 40
Kiev
Ukraine
Tel: +380 44 22 481 83, 190 95, Fax: +380 44 22 481 83
Group: Norsk Hydro

Hydro Aluminium Maritime AS [A/]

Hunnselveien 12, P.O. Box 94
N-2831 Raufoss
Norway
Tel: +47 61 19 40 00, Fax: +47 61 19 20 90
Group: Norsk Hydro
Notes: Part of the Finished Products business. Makes prefabricated modules for marine applications.

Hydro Aluminium Maritime, Karmøy [A/]

Helganesvn. 41, P.O. Box 124
N-4262 Avaldsnes
Norway
Tel: +47 52 84 30 11, Fax: +47 52 84 21 05
Group: Norsk Hydro
Notes: Part of the Finished Products group. Makes prefabricated modules for marine applications. 'Structures' company offer engineering & material technology services, inc. road bridge, extrusion design support for fast-ferries for Stena Line.

Hydro Aluminium Metals Ltd. [A/]

Pant Glas Estate, P.O. Box 2, Bedwas
Newport, Gwent, S Wales NP1 8XE
United Kingdom
Tel: +44 122 285 72 00, Fax: +44 122 286 33 22
Group: Norsk Hydro
Product Types: Wrought alloys Cast alloys, Billet.
Notes: Aluminium recycling unit, from extrusion plants, to produce extrusion billets.

Hydro Aluminium Milano [A/]

Primary Metal Sales
Milano Oltre, Pal. "Raffaello", Via Cassanese 224
I-20090 Segrate (MI)
Italy
Tel: +39 2 26 92 90 23, Fax: +39 2 26 92 18 23
Group: Norsk Hydro

Hydro Aluminium Moscow [A/]

Norsk Hydro Moscow, 33/7 Ulitsa Usatcheva, bld. 7
RU-119 048 Moscow
Russian Federation
Tel: +7 502 224 1448, 1449, Fax: +7 502 220 3135
Group: Norsk Hydro

Hydro Aluminium Murmansk [A/]

Branch Office of Norsk Hydro Moscow, Pushkinskaya str. 10
RUS-183 038 Murmansk
Russian Federation
Tel: +7 51 295 107 37, Fax: +7 51 295 107 37
Group: Norsk Hydro

Hydro Aluminium Nenzing GmbH [A/]

Austrasse 16, P.O. Box 13
A-6710 Nenzing
Austria
Tel: +43 55 25 601 0, Fax: +43 55 25 601 399
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.
Approvals: EMAS 183693 (environmental audit).
Notes: PX press line offering new extrusion & handling technology.

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Hydro Aluminium Nordisk Aviation Products a/s [A/]

København Lufthavn Syd, Bygning 280
DK-2791 Dragør
Denmark
Tel: +45 32 45 44 10, Fax: +45 32 45 56 86
Group: Norsk Hydro

Associated Companies: Service Centres: Copenhagen, Hong Kong, London Heathrow & Gatwick, Los Angeles, Moscow, Singapore, San Fransisco.

Notes: Part of the Finished Products business. Manufactures airfreight containers & pallets. World-wide distribution centre.

Hydro Aluminium Nordisk Aviation Products Ltd. [A/]

At London Heathrow Unit 15, Central Park Estate, Staines Road
Hounslow, Middlesex TW4 5DJ
United Kingdom
Tel: +44 181 814 04 99, Fax: +44 181 814 04 98
Group: Norsk Hydro

Notes: Part of the Finished Products business. Assembles & maintains airfreight containers & pallets.

Hydro Aluminium Nordisk Aviation Products Ltd. [A/]

At London Gatwick, Bay 9 (Airsides), Building 211 Gatwick Airport
West Sussex RH6 0NP
United Kingdom
Tel: +44 129 350 2139, Fax: +44 129 350 2129
Group: Norsk Hydro

Notes: Part of the Finished Products business. Part of the Finished Products business. Assembles & maintains airfreight containers & pallets.

Hydro Aluminium Nordisk Aviation Products Moscow [A/]

Moscow, Airport Sheremetyevo-2
Mail: 103 339, Moscow, K-339, Airport Sheremetyevo-2, Moscow
Russian Federation
Tel: +7 095 578 1325, Fax: +7 095 578 6438
Group: Norsk Hydro

Notes: Part of the Finished Products business. Manufactures airfreight containers & pallets. World-wide distribution centre.

Hydro Aluminium Profiler AB [A/]

Box 8
S-360 70 Åseda
Sweden
Tel: +46 474 488 00, Fax: +46 474 108 00
Group: Norsk Hydro

Hydro Aluminium Profiler a.s [A/]

P.O. Box 34
N-2831 Raufoss
Norway
Tel: +47 61 15 30 00, Fax: +47 61 19 38 80
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Profiler a.s, avd. Gran [A/]

P.O. Box 66
N-2770 Jaren
Norway
Tel: +47 61 32 9332, Fax: +47 61 32 8979, 9382
Group: Norsk Hydro
Product Types: Wrought alloys.

Hydro Aluminium Profiler a.s, avd. Magnor [A/]

N-2240 Magnor
Norway
Tel: +47 62 83 33 00, Fax: +47 62 83 33 10
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Profiler Karmøy a.s [A/]

N-4265 Håvik
Norway
Tel: +47 52 85 45 00, Fax: +47 52 85 49 04
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Profiler UK Ltd. [A/]

Unit 3, Titan Business Centre, Tachbrook Park
Warwick CV34 6RS
United Kingdom
Tel: +44 1 926 887 955, Fax: +44 1 926 887 682
Group: Norsk Hydro
Product Types: Extrusion.
Notes: Imports extrusions from Norway. Fabrication service.

Hydro Aluminium Raeren SA NV [A/]

Walstrasse 91
B-4730 Raeren
Belgium
Tel: +32 87 85 92 11, Fax: +32 87 86 63 19, Telex: 49043,
Contact: Mme. C. Couvreur
Group: Norsk Hydro
Product Types: Wrought alloys Extrusions. Profiles. Extrusion.

Hydro Aluminium Raufoss Automotive [A/]

P.O. Box 15
N-2831 Raufoss
Norway
Tel: +47 61 15 20 00, Fax: +47 61 15 27 61
Group: Norsk Hydro
Notes: Aluminium bumper beams to European market. R&D centre to support the Automotive Structures group.

Hydro Aluminium Rockledge Inc. [A/]

100 Gus Hipp Blvd., Rockledge, FL 32955
United States of America
Tel: +1 407 636 8147, Fax: +1 407 636 8288
Group: Norsk Hydro
Notes: Part of the Heat Transfer business.

Hydro Aluminium Rolled Products [A/]

Parken, Øster Allé 48
DK-2100 København Ø
Denmark
Tel: +45 35 26 27 28, Fax: +45 35 26 34 35, Contact: Karsten M. Olesen
Group: Norsk Hydro Est: 1919 Employees: 19
Product Types: Wrought alloys.

Hydro Aluminium Rolled Products Benelux B.V. [A/]

Kanaaleweg 33-35, P.O. Box 356
NL-2900 AJ Capelle aan den Yssel
Netherlands
Tel: +31 10 458 35 55, Fax: +31 10 458 55 77
Group: Norsk Hydro

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Hydro Aluminium Rolled Products Ltd. [AI]

Gibbons Industrial Park, Dudley Road, Kingswinford
W. Midlands DY6 8XF
United Kingdom
Tel: +44 1384 298511, Fax: +44 1384 271814, Contact: Mr.
Winsper

Group: Norsk Hydro

Associated Companies: N, S, DK, SF, UK, D, NL, B, F, CH, A,
USA

Alloys: Holmestrand Mill (hot-rolled): 1050A, 1070, 1100, 1200,
1200A, 8011 (AA 8011A), 3003, 3101, 3103A, 3005, 3105,
3207, 5005, 5050. Karmøy Mill (cold-rolled): 1050A, 1070, 1100,
1200, 8011 (AA 8011A), 8111, 3003, 3103, 3103A, 3005, 3105,
5010. Tempers: Not stated. Designation systems: USA CEN
BS DIN NF Proprietary. Sweden (SIS).

Product Types: Wrought alloys Sheet from Holmestrand Mill 1xxx-
series alloy sheet: 0.50-4.00mm thick, 790-1250mm wide, 500-
4000mm long. 3xxx-series alloy sheet (not 3005): 0.50-3.20mm
thick, 790-1000mm wide, 500-4000mm long. 3005 & 5005
alloys: 0.50-3.20mm thick, 790-1220mm wide, 500-4000mm
long. Stucco-sheets (1050, 3003, 3103, 3103A): 0.50-1.00mm
thick, 790-1220mm wide, 500-3900mm long. Coil: 0.20-2.00mm
thick, 20-1270mm wide. Suco coils 0.50-1.00mm thick, 790-
1220mm wide. From Karmøy Mill: All alloys 0.50-2.00mm thick,
305-1540mm wide, 610-6000mm long. Coil: 0.40-2.00mm thick,
10-1540mm wide. Note: Alloy 1070EC to 2.5mm thick. Sheet,
strip. Stucco.

Applications: Numerous. Building. Transport. Electrotechnical.
Refrigeration. Packaging.

Notes: Sales office for products imported from two Norwegian
manufacturing plants (Holmestrand Mill & Karmøy Mill).
Recycled materials. 60000T annual capacity at Holmestrand.
50000T sheet & strip annual capacity at Karmøy. Continuously
cast strip for cold-rolling stock.

Hydro Aluminium s.a. [AI]

Route de Chavannes 31
CH-1007 Lausanne
Switzerland
Tel: +41 21 621 83 83, Fax: +41 21 621 83 43
Group: Norsk Hydro

Hydro Aluminium Sales & Trading UK [AI]

Shenley Hall, Rectory Lane, Shenley, Hertfordshire WD7 9AN
United Kingdom
Tel: +44 192 385 82 20, Fax: +44 192 385 91 30
Group: Norsk Hydro

Hydro Aluminium Sales & Trading Snc. [AI]

Défense Parc 2, 106 rue des Trois Fontanot, P.O. Box 133
F-92751 Nanterre Cedex
France
Tel: +33 1 41 37 50 00, Fax: +33 1 41 37 51 65
Group: Norsk Hydro

Hydro Aluminium Seneffe SA [AI]

Zoning Industriel C
B-7180 Seneffe
Belgium
Tel: +32 64 52 04 40, Fax: +32 64 54 91 77, Contact: Mr. Guy
Delmotte
Group: Norsk Hydro
Product Types: Wrought alloys. Profiles. Large conductors
(cables). Tube, Wire, Extrusion, Conductors (cables).
Applications: Cables. Automobile.
Notes: Part of the heat transfer business.

Hydro Aluminium Suomi Oy [AI]

Thurmansallén 8
SF-02700 Grankulla
Finland
Tel: +35 80 505 30 77, Fax: +35 80 505 47 97
Group: Norsk Hydro

Hydro Aluminium Sverige AB [AI]

Grev Turegatan 18
S-114 46 Stockholm
Sweden
Tel: +46 8 667 91 05, Fax: +46 8 667 99 05, Contact: Patrik
Segér
Group: Norsk Hydro Est: 1952 Employees: 15
Product Types: Wrought alloys Profiles, Extrusion.

Hydro Aluminium Systems Hellas S.A. [AI]

Via Aghias Annis 100, Zona: Aghio Ioannis Rendis
Athens 182 33
Greece
Tel: +30 1 34 66 135, 24 901, 951, Fax: +30 1 34 24 984
Group: Norsk Hydro
Tradenames: Domal
Notes: Markets DOMAL building products.

Hydro Aluminium Systems S.p.A. [AI]

Via Meucci, 5
I-20060 Ornago
Italy
Tel: +39 39 60 28 1, 222, Fax: +39 39 60 11 330
Group: Norsk Hydro
Tradenames: Domal
Notes: Markets DOMAL building products.

Hydro Aluminium Tønder a.s. [AI]

Postboks 10, Bygmestervej 7
DK-6270 Tønder
Denmark
Tel: +45 73 93 93 93, Fax: +45 73 93 93 13, Contact: Vagn
Grønbjerg
Group: Norsk Hydro Est: 1975 Employees: 240
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Uphusen GmbH [AI]

Postfach 11 29
D-28817 Achim [Uphuser Heerstraße 7, D-28832 Achim]
Germany
Tel: +49 42 02 57 0, Fax: +49 42 02 57 239, Contact: Dipl. -Ing.
Henner Meckel
Group: Norsk Hydro Est: 1986 Employees: 350
Product Types: Wrought alloys, Extrusion.

Hydro Aluminium Vekst a.s [AI]

Drammensveien 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 86 51
Group: Norsk Hydro
Notes: Investment & industry development company.

Hydro Aluminium Vik Verk a.s [AI]

P.O. Box 214
N-5860 Vik I Sogn
Norway
Tel: +47 57 69 55 55, Fax: +47 57 69 55 00
Group: Norsk Hydro
Notes: Part of the Finished Products group. Traffic & safety
equipment. Building elements, e.g. tunnel cladding.

Hydro Alumino La Roca SA [AI]

Polig. Industrial Can Font de la Parera
Sta. Agnès de Malanyanes
E-08430 La Roca del Valles - Barcelona
Spain
Tel: +34 3 842 23 36, Fax: +34 3 842 20 27
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.

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Hydro Aluminum Adrian, Inc. [AI]

1607 East Maumee Street
Adrian, Michigan 49221
United States of America
Tel: +1 517 265 7141, Fax: +1 517 263 3559
Group: Norsk Hydro
Notes: Part of the Heat Transfer business.

Hydro Aluminum Automotive Structures, Inc. [AI]

365 West 24th Street
Holland, Michigan 49423
United States of America
Tel: +1 616 396 6591, Fax: +1 616 396 6029
Group: Norsk Hydro
Applications: Automotive.
Notes: Seat rails, seat frames & subframes. Bumper applications.

Hydro Aluminum Cedar Tools Inc. [AI]

104 West Beech Street, P.O. Box 560
Cedar Springs, Michigan 49319
United States of America
Tel: +1 616 696 0873, Fax: +1 616 696 1261
Group: Norsk Hydro
Notes: Extrusion die production.

Hydro Aluminum Louisville, Inc. [AI]

9400 Williamsburg Plaza, Suite 120, Louisville
Kentucky 40222
United States of America
Tel: +1 502 426 7100, Fax: +1 502 423 8071
Group: Norsk Hydro

Hydro Aluminum Nordisk Aviation Products, Inc. [AI]

5450 West 102nd Street
Los Angeles, California 90045
United States of America
Tel: +1 310 215 5721, Fax: +1 310 215 5709
Group: Norsk Hydro
Notes: Part of the Finished Products business. Manufactures
airfreight containers & pallets. World-wide distribution centre.

Hydro Aluminum Nordisk Aviation Products, Inc. [AI]

1423 San Mateo Ave.
South San Francisco, California 94080
United States of America
Tel: +1 415 875 3885, Fax: +1 415 875 3758
Group: Norsk Hydro
Notes: Part of the Finished Products business. Manufactures
airfreight containers & pallets. World-wide distribution centre.

Hydro Aluminum Puckett, Inc. [AI]

Highway 18, P.O. Box 306
Puckett, Mississippi 39151
United States of America
Tel: +1 601 825 1171, Fax: +1 601 825 3491
Group: Norsk Hydro
Notes: Part of the Heat Transfer business.

Hydro Czech Republic s.r.o. [AI]

Dusni 10, P.O. Box 643
CZ-111 21 Praha 1
Czech Republic
Tel: +42 2 248 10 650, 654, 671, Fax: +42 2 248 10 647
Group: Norsk Hydro

Hydro Equipment AS [AI]

Drammensvn. 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 73 75
Group: Norsk Hydro

Hydro Magnesium [Mg]

Avenue Marcel Thiry 83
B-1200 Brussels
Belgium
Tel: +32 2 773 5211, Fax: +32 2 773 5450, Telex: 4624389 hydag
b, Email: Francois.Borman@hmm.hydro.com, Contact: Dwain
Magers - Director of Market Development
Group: Norsk Hydro
Associated Companies: Market development office (user
technical/marketing services): USA, Europe, Japan.
Alloys: ASTM B93-94a: AZ91D, AM60B, AM50A, AS41B. Hydro
Alloy Spec.: AM20, AS21, AE42. Designation systems: USA
Proprietary.
Product Types: Cast alloys, Powders Provide primary & alloy
magnesium. Die cast alloys. Primary & secondary ingot. Powder,
chunks & granules. Chips & turnings. Cast anodes. DC-Cast T-
bars & cylinders. Ingot, anodes.
Applications: Aluminium industry. Die-castings (automotive).
Desulphurisation of iron & steel.
Other Services: Design support. Technical service. Scrap buyers.
Metering devices (molten metal). Approvals: ISO 9001
Notes: Metal Group Head Office for world's largest supplier of
magnesium diecasting alloys.

Hydro Magnesium [Mg]

Market Development Center, 21644 Melrose Ave.
Southfield MI-48075-7905
United States of America
Tel: +1 810 353 2629, Fax: +1 810 353 2625
Group: Norsk Hydro
Product Types: Cast alloys.
Notes: N. America Sales & Marketing office.

Hydro Magnesium GmbH [Mg]

Industriestraße 61, Postfach 10 11 53
D-46211 Bottrop
Germany
Tel: +49 2041 7955 0, Fax: +49 2041 7955 16
Group: Norsk Hydro Est: 1953 Employees: 70
Product Types: Cast alloys.
Notes: European Sales & Marketing office.

Hydro Magnesium Japan Office [Mg]

Morimura Building, 3-1 Toranomom 1-Chome
Minato-Ku, Tokyo 105
Japan
Tel: +81 3 3502 6446, Fax: +81 3 3502 6427
Group: Norsk Hydro
Applications: Japanese industry: Rolling mills. Al-alloy producers.
Die-casters. Aircraft industries. Automotive.
Other Services: Distributor (stockist). Scrap buyers.
Notes: Far East Sales & Marketing office. Represent Norsk Hydro
Magnesium Div & Magnesium Elektron Ltd in Japan.
[Information provided by International Magnesium Association].

Hydro Magnesium Marketing [Mg]

2000, Peel Street, Suite 700
Montreal, Québec H3A 2W5
Canada
Tel: +1 514 286 0052, Fax: +1 514 286 9427
Group: Norsk Hydro
Notes: N. America Sales & Marketing office.

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Hydro Magnesium Norway [Mg]

Herøya, PO Box 2550
N-3901 Porsgrunn
Norway
Tel: +47 35 56 20 00, Fax: +47 35 56 25 47
Group: Norsk Hydro
Product Types: Cast alloys Pure Mg products.
Approvals: ISO-certified.
Notes: Norwegian manufacturing plant, comprising of Hydro Magnesium Norway (pure Mg) & Hydro Magnesium Alloys (Mg-alloys). Another manufacturing plant at Bécancour (Canada). Combined production capacity: 80000T.

Hydro Metal Products (Div.) [Al]

Drammensveien 264, Vækerø, P.O. Box 80
N-1321 Stabekk
Norway
Tel: +47 22 73 81 00, Fax: +47 22 73 88 61
Group: Norsk Hydro

Hydro Slovakia o.z. [Al]

Mail: Medená 35
SK-811 02 Bratislava
Slovakia
Tel: +421 7 533 54 69, Fax: +421 7 531 56 56
Group: Norsk Hydro

Hydro Stumek a.s [Al]

Storgt.1, P.O. Box 114
N-5901 Høyanger
Norway
Tel: +47 57 71 51 81, Fax: +47 57 71 51 80
Group: Norsk Hydro

Hydroslug a.s [Al]

P.O. Box 114
N-5901 Høyanger
Norway
Tel: +47 57 71 50 00, Fax: +47 57 71 25 44
Group: Norsk Hydro

Hydro Trans [Al]

See: Hydro Aluminium a.s - Hydro Trans

Hydro Utvikling Sogn [Al]

See: Hydro Aluminium Hydro Utvikling Sogn

Hylite [Al]

See: Hoogovens Hylite BV

Hyspeed Norway a.s [Al]

Jersøy, P.O. Box 63
N-3108 Tønsberg
Norway
Tel: +47 33 32 95 11, Fax: +47 33 32 91 09
Group: Norsk Hydro
Notes: Joint venture company between Speedline SpA (I) & Scanmag (N) for magnesium wheels. Speedline is the largest European manufacturer of aluminium & magnesium wheels; Scanmag have developed casting technology for magnesium.

Hyspeed S.p.a. [Al]

Mail: Via Cognaro 57
I-30030 Caselle di S.Maria di Sala
Venezia
Italy
Tel: +39 41 57 09 311, 29 811, Fax: +39 41 5489 482
Group: Norsk Hydro
Notes: Joint venture company between Speedline SpA (I) & Scanmag (N) for magnesium wheels. Speedline is the largest European manufacturer of aluminium & magnesium wheels; Scanmag have developed casting technology for magnesium.

IMCO [Al]

See also: VAW IMCO Guß und Recycling GmbH

IMCO Recycling Inc. [Mg]

[Formerly International Metal Co.]
PO Box 1070 Hwy. 97 N
Sapulpa OK 74067
United States of America
Tel: +1 918 224 4746, Fax: +1 918 224 4849
Product Types: Cast alloys. Secondary Mg ingot, anodes (cast).
Tradenames: Amp-Pak (anodes).
Other Services: Dross reclamation. Scrap buyer.
Notes: A major independent smelter (Al & Mg). Formerly International Metal Co. USA. [Information provided by International Magnesium Association].

IM Export Trading & Associates SL [Al Ti]

Perdiz 19
E-28223 Pozuelo de Alarcon - Madrid
Spain
Tel: +34 91 3525740/5334126, Fax: +34 91 3527432/5334126
Product Types: profiles, bars, etc.
Notes: Trading company with wide range of products (from comestibles to metals & minerals). Information provided by ICEX (Instituto Español de Comercio Exterior).

INASA-Reynolds [Al]

Industria Navarra del Aluminio SA, Aralar 9
E-31860 Iruzun - Navarra
Spain
Tel: +34 948 608222/608256, Fax: +34 948 608158/608225
Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys, Bar, Tube, Extrusion.
Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Indalex Ltd. [Al]

Kingsditch Lane, Cheltenham, Glouc. GL51 9PD
United Kingdom
Tel: +44 1242 521641, Fax: +44 1242 513304
Product Types: Wrought alloys Solid & hollow extrusions/sections.
Applications: Building, engineering, transport.
Other Services: Anodizing (natural & bronze). Powder painting (polyester). Heat treatment (thermal improvement process).
Stretch forming facility. Approvals: BS 5750, ISO 9002
Notes: [Information from ALFED].

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INDAL - Indian Aluminium Company [AI]

1 Middleton Street
Calcutta 700 071
India

Tel: +91 33 240 22 1 0, **Fax:** +91 33 240 39 64, **Contact:** Farina Kapadia - Public Relations

Group: Alcan **Est:** 1938

Product Types: Wrought alloys Sheet & coil. Circles. Foil & foil laminates (plain, laquered & printed). Extrusions & profiles. Sheet, Foil, Extrusion.

Applications: Closures. Lamp-stock. Lithography plates. Packaging (also non-foil). Extrusions for building, transport, engineering & defence industries.

Approvals: Various plants & sites hold ISO 14001 (environmental) & ISO 9002 certification.

Notes: An Alcan affiliate (35% owned). An integrated company whose operations extend from bauxite mining, alumina refining, aluminium smelting (3 plants), to semi-finished products (sheet/coil, foil & extrusions). India's largest producer of aluminium sheets & second largest foil producer (26% holding in Annapurna Foils). One of 4 of India's integrated aluminium producers; highest sales of value-added products. Major products are: Rolled products (sheet 70 kT), Foil, Alumina, Printed Circuit Boards (Indal Electronics). Plants at: Durgmanwadi Bauxite Mine; Hirakud Power Plant; Nanjangud Electronics; Belur Sheet Mill; Taloja Sheet Mill; Hirakud Smelter; Alupram Smelter; Hirakud Power Plant; Annapurna Foils; Orissa Extrusions; Taloja Recycling Plant. Joint ventures with Tata & Hydro Aluminium (Norway) to setup Utkal Alumina Project in Orissa. Partner with Courtalds plc (UK) to setup laminated tube plant in Goa. Joint venture with Hydro Aluminium Extrusion Group (Norway) for high-quality extrusion for building systems.

Indal Hydro Extrusion Ltd. [AI]

Mail: 50/2, 13th Cross Road, Malleswaram, Bangalore, 560003
India

Tel: +91 80 334 1125, **Fax:** +91 80 334 1125

Group: Norsk Hydro

Tradenames: Domal.

Notes: Distributor of DOMAL building system extrusions within India.

Indian Aluminium Company [AI]

See: INDAL - Indian Aluminium Company

Indian Smelting & Refining Co. Ltd. [AI]

Post Box No. 17306, Lal Bahadur Shastri Marg
Bhandup, Mumbai 400 078
India

Tel: +91 22 578 4331, **Fax:** +91 22 578 4180, **Telex:** 11-72273,

Email: isarc@giasbm01.vsnl.net.in, **Internet:**

<http://www.members.tripod.com>, **Contact:** Mr. A.K. Singhi -

Managing Director

Employees: 761

Product Types: Aluminium base alloys. Aluminium alloys.

Notes: Manufacturers & suppliers of mainly non-ferrous metal products, inc. aluminium, but also Cu-, Ni-, Zn-alloys. Some Fe-based items. Export to USA, Europe, Middle-Eastern countries.

Industria Navarra del Aluminio SA [AI]

See: INASA-Reynolds

Industrias R. Jimenez SA [AI]

Lepanto 5
E-46930 Quart de Poblet - Valencia
Spain

Tel: +34 96 1547590, **Fax:** +34 96 1548880

Product Types: Cast alloys.

Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Industrilackering i Vetlanda AB [AI]

Nydalavägen 16
S-574 35 Vetlanda
Sweden

Tel: +46 383 180 55, **Fax:** +46 383 173 09

Group: SAPA

Notes: Powder coating of extrusions.

Inespal Laminacion SA [AI]

Jose Abascal 4
E-28001 Madrid
Spain

Tel: +34 91 5776359, **Fax:** +34 91 4310182

Product Types: Wrought alloys Rolled products in aluminium & alloys. Plate, Sheet, Strip, Coil.

Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Inometa [AI]

Planckstrasse 15
D-32052 Herford
Germany

Tel: +49 5221 777 0, **Fax:** +49 5221 70600, **Telex:** 934945

Group: Inometa

Associated Companies: France.

Alloys: DIN 1725: AlMgSi0.5. **Designation systems:** DIN

Product Types: Wrought alloys, Cast alloys. Precision tube. Size ranges diameters to 1000mm, wall thickness to 50mm, lengths to 12000mm. Tube manufactured by drawing, hot-extrusion, centrifugal casting or rolled & welded.

Applications: Rollers for manufacturing equipment (textile, plastic foils, magnetic tape). Precision tubing for vehicle engineering & aviation).

Tradenames: For roller tubes: F&G-TOP, F&G-HT, ISQ.

Other Services: Cutting-to-length. High-precision straightening. Grinding. Turning. Custom-items (on request).

Notes: Manufacturer of precision tubing, mainly for industrial rollers in process machinery. Also produce web roller guides. Wide range of stock-items.

Inometa France sarl [AI]

79 ave. Edourad Valliant
F-92517 Boulogne Cedex
France

Tel: +33 1 46 10 47 26, **Fax:** +33 1 46 10 47 23, **Contact:** Mr. Jean-Christophe Poussin - Director

Group: Inometa

Associated Companies: Plant: Inometa, D.

Alloys: DIN 1725: AlMgSi0.5.

Product Types: Wrought alloys Cast alloys Precision tube. Size ranges diameters to 1000mm, wall thickness to 50mm, lengths to 12000mm. Tube manufactured by drawing, hot-extrusion, centrifugal casting or rolled & welded. Tube, roller tubes.

Applications: Rollers for manufacturing equipment (textile, plastic foils, magnetic tape). Precision tubing for vehicles & aviation).

Tradenames: For roller tubes: F&G-TOP, F&G-HT, ISQ.

Other Services: Custom-items (on request).

Notes: Supplier for German manufacturer of precision tubing, mainly for industrial rollers in process machinery. Also produce web roller guides. Wide range of stock-items.

Interlink Metals & Chemicals [Mg]

750 Lexington Ave, 22nd Floor
New York NY 10022
United States of America

Tel: +1 212 486 3300, **Fax:** +1 212 486 4146, **Contact:** Mr. Andrew Mestel

Product Types: Cast alloys Pure & primary Mg- Ingot. Plate.

Other Services: Agents. Distributor (stocking).

Notes: International marketing of Mg metals & alloys, with emphasis on the CIS. Establish direct relationships with overseas producers. Supply to USA, Europe & Far East. [Information from International Magnesium Association].

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Intermetal S.A. - Compagnie des Métaux [Mg]

2 ave de Montbenon
P.O. Box 3034, CH-1002 Lausanne/Vaud
Switzerland
Tel: +41 21 343 0343, Fax: +41 21 312 2558, Contact: Mr.
Marcelo Leipziger

Product Types: Cast alloys, Powders. Primary & recycled ingot.
Powder, chunks & granules.

Other Services: Master alloys. Scrap buyers. Tolling.

Notes: Trading company active in light metals, non-ferrous, minor
metals & noble alloys. [Information provided by the International
Magnesium Association].

Intermétaux SA [Al]

4 rue des Champs-Fourgons
F-92230 Gennevilliers
France
Tel: +33 1 47 94 02 24, Fax: +33 1 47 94 09 07, Contact: Erick
Martin

Product Types: Wrought alloys. Rolled products.

Notes: Late entry.

International Extrusions [Al]

5800 Venoy Road, Garden City, MI 48135
United States of America
Tel: +1 313 427 8700, Fax: +1 313 427 8219

Product Types: Wrought alloys, Extrusion.

Other Services: Moulding, Forming, Milling, Metal Finishing,
Powder Coatings, Protective Coatings.

International Metal Company [Mg]

See: IMCO Recycling Inc.

Intexalu Systèmes Puget SA [Al]

ZI Camp Dessert Nord
BP 12, F-83488 Puget sur Argens Cedex
France
Tel: +33 4 94 40 27 27, Fax: +33 4 94 45 23 44/81 55 10, Telex:
970492 f

Est: 1978 **Employees:** 250

Associated Companies: France: Lyon, Tel: +33 4 78 90 28 68;
Strasbourg, Tel +33 3 88 33 96 66; Toulouse, Tel +33 5 61 76
28 03; Vendôme, Tel +33 2 54 77 13 07.

Alloys: 6060. Temper T5 **Designation systems:** NF

Product Types: Wrought alloys Extruded profiles (to NFA 50.710
tolerances). Extrusion.

Applications: Building façades. Curtain walling. Roofing.
Architectural/glazing systems (verandas, windows, doors,
shutters, etc.) Handrail systems.

Notes: Provide a complete service from concept design (CAD),
extrusion to surface finishing (20-25 microns anodized, various
colours & 'Qualicoat' painted in various colours) for profiles used
in architectural & building projects, inc. public buildings & private
dwellings. Distribution centres across France.

Ireland Alloys Inc. [Ti]

P.O. Box 41000, 11300 Spencer Road
Houston, TX 77241-1000
United States of America
Tel: +1 713 937 1111, Fax: +1 713 937 1438, Email:
105102,550@compuserve.com, Contact: Nick Oliver - Sales &
Operations Manager

Group: Ireland Alloys (Holdings) Ltd. **Est:** 1971 **Employees:** 45

Associated Companies: Additional Sales Office(s):

Ireland Alloys Ltd.
Hamilton, Scotland
Tel: +44 1698 822461, Fax: +44 1698 825166

Product Types: Wrought alloys Feedstock, Bulk Weldables, Buy
& Sell, Scrap, Turnings.

Other Services: Recycling, Toll Processing.

Notes: Ireland Alloys Inc. specializes in processing Complex
Nickel, Cobalt and Titanium based alloy scrap, and is one of the
few recyclers in the United States of America approved to supply

secondary solids and turnings for the production of rotating parts
for jet engines. The sister company in Hamilton, Scotland has a
similar product mix.

Italma [Al]

Via A. Ciucani No. 8
I-20060 Ornago (MI)
Italy
Tel: +39 39 66 581, Fax: +39 39 60 10 214

Group: Norsk Hydro

Notes: Extrusion die production.

I.T.C. [Al]

See: Hydro Aluminium I.T.C. s.n.c.

Itochu Non-Ferrous Materials Co. Ltd. [Ti]

2-15 Minami-Aoyama, 2-Chome, Minato-Ku, Tokyo 10
Japan

Tel: +81 33 497 8482, Fax: +81 33 497 8180, Email:
hideaki.shibayama@nfmte.itochu.co.jp, Contact: Ichita Kosaka -
President

Group: Itochu Corp. **Est:** 1968 **Employees:** 75

Associated Companies: Additional Sales Office(s):

Itochu International, Inc.

New York, NY United States of America

Tel: +1 212 818 8163, Fax: +1 212 818 8502

Itochu (Thailand) Inc. Bangkok, Thailand

Tel: +662 266 3086, Fax: +662 266 3126

Product Types: Wrought alloys Cast alloys Specializing in
titanium sponge, ingot and mill products in transactions of
domestic, export, import and third countries. Alloying Additives,
Alloys, Bar & Rod, Billet, CP Billet, Briquettes, Commercial
Products, Sporting Goods, Electrodes, Remelting, Extrusions &
Extruded Shapes, Flats, Ingot & CP Ingot, Seamless Pipe,
Welded Pipe, Plate, Clad & CP Plate, Scrap, Turnings, Sheet,
Slab & CP Slab, Sponge, Strip, Tube, Tube - Finned, Tube -
Welded, Wire & Wire Coil.

Other Services: Toll Processing.

Notes: Annual sales of approximately US\$ 400 million.

G. James Australia Pty. Ltd. [Al]

Head Office - Administration
1084 Kingsford Smith Drive, Eagle Farm
Brisbane, Queensland, PO Box 78, Hamilton Central
Queensland 4007

Australia

Tel: +61 7 3877 2333, Fax: +61 7 3877 2893, Telex: AA 145277

Group: G. James (Australia) **Est:** 1959 **Employees:** 1700

Associated Companies: Throughout Australia: Queensland, New
South Wales, Victoria. Overseas Sales Office: Singapore,
Malaysia.

Product Types: Wrought alloys Custom extrusions. Standard

angles, channels, flats & tubes. Glazing profiles. Extrusion

Applications: Building & architecture. Residential doors &
windows. Internal fittings (bathroom, etc). Roadside furniture
(posts). Roofing. Mobile scaffold.

Tradenames: ArmaGrille (security grill).

Other Services: Contracting (curtain walling, façade, shop fronts,
etc.). Surface finishing (anodising, paint & powder-coat in
various colours). Welding (specialist).

Notes: A privately owned group of aluminium & glass companies
providing glazing products, furniture, windows & doors (inc.
bullet-proof). Group includes: G. James Glass & Aluminium
(QLD) Pty. Ltd.; G. James Extrusion Co Pty. Ltd.; G. James
Safety Glass Pty. Ltd.

G. James Industries (Malaysia) Sdn. Bhd. [Al]

Lot 2596 Jalan Perindustrian 3, Kawasan Perindustrian Senai 11
81400 Senai, Johor

Malaysia

Tel: +60 7 599 3266, Fax: +60 7 599 3213

Group: G. James (Australia)

Product Types: Wrought alloys.

Notes: Sales Office.

88 Supplier Addresses & Product Details

G. James Singapore Pte. Ltd. [AI]

Bugis Village 237A, Victoria Street
Singapore
Tel: +65 721 4508, Fax: +65 582 6108
Group: G. James (Australia)
Product Types: Wrought alloys.
Notes: Sales office.

Japan Metals & Chemicals Co. [Mg]

Metals & Electro-materials Div.
JMC Building No. 8-4, Koami-cho Nihonbashi Chou-ku, Tokyo 103
Japan
Tel: +81 33 667 1332, Fax: +81 33 669 1973, Contact: Mr. Tetsuo
Tanabe
Product Types: Cast alloys Primary pure & alloy ingot.
Notes: Annual capacity of 5000T for domestic market. JMC plant
also at Toyama-ken, Japan. [Information provided by the
International Magnesium Association].

Jimenez [AI]

See: Industrias R. Jimenez SA

Josef Gartner & Co. [AI]

Werkstätten für Stahl- und Metallkonstruktionen
Postfach 20/40
D-89421 Gundelfingen [Gartnerstraße, D-89423 Gundelfingen]
Germany
Tel: +49 9073 84 0, Fax: +49 9073 84 2100, Telex: 51531,
Contact: H. Schwaigener - Sales Manager
Group: Gartner Est: 1868 Employees: 2100
Product Types: Wrought alloys, Semi-finished products.

P.T. Justus Kimiaraya [AI]

JL. Kebon Jeruk 18 No. 2A-B, Jakarta 11150
Indonesia
Tel: +62 21 639 7708, Fax: +62 21 626 0901, Contact: Tjandra
Martaniardjo
Group: Comalco
Notes: Distributor - Aluminium Pastes / Flakes

KACC [AI]

See: Anglesey Aluminium Metal Ltd.
See: Kaiser Aluminum International Incorporated
See: Rio Tinto Aluminium Ltd.

Kaiser Aluminum International Incorporated [AI]

PO Box 877, 6177 Sunol Boulevard
Pleasanton CA 94566
United States of America
Tel: +1 510 847 5810, Fax: +1 510 847 4700, Contact: Mark
Chistolini
Group: RTZ/KACC Consortium Co.

Kapa GmbH []

Leichtsofftechnik, Kiefernweg 10, Postfach 2707
D-49090 Osnabrück
Germany
Tel: +49 541 121 93 0, Fax: +49 541 121 93 93
Group: Alusuisse-Lonza (CH)
Product Types: Composites for inner-body shell
Notes: Member of the Alusuisse-Lonza (A-L) Aluminium Division,
an interdisciplinary team experienced in automotive industry
requirements.

Karam Corporation [Mg]

Kang Nam, P.O. Box 922, Seoul 135-609
South Korea
Tel: +82 2 577 8920, Fax: +82 2 574 6637
Group: Norsk Hydro

Kaye Aluminium plc [AI]

Ogden Road, Wheatley Hills, Doncaster DN2 4SG
United Kingdom
Tel: +44 1302 762500, Fax: +44 1302 360307, Contact: Gary Coe
- Designer
Group: Kaye
Associated Companies: Also Enfield
Alloys: AA designations: 6005A, 6063, 6082; AlMgSi0.5,
AlMgSi0.7, AlMgSi1. Tempers: F, F13, F21, F22, F25, F26, F28,
F31, T4, T5, T6.
Product Types: Wrought alloys Extruded sections up to max
circumscribing circle of 200mm, from 0.13 to 12 kg/m. Standard
lengths from 2.6 to 7m.
Applications: Building/architecture - windows; curtain walls.
Other Services: Comprehensive design service. Polyester powder
and paint finishing. Anodising and fabricating (by sub-
contractors; in-house). Thermal break.

Koninklijke Hoogovens [AI]

Vondellaan 10, Beverwijk, Postbox 10000
NL-1970 CA IJmuiden
Netherlands
Tel: +31 251 499111, Fax: +31 251 470057
Group: Hoogovens Groep
Product Types: Wrought alloys
Notes: Head company of Hoogovens group.

Krupp Hoesch Steel Ltd. [Ti]

Speedwell Industrial Estate, Staveley nr. Chesterfield
Derbyshire S43 3JW
United Kingdom
Tel: +44 1246 280280, Fax: +44 1246 280445, Telex: 54349,
Contact: Mandy Betteridge - Sales (Titanium)
Group: Deutsche Titan (D)
Associated Companies: Woking, Surrey.
Product Types: Wrought alloys Cast alloys Ingots - 4 tonne, mill
production. (Deutsche Titan, Titania). Shapes/profiles (c/o SW
Hempel).
Notes: Sales office (UK) for Deutsche Titan (D).

K-Trade Ltda [AI]

Av. Antonio Abrahao Caram, 820-sl. 1.011, Sao Jose
Belo Horizonte, MG
Brazil
Tel: +55 31 443 1962, Fax: +55 31 441 5407, Contact: Ana
Claudia B. Kayser
Group: Comalco
Notes: Distributor - Aluminium Powder / Granules

Lacagem de Metais [AI]

See: Tecnilaca Lacagem de Metais, Lda.

Lacal SNC [AI]

ZA du Garric, BP6
F-81450 Le Garric
France
Tel: +33 5 63 80 20 20, Fax: +33 5 63 80 20 29
Group: SAPA
Notes: Powder finishing plant.

Lachenal Industries [AI Mg]

ZI les Esserts, BP 8
F-74140 Douvaine
France
Tel: +33 4 50 94 10 85, Fax: +33 4 50 94 21 12
Group: Groupe Valfond Est: 1936 Employees: 190
Alloys: AS9U3, AS12U, AS12, Mg. Designation systems: NF
Product Types: Cast alloys, Die castings.
Applications: Automotive, domestic and leisure goods, etc.

Lawson Mardon Packaging Inc. [AI]

6733 Mississauga Road, Suite 800
Mississauga, Ontario L5N 6P6
Canada
Tel: +1 905 821 9711, Fax: +1 905 821 1454
Group: Lawson Mardon Packaging
Applications: Packaging.
Notes: North America Head Office.

Lawson Mardon Packaging Ltd. [AI]

Avonbank, Clifton Down, Bristol BS8 3HT
United Kingdom
Tel: +44 117 9464200, Fax: +44 117 9735810
Group: Lawson Mardon Packaging
Applications: Packaging.
Notes: UK Head Office.

Lawson Mardon Packaging SA [AI]

63 rue de l'Est
F-92100 Boulogne
France
Tel: +33 1 47 12 49 00, Fax: +33 1 47 12 49 99
Group: Lawson Mardon Packaging
Applications: Packaging.
Notes: French Head Office.

Lawson Mardon Star Ltd. [AI]

Stourbridge Road, Bridgenorth, Shropshire WV15 6AW
United Kingdom
Tel: +44 1746 713 000, Fax: +44 1746 761 860, Telex: 338130,
Internet: <http://lawsonmardon.com>, Contact: John Shipley - Sales
Group: Lawson Mardon Packaging Est: 1933
Associated Companies: Worldwide. Head offices in UK, F, CH, Canada.
Alloys: AA: 1060, 1200, 3003, 8006, 8011, 8012A, 8021A, 8014.
Temper: Fully annealed or hard, H19, H18, H22, H24, H26.
LM Star alloy No.: 1602, 1201, 1084, 1085, 3103, 8101.
Designation systems: USA Proprietary.
Product Types: Wrought alloys Converter foil, thin strip & household. Thickness 6.5-20 microns, 20-200 microns. Width 300-140 mm. One- or two-sides bright. Container & Container Lidding Foil: 30-150 microns thick, 150-1300 mm wide. Laquered (epoxy or vinyl, total of 26 colours) or plain bright mill finish. Dairy foil: For bottle-capping 38-50 microns thick, 51, 88, 128 mm wide. Bright, undercoat, laquered or custom-printed finish. For plain & laquered lidding, 30 or 38 microns thick, 1000mm max. width. For butter laminates, 8 micron (to customer requirements). Confectionary foil: 8,9,10,11,12 microns (normally supplied), width 40-1050mm (varies with alloy type). Plain, laquered or printed finish. Also confectionary laminates (foil-on-paper/plastic). Foil, thin strip.
Applications: Litho strip, converter, household foil, container strip, confectionary, tobacco & industrial products.
Approvals: ISO 9002. FDA food regulations.
Notes: Part of Aluisse-Lonza group, Lawson Mardon Packaging is a worldwide operation with companies producing all types of packaging for all industry sectors, inc. food-stuffs, beverages, pharmaceuticals, technical uses, litho-printing. LM group R&D activity sited in CH. 'Star' is one of Europe's major foil manufacturers. Integrated production company from casting rolling slab, hot-rolling, cold-rolling to foil, slitting, lubricating to packing & shipping.

L. M. P. [AI]

Allée du Parc aux Boeufs
F-77200 Torcy
France
Tel: +33 1 60 06 30 24, Fax: +33 1 60 17 25 96, Contact: Maurice Balbiani
Est: 1969 Employees: 50
Notes: Late entry.

London & Scandinavian Metallurgical Co. Ltd [AI MMC]

Head Office & Sales, 45 Wimbledon Hill Road, London SW19 7LZ
United Kingdom
Tel: +44 181 947 1221, Fax: +44 181 947 2966, Telex: 929830
Group: Metallurg (USA)
Product Types: Cast alloys MMC's - particulate reinforced. Ingot, rod; tablets; MMC powders.
Other Services: Analytical. Rod-feeding machines.
Notes: Manufacturers of aluminium grain refiners & master alloys in rod & ingot form. Al-alloying tablets. [Information provided by ALFED].

London & Scandinavian Metallurgical Co. Ltd [AI]

Fullerton Road, Rotherham, South Yorkshire
United Kingdom
Tel: +44 1709 828500, Fax: +44 1709 830391, Telex: 54581
Group: Metallurg (USA)
Product Types: Powders Metal Powders

Lord Corporation [Ti]

Mechanical Product Division
1952 W. Grandview Blvd.
Erie, PA 16514-0040
United States of America
Tel: +1 814 868 5424, Fax: +1 814 868 1345, Contact: Wilbur C. Hinkston - Manager Manufacturing
Group: Lord Corporation Est: 1924 Employees: 1100
Associated Companies: Subsidiaries: Lord SA; Lord UK and Lord GmbH
Additional Sales Office(s):
Lord, Mechanical Prod. Div.
Erie, PA United States of America
Tel: +1 814 868 5424, Fax: +1 814 868 3109
Lord, Mechanical Prod. Div.
Cary, NC United States of America
Tel: +1 919 859 4911, Fax: +1 919 851 5390
Applications: Mechanical Products for Aerospace & Industry.
Notes: Lord Mechanical Products Division designs, manufactures and markets mountings, isolators, suspensions, and cancelation systems to protect people and sensitive equipment from shock, vibration and noise. Markets served include: aerospace, automotive, on and off highway vehicles, marine, railroad, mass transit, computer, HVAC, and many others requiring protection from shock, vibration & noise.

Luxfer Gas Cylinders [AI]

Colwick, Nottingham NG4 2BH
United Kingdom
Tel: +44 115 980 3800, Fax: +44 115 980 3899
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys, Extrusion.
Applications: Life-support/Breathing apparatus (safety workers); Medical (oxygen & anaesthetics). Diving (commercial & leisure scuba tanks). Beverage dispensers. Airbag cylinders.
Notes: Development, production & supply of seamless extruded aluminium (& composite) high-pressure gas cylinders for storage of liquefiable & non-liquefiable gases. Manufacturing plants in UK (Nottingham, small cylinders - Staffordshire), USA (California, N. Carolina), Australia (licensee in NSW).

Luxfer USA Ltd. [AI]

1995 Third Street, PO Box 5300, Riverside, CA 92517
United States of America
Tel: +1 909 684 5110, Fax: +1 909 351 0790
Group: British Aluminium Holdings (UK)
Associated Companies: USA (Pennsylvania). Tel: +1 610 565 1749, fax: +1 610 565 4709. UK (Nottingham) tel +44 115 980 3800, fax +44 115 980 3899.
Product Types: Wrought alloys.
Applications: Gas cylinders(industrial, safety equipment, diving, beverage, medical).
Notes: Other USA manufacturing plants: Luxfer Composite Cylinders (Palcentia, CA); Graham (North Carolina).

90 Supplier Addresses & Product Details

MagCorp - Magnesium Corp. of America [Mg]

238 North 2200 West
Salt Lake City, UT 84116
United States of America
Tel: +1 801 532 2043, Fax: +1 801 534 1407, Telex: 6711664,
Contact: Mr. Michael Legge
Est: 1972

Alloys: ASTM B843 (anodes): M1C high-potential anodes. Alloys: AZ91D, AZ91E, AM50A, AM60B, AZ81A; Grade 9908A, Grade 9990A. **Designation systems:** USA.

Product Types: Cast alloys Primary (pure & alloy) & secondary ingot. Ingot sizes: 25, 50, 250, 500 lbs. Grinding slab (99.8% pure): 37 lb. Die- & sand-casting ingot: 15/25 lb. Cast anodes. Cast (pure Mg) anodes. Ingot, anodes (cast)

Applications: Corrosion protection. Die- & sand-casters. Aluminium alloying. Steel-industry. Powder & chip production (grinding slab).

Tradenames: MagMax (anodes).

Other Services: Other alloys on request.

Notes: Third largest producer of primary magnesium worldwide. Mg obtained by extraction from brine (Great Salt Lake) using solar energy (95% of processing energy used). High-potential anode business a co-venture with Garfield Alloys (USA). MagMax anode plant at Rowley, UT & at Garfield Alloys in Cleveland, OH. Anode testing to ASTM G97 method. Product range of over 30 different ingot shapes, sizes & alloys. Member of the International Magnesium Association.

Magnesium Corp. of America [Mg]

See: MagCorp - Magnesium Corp. of America

Magnesium Elektron [Mg MMC]

P.O. Box 23, Swinton, Manchester, Lancs. M27 8DD
United Kingdom

Tel: +44 161 911 1000, Fax: +44 161 911 1010/25, Telex: 667817melmang, Contact: Mr S.R. Harris - Sales & Marketing Manager

Group: British Aluminium Holdings (UK)

Alloys: Cast alloys (Elektron): WE54, WE43, QE22, EQ21, ZE41, EZ33, ZC63; Cast alloys: AZ91, AZ81, AM60, AM50, AM20, AS41, AS21, AE42 (development alloy). Wrought alloys (Elektron): ZC71, ZW3, ZM21, WE54, WE43; Wrought alloys: AZ80, AZ61, AZ31. Metal Matrix Composites (wrought): Melram 072, Melram 072TS. Welding rod (W=Elektron grades, UK/USA): W1(Pure Mg 99.5), W2(AM503/MIA-F), W4(HPAZ92), W5(ZM21), W6(ZRE1/EZ33A), W7(RZ5/ZE41A), W8(QE22A), W9(ZE63A), W10(ZW1/ZK10), W13(MSR-B), W14(A8/AZ81), W15(AZ31), W16(HPAZ101), W18(HPAZ91/AZ91E), W19(EQ21A), W21(ZCM630/ZC63), W22(ZCM711/ZC71), W23(W23WE54). **Designation systems:** USA BS.

Product Types: Wrought alloys Cast alloys, Powders Casting & wrought alloys. Speciality hardeners. Granules & raspings. Forging & extrusion billets. Melmag sheets (electrochemical uses). Welding rod (Mg-base & Al-alloy). Anodes. Semi-fabricated products (used in Magnox nuclear reactors). Ingot, billet, sheet, forgings/stock, anodes; welding rod.

Applications: General engineering (cast components). Power industry. Chemical industry. Corrosion protection (anodes). Steel industry. Aero-industry. Automotive (pistons, etc.).

Tradenames: MELMAG, MELRAM.

Other Services: Approval of foundries (list available from MEL). Technical assistance. Product information/guidance available on PC database. **Approvals:** BS ISO 9002

Notes: Provide a range of magnesium alloys & other magnesium speciality products. Production bases in UK (Swinton, Manchester) & USA (Reade Manufacturing, Lakehurst, NJ), which concentrates on particulates. Worldwide network of MEL (Magnesium Elektron) approved foundries (audited) for gravity & high-pressure die casting. Recycling facility in UK. Wide range of welding rod grades (designated W), compositions of which may not conform exactly to national/international specifications; their compositions are tuned to aid welding.

Magnesium Elektron [Mg]

500 Point Breeze Rd.
Flemington Junction NJ500
United States of America
Tel: +1 908 782 5800, Fax: +1 908 782 7768
Group: British Aluminium Holdings (UK)

Marathon [Ti]

See: S.A. Aciers Marathon Staal N.V.

Mark Metals Inc. [Mg]

12225 Coast Drive, Whittier CA 90601
United States of America
Tel: +1 310 692 7909, Fax: +1 310 692 8365, Contact: Mr. Randall Biggs

Product Types: Wrought alloys Cast alloys Extrusion & forging-billet; castings (die-, sand, permanent mould, investment); Impact extrusions; forgings; Tooling & tread-plate; welding rods & electrodes. Billet, Plate, Sheet, Wire.

Other Services: Stockist. Scrap buyers.

Notes: Distributor. USA: Toll-free 800 955 6404. [Information provided by the International Magnesium Association].

Marle [Ti]

Odival, BP 46
F-52800 Nogent
France
Tel: +33 3 25 31 85 79, Fax: +33 3 25 31 62 65, Telex: 840179 f,
Contact: Robert Favre
Est: 1972 **Employees:** 57
Product Types: Wrought alloys.
Applications: Forged titanium items (prosthesis).
Notes: Late entry.

M&C Métaux et Chimie [Al]

BP 7115
F-95054 Cergy-Pontoise Cedex
France
Tel: +33 1 34 64 95 95, Fax: +33 1 34 64 06 60, Contact: Mr. Perivier

Product Types: Powders (aluminium & ferrous & precious & semi-precious for sintering [fritting]).

Notes: Late entry.

MEL [Mg]

See also: Magnesium Elektron

MEL Chemicals [Mg]

PO Box 6, Clifton Junction, Swinton, Manchester M27 8LS
United Kingdom
Tel: +44 161 911 1100, Fax: +44 161 911 1099
Group: British Aluminium Holdings (UK)
Notes: Speciality zirconium chemicals for paper coating, pigments, water-proofing, paint driers, anti-perspirants, ceramics, electronics & catalysis. Manufacturing plants in UK (Swinton, Manchester); USA (Flemington, New Jersey & Aspen, Pennsylvania).

Metal Agencies Ltd. [Al]

Surrey House, 114, Tilt Road, Cobham, Surrey KT11 3JH
United Kingdom
Tel: +44 1932 860250, Fax: +44 1932 867499
Product Types: Wrought alloys. Rolled products, Plate, Sheet, Strip, Foil.
Notes: Agent for Elval (Greece).

Supplier Addresses & Product Details 91

Metal Casting Technology, Inc. [MMC]

Hitchiner Manufacturing
Milford, New Hampshire 03055
United States of America
Group: Hitchiner Manufacturing Co. Inc.
Alloys: Metal Matrix Composites - aluminum alloys with up to 40 percent silicon carbide reinforcement using countergravity investment casting.
Product Types: Cast alloys. Metal Matrix Composites.
Notes: General Motors Corporation and Hitchiner Manufacturing Co. Inc. joint venture research and development company. MMC production casting carried out by: Hitchiner's Nonferrous Division in O'Fallon, Missouri.

Metalchimica Srl [Al Mg Ti]

Casella Postale 397
I-10100 Torino
Italy
Tel: +39 669 2057, **Fax:** +39 669 8116, **Telex:** 221331
Group: Metallurg (USA)
Product Types: Powders.

Metal Experts International [Al]

7440 Mason Falls Drive
Winston, GA 30187
United States of America
Tel: +1 770 942 7893, **Fax:** +1 770 942 0922, **Email:** yodonna@aol.com, **Contact:** John Mihelich
Group: Comalco

Metal Inoxydables Ouvrés [Ti]

See: M. I. O.

Metallisation Service Ltd. [Al]

Pear Tree Lane, Dudley DY2 0HX
United Kingdom
Tel: +44 1384 252464, **Fax:** +44 1384 237196, **Contact:** John Smith - General Manager
Product Types: Wear-resistant/anti-skid floor-tiles.
Notes: Supplier of British Aluminium Wire 'Duralcan 90/10' coated tiles for anti-skid, wear-resistant flooring (foot- & heavy-vehicle traffic, inc. helidecks).

Metallurg (Canada) [Al Mg Ti]

40 University Ave, Suite 1066, Toronto M5J 1T1
Canada
Tel: +1 416 977 7959, **Fax:** +1 416 977 6136, **Telex:** 06-217582
Group: Metallurg (USA)
Product Types: Powders.

Metallurg do Brasil Ltda [Al Mg Ti]

Rua Sete de Setembro 55-10 andar
20.050 Rio de Janeiro, RJ
Brazil
Tel: +55 21 221 3450, **Fax:** +55 21 221 8411, **Telex:** 21-30565
Group: Metallurg (USA)
Product Types: Powders.

Metallurg (Far East) Ltd. [Al Mg Ti]

PO Box 5221, Tokyo Int. 10031, Tokyo
Japan
Tel: +81 3 591 0431, **Fax:** +81 3 591 9060, **Telex:** 22772
Group: Metallurg (USA)
Product Types: Powders.

Metallurg Inc. [Al Mg Ti]

Group HQ
25 East 39th Street, New York, NY 10016
United States of America
Tel: +1 212 686 4010, **Fax:** +1 212 685 6280
Group: Metallurg (USA)

Associated Companies: World-wide, USA (Birmingham, Chicago, Houston, Los Angeles, Pittsburgh, Newfield, New York City), UK Rotherham. Corporate offices in UK, CH, D, I, Canada, Japan, Brazil, USA, S. Africa, E, Mexico, SW, Turkey. Agents: Argentina, Australia, Austria, Chile, China, Colombia, Cosat rica, Denmark, Egypt, Finland, F, Greece, NL, Hong-Kong, India, Korea, Luxembourg, Malaysia, Morocco, New Zealand, Norway, Peru, Phillipines, Portugal, Venezuela.

Product Types: Powders Speciality metals, alloys, metal-based chemicals & powders. Master alloys. Metal powders.

Notes: One of the worlds foremost manufacturers & suppliers of ferrous, non-ferrous metals & alloys, metal-based chemicals & complementary products. With producing works & 3 mining operations.

Metallurg (South Africa) Pty Ltd. [Al Mg Ti]

PO Box 14676, Wadeville 1422, Germiston
South Africa
Tel: +27 11 902 6930, **Fax:** +27 11 902 5749, **Telex:** 748713
Group: Metallurg (USA)
Product Types: Powders.

Métaux et Chimie [Al]

See: M&C Métaux et Chimie

Mifa Aluminium BV [Al]

Postbus 3111, Ind. Terrein nr. 5622
NL-5902 RC Venlo [Deltakade 4-6, NL-5928 PX Venlo]
Netherlands
Tel: +31 77 389 88 88, **Fax:** +31 77 389 89 89
Group: MIFA group
Alloys: ISO: 6063, 6005A, 6061, 6082, 2024, 3003, 7020, 7022, 7075. DIN: AlMgSi0.5, AlMgSi0.7, AlMg1SiCu, AlMgSi1, AlCuMg2, AlMn1Cu, AlZn4.5.Mg1, AlZnMgCu1.5. **Designation systems:** ISO DIN
Product Types: Wrought alloys. Extrusion. Precision profiles, circumscribing circle 2-120mm dia. linear weight from 3g/m, wall thickness 0.4mm min. Tolerances +/- 0.02mm. Open profiles & semi-open profiles. Complex shaped profiles (internal & external features). Standard & custom- aerospace profiles.
Applications: Precision engineering components. Office & computer equipment. Aerospace & defence. Medical. Food industry. Offshore. Chemical industry. Optical & graphic parts.
Other Services: Custom-extrusions (10kg min. quantity). Casting. Machining. Finishing (various surface coatings for corrosion resistance, lubrication, wear resistance). Panel bonding. Assembly. Technical Research & Development. **Approvals:** ISO 9002.

Mifa Aluminium Precision Ltd. [Al]

PO Box 146, Stratford-upon-Avon CV37 6ZW
United Kingdom
Tel: +44 1789 266668, **Fax:** +44 1789 204443
Group: MIFA group
Product Types: Wrought alloys, Extrusion.

MIFA - Bureau Commercial [Al]

5, rue du Péage
F-67000 Strasbourg
France
Tel: +33 3 88 45 06 23, **Fax:** +33 3 88 61 83 12
Group: MIFA group
Product Types: Wrought alloys, Extrusion.

Mil-Ver Metal Co. Ltd. [Al]

Coronel Avenue, Rowleys Green Industrial Estate
Coventry, W. Midlands CV6 6AP
United Kingdom
Tel: +44 1203 667 098, **Fax:** +44 1203 637 580
Group: Hampson Industries plc (UK)
Product Types: Cast alloys Primary & secondary-based foundry alloys (to BS 1490) & customer specifications. Ingot.
Notes: [Information from ALFED].

92 Supplier Addresses & Product Details

Minalex [AI]

Southam Road, Banbury, Oxfordshire OX16 7SN
United Kingdom
Tel: +44 1295 45 4611, **Fax:** +44 1295 45 4674
Group: British Aluminium Holdings (UK)
Alloys: Alloys 1XXX, 2XXX, 3XXX, 5XXX, 6XXX & 7XXX-series.
Designation systems: USA CEN DIN NF
Product Types: Wrought alloys Precision miniature extrusions to close tolerances. Max. circumscribed circle 65mm, max. width 65mm, weight 0.01-1.5 kg/m.
Applications: Industrial. Electrical connectors & heat-sinks, other small section parts.
Approvals: ISO 9002, CAA BCAR A8-4B2, BAe. (ISO 9001, QS 9000 in progress), RG 2000.

Mineração Rio do Norte S.A. [AI]

Praia do Flamengo 200, 5º e 6º and.
Rio de Janeiro, RJ CEP 22210
Brazil
Tel: +55 21 205 91 12, **Fax:** +55 21 245 55 45, **Telex:** 2123352
Group: Norsk Hydro

M. I. O. [AI]

[Metal Inoxydables Ouvrés]
4, Ave Hoche
F-75008 Paris
France
Tel: +33 1 47 63 08 14, **Fax:** +33 1 47 63 08 13, **Contact:** Isabelle Khokhlova - Assistante Commerciale
Est: 1941 **Employees:** 18
Alloys: ASTM: Grade 1, Grade 2, Grade 3, Grade 5.
AFNOR: T30, T35/T40, T60, TA6V. **Designation systems:** USA NF.
Product Types: Wrought alloys, Billet, Plate, Sheet, Strip, Bar, Tube, Wire, Forgings/Stock, Welded & seamless tubes.
Applications: Chemical, petrochemical, nuclear, paper, electrochemical industries. Desalination plants. Aerospace (engines parts, plumbing, surfaces). Electronic. Medical prothesis. Sports & leisure.
Notes: Specialist material supplier for high-technology engineering & medical applications.

Mitsui & Co. (USA) Inc. [AI]

200 Park Avenue, New York, NY 10166-0130
United States of America
Tel: +1 212 878 4133, **Fax:** +1 212 878 4001, **Contact:** Mr. A. Adachi - Deputy General Manager
Group: Mitsui & Co. Ltd. (Japan) **Est:** 1966 **Employees:** 750
Associated Companies: Subsidiaries: Toho Titanium / UTSC
Product Types: Wrought alloys, Powders Alloys, Billet, CP Billet, Ingot, CP & TiAluminide Ingot, Mill Products - High Purity, Pipe - Seamless, Pipe - Welded, Piping System, Plate, CP Plate, Powder - High Purity, Scrap, Sell, Sheet, Slab CP, Sponge, Sponge - High Purity, Strip, Tube, Tube - Welded, Wire & Wire Coil, Strip, Bar.
Notes: Mitsui & Co. (United States of America) Inc. with annual transactions in excess of \$15 billion is the largest subsidiary of the trading company - Mitsui & Co. Ltd. of Tokyo.

Monarch Aluminium Ltd [AI]

Manor Road, Swindon Village
Cheltenham, Gloucestershire GL51 9SQ
United Kingdom
Tel: +44 1242 51 05 54, **Fax:** +44 1242 57 62 58
Group: SAPA
Product Types: Wrought alloys
Other Services: Powder coating (Skelmersdale UK). **Approvals:** BS 5750, ISO 9002.
Notes: Manufacturer of aluminium doors and windows.

Montangessellschaft GmbH [Mg]

Vietostrasse 17, P.O. Box 91 05 56
D-51075 Köln
Germany
Tel: +49 221 88984 0, **Fax:** +49 221 88984 20, **Contact:** Mr. Dieter Schwitallik
Product Types: Wrought alloys Cast alloys Primary (pure & alloy), Ingot, Extrusion, Anodes.
Other Services: Distributor (stockist).
Notes: Marketing & trading company. Represents US primary producers in special areas. [Information provided by the International Magnesium Association].

Morimura Brothers [Mg]

Morimura Building 3-1, Toranomon 1-Chome
Minato-ku Tokyo 105
Japan
Tel: +81 33 502 6443, **Fax:** +81 33 508 2389, **Contact:** Mr. Yusuke Morimura
Alloys: [See: Hydro Magnesium & Magnesium Elektron]
Product Types: Wrought alloys Cast alloys, Powders, Ingot, Billet, Plate, Wire, Extrusion.
Applications: Japanese industry: Rolling mills. Al-alloy producers. Die-casters. Aircraft industries. Automotive.
Other Services: Distributor (stockist). Scrap buyers.
Notes: Represent Norsk Hydro Magnesium Div & Magnesium Elektron Ltd in Japan. [Information provided by International Magnesium Association].

F.E. Mottram (Non-Ferrous) Ltd. [AI]

Radnor Park Industrial Estate, Congleton, Cheshire CW12 4XE
United Kingdom
Tel: +44 1260 271122, **Fax:** +44 1260 271324
Product Types: Cast alloys Primary & secondary based alloys & aerospace alloys (to BS 1490, international & customer requirements). Master alloys. Deoxidants. Ingot.
Notes: [Information from ALFED].

National Northeast Corporation [AI]

65 Manchester Street, Lawrence, MA 01842
United States of America
Tel: +1 508 686 4197, **Fax:** +1 508 688 2636
Product Types: Wrought alloys, Extrusion.
Applications: Heatsinks, enclosures, etc.

NEMAG Metallhandels-AG [AI]

Rheinfeldstrasse 21, Postfach 292
CH-4005 Basel
Switzerland
Tel: +41 61 681 50 66, 67, **Fax:** +41 61 681 50 65, **Telex:** 963420
Group: VAW (D)
Product Types: Wrought alloys. Cast alloys.

Nemco Metals International [AI]

5 Pennard Cl., Brackmills, Northampton NN4 7BE
United Kingdom
Tel: +44 1604 766181, **Contact:** Brian - Sales
Product Types: Wrought alloys strip/coil (Al); many sorts of brass & bronzes are manufactured. Strip.
Notes: Late entry.

Neumeyer CR, spol. sr.o [AI]

Padochovska 28
66412 Oslavany
Czech Republic
Tel: +42 502 922 185/176, **Fax:** +42 502 922175
Group: Hoogovens Groep

Supplier Addresses & Product Details 93

Neumeyer Fließpressen GmbH [AI]

Steiglehnstraße 10, Postfach 3342
D-90491 Nürnberg
Germany
Tel: +49 911 59810, Fax: +49 911 5981310
Group: Hoogovens Groep

Noralu Walzprodukte AG [AI]

Zürichstrasse 79
CH-8600 Dübendorf
Switzerland
Tel: +41 1 821 43 77, Fax: +41 1 821 44 96
Group: Norsk Hydro

Noranda Metallurgy Inc [Mg]

Toronto
Canada
Group: Noranda Inc. (Canada)
Product Types: Cast alloys, Ingot.
Notes: Wholly-owned by Noranda Inc. Noranda Metallurgy is a large refiner of Cu & precious metals. Magnola Metallurgy Inc. (52% owned by Noranda Metallurgy Inc.) has a pilot plant (in Salaberry de Valleyfield, Quebec) extracting magnesium metal from asbestos mine tailings. (First ingot was cast in Feb. 1997). A production plant is planned to start producing in late 2000.

Norcable a.s [AI]

N-4265 Håvik
Norway
Tel: +47 52 85 01 00, Fax: +47 52 85 32 15
Group: Norsk Hydro

Nordisk Aviation Products [AI]

See also: Hydro Aluminium A/S - Nordisk Aviation Prod.

Nordisk Aviation Products Asia Ltd. [AI]

1401-5 Great Eagle Centre, 23 Harbour Road, Wanchai
Hong Kong
Tel: +852 258 79 778, Fax: +852 251 15 394
Group: Norsk Hydro
Notes: Part of the Finished Products business. Manufactures airfreight containers & pallets. World-wide distribution centre.

Nordisk Aviation Products Pte. Ltd. [AI]

73 Loyang Way, Singapore 508763
Singapore
Tel: +65 542 7025, Fax: +65 542 3320
Group: Norsk Hydro
Notes: Part of the Finished Products business. Manufactures airfreight containers & pallets. World-wide distribution centre.

Norsk Hydro [AI]

Shanghai Representative Office, B-17-1, Harvest Building, 585
Long Hua Xi Road, Shanghai, 200232
China
Tel: +86 2164 69 8839, 68 9813, 165, Fax: +86 2164 69 8830
Group: Norsk Hydro
Notes: Part of the Heat Transfer business. To establish local production facilities in co-operation with the Chinese & service the Far East market.

Norsk Hydro a.s. [AI Mg]

Bygdøy allé 2
N-0240 Oslo
Norway
Tel: +47 22 43 2100, Fax: +47 22 43 2725, Telex: 72948 hydro n,
Contact: Eigel Myklebust - General Director
Group: Norsk Hydro
Product Types: Powders.

Norsk Hydro ASA [AI]

Tokyo Representative Office, Shuwa Kioi-Cho TBR Bldg. 1102
5-7, Kojimachi Chiyoda-ku, Tokyo 102
Japan
Tel: +81 3 3288 3051, Fax: +81 3 3288 3054
Group: Norsk Hydro

Norsk Hydro ASA [Mg]

Research Centre Porsgrunn - Magnesium Materials Technology
P.O. Box 2560
N-3901 Porsgrunn
Norway
Tel: +47 35 56 20 00, Fax: +47 35 56 34 31
Group: Norsk Hydro
Product Types: Cast alloys
Notes: Research & Development Office for magnesium materials.

Norsk Hydro Asia Pte. Ltd. [AI]

152 Beach Road no. 20-05/08, Gateway East, Singapore 189721
Singapore
Tel: +65 295 71 00, Fax: +65 295 71 22
Group: Norsk Hydro

Norsk Hydro Canada Inc. [Mg]

7000, Blvd. Raoul-Duchesne, Bécancour, Québec G0X 1B0
Canada
Tel: +1 819 294 4500, Fax: +1 819 294 2671
Group: Norsk Hydro
Approvals: ISO-certified.
Notes: Canadian manufacturing plant. (Second plant at Porsgrunn, Norway). Site operational in 1989; most recent plant world-wide. Combined production capacity 80000T.

Norsk Hydro Far East Ltd. [Mg]

Suites 1401-5, Great Eagle Centre 23, Harbour Road, Wanchai
Hong Kong
Tel: +852 2511 8000, Fax: +852 2511 8011
Group: Norsk Hydro
Notes: Far-East Sales & Marketing office. Hydro Magnesium Pacific.

Norsk Hydro (UK) Ltd. [AI]

Bridge House, 69 London Road, Twickenham
Middlesex TW1 3RH
United Kingdom
Tel: +44 181 255 2500, Fax: +44 181 892 1686, Telex: 24513
hydro g, Contact: Fleur
Group: Norsk Hydro
Product Types: Wrought alloys Cast alloys Cast, rolled, extruded & fabricated parts.
Notes: Holding company for Hydro operations in the UK. Of which Hydro has a number of UK companies involved in the manufacture, fabrication, marketing & recycling of aluminium products. Hydro Aluminium Century (at Sanquhar & Birtley) and Hydro Aluminium Precision Extruders (Alupress, Bedwas, S. Wales), manufacture extrusions from billets supplied from Hydro's smelters in Norway & the remelt unit in S. Wales.

Norsk Hydro USA Inc. [AI]

800 Third Avenue, New York, NY 10022-7671
United States of America
Tel: +1 212 688 6606, Fax: +1 212 750 1252
Group: Norsk Hydro

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Norton Aluminium Products Ltd. [AI]

Norton Green Lane, Norton Canes
Norton, Cannock, Staffs. WS11 3PS
United Kingdom
Tel: +44 1543 279329, Fax: +44 1543 275855, Contact: John Wade
Group: Concentric plc
Associated Companies: Concentric sarl (France)
Product Types: Cast alloys ingots (to BS1419; DIN; NF & customer specifications). Master alloys.
Other Services: Scrap purchase. Approvals: BS EN 9002, CAA.
Notes: [Information from ALFED].

Nova Titanium Inc. [Ti]

P.O. Box 266736, Houston, TX 77207-673
United States of America
Tel: +1 713 643 1336, Fax: +1 713 640 2860, Contact: John R. Fausek - President
Group: Nova Titanium Est: 1993 Employees: 25
Associated Companies: Additional Sales Office(s):
Southern Corp. of South Carolina
Clover, SC United States of America
Tel: +1 803 831 9053, Fax: +1 803 831 9192
Surline & Associates, Inc.
Mobile, AL United States of America
Tel: +1 334 343 0065, Fax: +1 334 342 0065
Product Types: Wrought alloys Bar & Rod, Billet, CP, Clad Products, Columns & Towers, Equipment, Fabrications, Specialty, Fasteners, Fittings, Flats, Heat Exchangers, Welded Pipe, Seamless Pipe, Piping System, Plate, CP Plate, Shafts & Agitators, Sheet, Strip, Tanks & Vessels, Tube, Tube Welded.
Other Services: Cutting, Cutting Plasma, Fabrication, Grit Blasting, Lathe Turning, Machining, Milling, Sand Blasting, Sawing, Welding.

Nuclear Metals, Inc. [Be]

2229 Main St., Concord, MA 01742
United States of America
Tel: +1 508 369 5410, Fax: +1 508 369 4045, Contact: Dennis Lehan - Manager, Specialty Products
Product Types: Wrought alloys. Cast alloys, Powders Depleted Uranium Shielding and Counterweights, Co-extruded Dissimilar Metal Transition Joints, Seamless Extruded Beryllium Tubing, Beryllium-Aluminum Investment Castings, Powder Metal Components, and Spherical Metal Powders. Tube, Extrusion, Be-Al castings.
Notes: Produce a wide variety of specialty metal fabricated products.

Nuson Inc. [AI]

1020 East Boal Avenue, P.O. Box 540, Boalsburg, PA 16827
United States of America
Tel: +1 814 4662000, Fax: +1 814 4667223
Group: Hoogovens Groep

OREMET Titanium [Ti]

530 34th Avenue, SW, P.O. Box 580, Albany, OR 97321
United States of America
Tel: +1 541 967 9000, Fax: +1 541 917 0647, Contact: John Kosin - Technical Director
Group: Oremet (USA) Est: 1956 Employees: 575
Associated Companies: Subsidiaries: Titanium Industries
Additional Sales Office(s):
OREMET France - Trappes, France
Tel: +33 1 3066 0550, Fax: +33 1 3482 8954
OREMET East - Wexford, PA United States of America
Tel: +1 412 935 6322, Fax: +1 412 935 1423
Product Types: Wrought alloys Cast alloys, Powders Alloys, Bar & Rod, Billet & Billet, CP, Briquettes, Castings - Pumps, Valves & Casings, Castings - Small Quantity, Electrodes, Remelting, Electrodes, TiAluminide, Feedstock, Bulk Weldables, Ferrotitanium, Furnaces, Plasma Melt, Furnaces, Vacuum Arc, Ingot, Ingot, CP, Ingot, TiAluminide, Plate & Plate, CP, Powder, Scrap, Buy & Sell, Recycle Scrap, Turnings - Scrap, Turnings - Rotor Quality, Slab, Slab - CP, Sponge, Sponge - High Purity, Ingot, Billet, Bar, sponge, electrodes, castings, scrap.
Other Services: Alloy Development, Cutting, Grinding, Grit Blasting, Heat Treating - In-House Captive, Inspection, X-Ray, Lathe Turning, Machining, Melting, Melting - Custom, Melting - Test, Recycling, Sand Blasting, Sawing, Toll Processing.
Notes: OREMET is one of two fully integrated titanium producers in the U.S. which is defined as a company producing titanium sponge through to mill products. OREMET is a qualified source to produce aerospace titanium alloys for all the major jet engine and airframe producers.

Orissa Extrusions Ltd. [AI]

Mail: Ganeswarpur Industrial Estate, Balasore
756 019 Orissa
India
Tel: +91 6782 62976, 63078, Fax: +91 6782 62975
Group: Norsk Hydro

Osprey Metals Ltd. [AI Mg Ti MMC]

Red Jacket Works, Millands, Neath SA11 1NJ
United Kingdom
Tel: +44 1639 634121, Fax: +44 1639 630100, Email: 100072.3241@compuserve, Contact: Dr. Andrew J.W. Ogilvy
Group: Sandvik (S)
Alloys: Al-Li: 8090, 8091 + novel alloys to 5%Li. Al-Cu: novel 2014/2618 type. Al-Zn: Novel alloys to 12% Zn. Al-Si: To 50% Si & Cu, Fe, Ni. Commercial Al20%Si. Mg + novel alloys (to 15% Li). Ti alloys: Conventional & TiAluminides. Powders: LM6 braze alloy, Al25%Si, Ti-based, etc.
Product Types: Wrought alloys, Powders Billets & preforms (for extrusion, forging). Speciality fine powders. Billet, Plate, Tube, Preforms.
Applications: Engineering applications, inc. automotive.
Tradenames: Osprey.
Other Services: Development alloys. Process licensing agreements. Custom alloys.
Notes: The Osprey Process (a patented gas atomisation technique) is a rapid solidification technique for producing semi-finished preforms. The rapid solidification route produces uniform fine, equiaxed grain-size without macro segregation. Offers significant saving over traditional ingot metallurgy & powder metallurgy. Manufacture of traditional & novel, difficult to process alloys (including MMCs). Melt sizes: 5kg to 200kg (Al). Any (non-toxic) alloys can be atomised. Special fine powders. Light alloys: Al-Li, Al-Cu, Al-Zn, Al-Si, Mg, Ti (requires a modified processing technique to avoid oxygen pick-up). The Osprey process is licenced to 25 companies worldwide for the production of light alloys (inc. special steels, Superalloys & Cu-based materials), e.g. aluminium billets from Peak (D) AISi alloy 250mm dia.x1.4m long for extrusion/forging car components); Sumitomo Light Metals (J) AISi alloy for extrusion of car components.

Otto Fuchs Metallwerke GmbH [Al Mg Ti]

Postfach 12 61
D-58528 Meinerzhagen
[Derschlagener Straße 26, D-58540 Meinerzhagen]
Germany
Tel: +49 2354 73 1, **Fax:** +49 2354 73 201, **Telex:** 826244,
Contact: Dr. K. Weischof
Group: Otto Fuchs (D) **Est:** 1909 **Employees:** 2600
Alloys: Fuchs Aluminium Alloys (DIN/AA): R (3.0400), R05 (3.3309), R1 (3.3319), E (3.0305), E05 (3.3308), E1 (3.3318), ES90 (3.3208), ES70, A1 (3.0285/1080A), A2 (3.0275/1070A), AM05, AM11, AM10 (3.3315/5005A), AM15 (3.3316/5050B), AM18 (3.3326/5051A), AM21 (3.3527/5049), AM25 (3.3523/5052), AM30 (3.3535/5754), AM36 (5052-type), AM32 (-/5754), AM40 (3.3547/5083), AM54 (3.3549/5182), AM58 (3.3555/5056A), AG15 (3.0515/3103), AG18 (3.0517/3003), AS05 (3.3206/6060/6063/6063A), AS07 (3.3210/6005A), AS10 (3.2315/6082), AS17, AS20 (3.3211/6061), AB13 (3.0615/6012), AS60 (-/4032), AB27 (3.1645/2007), AK13 (3.1325/2017/2017A), AK24 (3.1355/2024), AK34 (3.1255/2014), AK60 (-/2219), AN40 (-/2618/2618A), AN50, AZ14 (3.4335/7020), AZ24, AZ34, AZ54 (3.4345/7079/7022), AZ62 (-/7475), AZ64 (3.4365/7075), AZ66 (-/7049/7149), AZ67, AZ69 (-/7175), AZ74 (-/7009), AZ83 (-/7010), AZ84 (3.4144/7050/7150), AZ86 (7049A), AL10 (8090), AL11 (8091), AL21 (2091). **Fuchs Titanium Alloys** (DIN): T2 (3.7025), T3 (3.7035), T6 (3.7065), TL10, TL20, TL35 (3.7110), TL44, TL62, TL64 (3.7165), TL66. **Fuchs Magnesium Alloys** (DIN): M10 (3.5003), MG20 (3.5200), MA25, MA30, MA39 (3.5312), MA64 (3.5612), MA84 (3.5812). **Designation systems:** USA DIN Proprietary, Aerospace.

Product Types: Wrought alloys Cast billets for forging & extrusion. Extrusion bar tubes & sections, often intricate profiles (in Al- & Mg-alloys) max. circumscribed circle 260mm, seamless tube max. ID 180mm. Drawn bar & tube 14-70mm dia. typ. Wire 11-20mm dia. Forgings (hand & die), small & large items. Billet, Bar, Tube, Wire, Extrusion, Forgings/Stock, forgings.

Applications: Aerospace (frames, structural items, critical mechanical components, wheels, etc.) Surgical implants.
Other Services: Custom-profiles. R&D. Extensive fabrication & machining facilities (welding to DIN4113). Surface treatment. Other alloys (on request). **Approvals:** ISO 9001. CAA. NATO. Worldwide major aerospace company approvals, (inc. Aerospatiale, Alenia, Boeing, BAe, RR, Casa, Daimler-Benz, MTU, Westlands, etc.).

Notes: Privately owned company producing a range of extruded products (Al- & Mg-alloys) and hand-/die-forgings in Al-, Mg- & Ti-alloys. In-house foundry for Al- & Mg-alloy billets; Ti-alloy forging stock currently bought-in (to customer or in-house specs.). Seven extrusion presses, capacity 1500-3500 T. Range of forging presses; largest 30 000T. Titanium die-forged items to 10000sq cm (plan view). Also Cu- & Cu-based alloy items.

Palmex A.S. [Al]

Profilo Alüminyum Metal Kaplama ve Dograma Sanayi AS
Cendere Yolu 1
Beton Kopru, Soguksu Caddesi No. 131.
Kagithane
TK-80360 Istanbul
Turkey
Fax: +90 212 294 5440
Est: 1975 **Employees:** 150
Product Types: Wrought alloys Sheet, plate, foil.
Notes: Late entry.

Pandolfo Alluminio SRL [Al]

Via Vittorio Veneto 12
I-32020 Lentiai (Belluno)
Italy
Tel: +39 437 750046, **Fax:** +39 437 750665, **Telex:** 440030 paspal
Group: Pandolfo (I) **Est:** 1969 **Employees:** 407
Product Types: Wrought alloys, Extrusion.
Approvals: DIN EN ISO 9002 (No. 24020578).
Notes: Factory.

Pandolfo Alluminio SRL [Al]

Via Della provvidenza 143
I-35030 Sarmeola (PD)
Italy
Tel: +39 49 822 6000, **Fax:** +39 49 822 6050, **Telex:** 430142 paspap
Group: Pandolfo (I) **Est:** 1965 **Employees:** 407
Associated Companies: Finishing/surface treatment subsidiary: LTS Alluminio (I).
Alloys: AA designations: 6060, 6763, 6005, 6061, 6082, 7020.
Product Types: Wrought alloys Window, door & façade profiles, standard & custom profiles. Billet, Extrusion.
Other Services: Die manufacture. Anodizing, powder coating, cutting, shearing, milling, drilling, threading, bending.
Notes: Four extrusion presses: 1600 T, 2000 T, 2200 T & 3500 T. Maximum section dimensions: rectangular - 35x300mm/75x220mm, cylindrical 200mm. Section weights: 0.1kg/m to 15 kg/m. Minimum wall thickness: 1.2mm. Also hold exclusive license for window, door and roofing systems from Schüco International (D).

Paramount Extrusions Co. [Al]

6833 East Rosecrans Avenue, A
Paramount, CA 90723
United States of America
Tel: +1 310 634 3291, **Fax:** +1 310 634 1136, **Contact:** Les Munson - President
Alloys: No details.
Product Types: Wrought alloys, Extrusion.
Other Services: Short run stamping.

Peak Werkstoff GmbH [Al]

Velbert
Germany
Group: Erbslöh AG/Sintermetallwerk Krebsöge
Product Types: Wrought alloys.
Notes: Joint venture to enhance the range of high-temperature resistant aluminium alloys for engines, aircraft turbines, compressors & air conditioning units.

96 Supplier Addresses & Product Details

Pechiney [Al Mg]

[Pechiney Balzac]

10, Place des Vosges, La Défense 5

Courbevoie (Hauts-de-Seine)

F-92048 Paris La Défense Cedex

France

Tel: +33 1 46 91 47 93, Fax: +33 1 46 91 51 42, Telex: 612013

pech f, Contact: Communications/Public Relations Office

Group: Pechiney Employees: 3743

Associated Companies: Worldwide -300 plants & sales offices in 50 countries

Product Types: Wrought alloys. Cast alloys. Rolling slabs (sheet & plate production). Extrusion & forging billets. Ingots (primary & secondary aluminium & alloys). High-purity Al & alloys. Rolled products (sheet & plate). Extrusions (various). Wire. Ingot, Billet, Plate, Sheet, Strip, Bar, Tube, Solid conductor, Fastener stock, Forgings/Stock, slabs.

Applications: Engineering. Transport (automotive, trains, maritime). Aerospace. Electrical & electronics (inc. superconductors, I.C. industry). Building/construction. Home appliances. Packaging industry (beverage & food-can).

Approvals: Aerospace company approvals, inc. Boeing, Airbus.

Notes: Corporate office for Pechiney which was founded in the mid-1800's and is an important name in French industrial development. Within the group, which ranks among the European & world market leaders, the core businesses are aluminium (~32%) & packaging (~36%). Others are related industrial activities (~5%) which includes Pechiney Electrometallurgie magnesium production, and international trade division (27%). Worldwide, Pechiney has 300 plants & sales offices in 50 countries (~65% of production is outside France), 35000 employees (50% outside France) and, in 1996, produced 924000T of aluminium; fourth largest primary producer in the world, Europe's second largest hard-plate producer for aerospace applications, and a major European manufacturer of semi-finished products. In the aluminium business sector are: Aluminium Metal division (bauxite, alumina, primary aluminium (ingots, billets, slabs, wire & speciality products). Aluminium Mill Products (Rhenalu): producing can stock, coil & sheet, foils, rolled products, bars, tubes, bottles, speciality products (pre-painted sheets, anodes, etc.) Extrusion & Distribution: supply extrusions, finishing of semi-finished products.

Subsidiary companies & affiliates of Aluminium Metal division (based in Australia, Cameroon, Canada, F, Greece, Guinea, NL): Aluminium Pechiney, Affimet, Alucam, Aluminerie de Bécancour, Aluminium Dunkerque, Aluminium de Grèce, ECL, Friguia, Pechiney Nederland, QAL, Tomago Aluminium.

Subsidiary companies & affiliates of Aluminium Mill Products (Rhenalu) division, all in France: Pechiney Rhenalu, Aviatube, Pechiney Hermillon, Satma, SM Gerzat.

Subsidiary companies & affiliates Extrusions & Distribution division (sites in A, F, D, CH): Softal, Almet, Pechiney Aluminium, Presswerk (PAP).

The Packaging Division produces a wide variety of aluminium-based products (beverage cans, food cans, collapsible tubes (toothpaste-type), aerosol cans & deluxe items, inc. perfume & cosmetic containers, etc.). In 1996, over 38 billion beverage cans produced/sold.

Pechiney Aluminium Presswerk GmbH [Al]

Postfach 19 69

D-76809 Landau

Germany

Tel: +49 6341 9 57 0, Fax: +49 6341 9 57 130, Telex: 453366

Group: Pechiney Est: 1968 Employees: 269

Associated Companies: Through Almet (F, D, A, CH) with 45 branches & agencies, 6 service centres.

Product Types: Wrought alloys, Extrusion.

Applications: Building & industry.

Notes: Part of the Pechiney group Aluminium Metal Division, Extrusion & Distribution section. Concentrates on the manufacture & sales of soft aluminium alloy extrusions & profiles.

French sister company 'Softal' has 3 extrusion plants

Pechiney Aluminium Presswerk has 3 extrusion plants in Germany: Landau, 11000T annual capacity; Crailsheim, 18000T annual capacity; Burg, 12000T annual capacity.

Pechiney Electrometallurgie [Mg]

Chemical & Light Alloys Div.

Tour Manhattan 6, Place de l'Iris

F-92087 Paris La Défense Cedex

France

Tel: +33 1 47 62 87 77, Fax: +33 1 47 74 73 89, Contact: Jean

Martinon - Vice President - Chem & Light Alloys Div.

Group: Pechiney

Designation systems: International.

Product Types: Cast alloys, Powders Continuous cast ingots.

Primary (pure & alloys). Reagents. Turnings. Powder, chunks & granules. Ingot

Applications: Steel industry (desulphurisation). Chemical industry.

Notes: P.E.M. is the second largest European producer. Patented 'Magnetherm' process. Wide range of products. Manufacturing plants in France: Saint-Beat (Midi-Pyrenees) & La Roche de Rame (Provence). [Information provided by the International Magnesium Association].

Pechiney Hermillon [Al]

BP 45

F-73302 St. Jean de Maurienne

France

Tel: +33 4 79 59 90 21, Fax: +33 4 79 59 97 02

Group: Pechiney

Product Types: Cast alloys, Powders Aluminium pellets, shot & granules. Atomised powders (Al- & Al-alloys) & flakes. Master alloys. Sacrificial anodes.

Applications: Chemical industry.

Notes: Affiliate of Pechiney Group, Aluminium Mill Products division, concentrating on manufacture of speciality products.

Pechiney High Purity [Al]

See: PHP - Pechiney High Purity

Pechiney Japon [Al]

Shinjuku Mitsui Bldg., 2-1-1 Nishi Shinjuku, Tokyo 163-04 Japan

Tel: +81 3 33 49 6600/81, Fax: +81 3 33 44 4392/49 6700,

Contact: Mimiko Shimizu

Group: Pechiney

Product Types: Wrought alloys. Cast alloys.

Notes: Agent for Pechiney Group company PHP - Pechiney High Purity (F) which produces high-purity aluminium & alloys.

Pechiney Rhenalu [Al]

Laminés Techniques, BP 42

F-63504 Issoire Cedex

France

Tel: +33 4 73 55 50 50/51 62, Fax: +33 4 73 55 50 60/51 08,

Contact: Mr Jacques Arnaud - Manager - Commercial

Group: Pechiney

Alloys: Engineering grades: 1xxx, 2xxx, 3xxx, 4xxx, 5xxx, 6xxx,

7xxx, 8xxx series. Marine alloys: 5083, 5086, 5454, 6005A,

6060, 6061. Aerospace alloys: all grades. Industrial vehicles:

1050A, 3003, 5754, 5454, 5086, 5083, 6060, 6005A, 6106,

6061, 6082, 7020, 7075. **Designation systems:** USA CEN NF.

Product Types: Wrought alloys Plates (to 350mm thick). Shate.

Sheet. Wide coils. Bars. Sections. Plate, Sheet, Bar, Extrusion.

Applications: Aerospace. Industrial equipment. Transport. Tanks.

Ship-building & boats. Shipping containers. Trucks. Buses.

Trailers & dumpers. Mechanical engineering.

Notes: Part of the Pechiney group Aluminium Metal Division, Mill Products section. Concentrates on production of technical rolled products & large extrusion/precision drawn items.

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Pechiney Rhenalu [AI]

F-27250 Rugles
France
Tel: +33 2 32 29 25 00, Fax: +33 2 32 24 67 69, Contact: J. Barjavel/Mme Farver
Group: Pechiney
Product Types: Wrought alloys Thin foil (<0.2mm thick); thick foil. High-purity etched foil.
Applications: Flexible & semi-rigid packaging. Heat-exchangers. Electronics (capacitors).
Notes: Part of the Pechiney group Aluminium Metal Division, Mill Products section. Concentrates on production of foil. Second foil facility at Froges (F).

Pechiney Rhenalu [AI]

F-38191 Brignoud Cedex
France
Tel: +33 4 76 45 30 62, Fax: +33 4 76 71 39 76, Contact: M-C Boy
Group: Pechiney
Product Types: Wrought alloys Thin foils (40-200 micron), Foil
Notes: Part of the Pechiney group Aluminium Metal Division, Mill Products section. Concentrates on production of foil.

Pechiney Rhenalu [AI]

6 Place de l'Iris, Tour Manhattan, Courbevoie Cedex 21
F-92087 Paris La Defense
France
Tel: +33 1 46 91 40 00, Fax: +33 1 46 91 40 67, Telex: 616256 f
Group: Pechiney Est: 1967 Employees: 4729
Associated Companies: Worldwide
Product Types: Wrought alloys Can stock. Sheet. Foil. Technical rolled products. Speciality products. Plate, Bar, Tube, Wire.
Applications: Packaging (beverage/food cans, foil packaging). Electronics (capacitors). Automotive (bodies, heat-exchangers, OEM suppliers). Building & construction. Aerospace. Industrial equipment. Transport (maritime - ship building & containers, buses, rolling-stock, trucks, tankers). Cookware, domestic appliances.
Tradenames: Jumbo 3 CM (thin-gauge continuous casting process).
Other Services: R&D in product & process development. Engineering services (at Voreppe).
Notes: Head office for Pechiney Rhenalu, part of the Pechiney Aluminium Metal Division producing a range of mill products; 427 000T flat-rolled products in 1996. World's second largest manufacturer of heavy plate for the aerospace industry & leader for plate in high-speed ship construction. Each of eight plants specialises in the production of specific types of semi-finished products. Principal facilities at Neuf-Brisach & Issoire; recycling at Noguères; Neuf-Brisach, Issoire & Annecy also supply intermediate products to other sites; Rugles & Froges (for foil); Chambéry (appliance panels); Castelsarrasin (wire).

Pechiney Rhenalu [AI]

Zone Industrielle de Biesheim, BP 49
F-68600 Neuf-Brisach
France
Tel: +33 3 89 72 41 00, Fax: +33 3 89 72 88 89, Contact: Mme. LeRoy
Group: Pechiney
Associated Companies: Worldwide
Alloys: Most grades in the 1xxx, 2xxx, 3xxx, 4xxx, 5xxx, 6xxx, 7xxx series. Designation systems: USA CEN NF
Product Types: Wrought alloys Can-stock sheet. Automotive sheet/coil. Standard sheet & coils (0.2-3.2mm thick).
Applications: Packaging (beverage & food- cans); Automotive (car bodies, heat exchangers, OEM suppliers). Building panels/signs.
Notes: Part of the Pechiney group Aluminium Metal Division, Mill Products section. Concentrates on production of sheet/coil products.

Pechiney Rhenalu [AI]

Alliages dur filés, 44 av. V Hugo
F-49460 Montreuil-Juigné
France
Tel: +33 2 41 37 44 00, Fax: +33 2 41 37 44 48, Contact: D. Perpriat
Group: Pechiney
Associated Companies: Worldwide
Product Types: Wrought alloys Bars, sections, tubes & wire. Extrusion, profiles.
Applications: Engineering (machined bar, mechanical components, etc.) Aerospace.
Notes: Part of the Pechiney group Aluminium Metal Division, Extrusion & Distribution section.

Pechiney Rhenalu d'Annecy [AI]

74 ave. de la République, BP 14
F-74961 Cran-Gevrier Cedex
France
Tel: +33 4 50 66 62 00/19/24, Fax: +33 4 50 66 62 77, Contact: M. Engerbeau - Assistante-commerciale
Group: Pechiney
Alloys: 3003, 3004, 3005, 1050.
Temper: H45/H257, H46/H267, H43, H237, H48/H287, H44/H247. Designation systems: USA CEN NF.
Product Types: Wrought alloys Circles. Precoated sheet (0.3-2mm thick, typ. wide range of colours & finishes - polyester, PVC, laquer). Sheet, circles; precoated sheet.
Applications: Cookware. Building (roofing, shutters, ceilings, lighting, gutters, etc). Vehicles body panels. Caravans. Domestic appliance panels.
Other Services: R&D (at Voreppe). Custom products (thickness, finish) on request. Approvals: ISO 9002.
Notes: Part of the Pechiney group Aluminium Metal Division, Mill Products section. Concentrates on production of speciality products.

Pechiney UK [AI]

Pechiney House, The Grove, Slough, Berkshire. SL1 1QF
United Kingdom
Tel: +44 1753 522800, Fax: +44 1753 522014
Group: Pechiney
Associated Companies: Worldwide.
Product Types: Wrought alloys. Cast alloys.
Notes: UK office for the Pechiney Group.

Pechiney World Trade [AI]

475 Steamboat Road, Greenwich, CT 06830
United States of America
Tel: +1 203 863 50 24, Fax: +1 203 869 61 83, Contact: Martin Di Minno
Group: Pechiney
Product Types: Wrought alloys. Cast alloys.
Notes: Agent for Pechiney Group company PHP - Pechiney High Purity (F) which produces high-purity aluminium & alloys.

Perfil [AI]

See also: Alu Perfil Espana SA

Perfil Arteaga SA [AI]

Arroyo Teatinos 46
E-28820 Coslada - Madrid
Spain
Tel: +34 91 6720011, Fax: +34 91 6738844
Product Types: Wrought alloys Profiles (to 6m long), Extrusion.
Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

98 Supplier Addresses & Product Details

Perrière International [Ti]

31 Avenue du Général Leclerc
F-92100 Boulogne Billancourt
France
Tel: +33 1 46 21 22 11, Fax: +33 1 46 21 26 66, Contact: Jean Perrière
Est: 1993 Employees: 10
Notes: Late entry.

Phenix Aluminium S.A. [AI]

B-4400 Ivoz-Ramet
Belgium
Tel: +32 41 752291, Fax: +32 41 751616
Group: Hoogovens Groep
Notes: Hoogovens Aluminium Rolled Products Duffel.

Phoenix [Ti]

Division of Kodiak Industries Inc.
16723 Aldine Westfield Road, Houston, TX 77032
United States of America
Tel: +1 281 821 5297, Fax: +1 281 821 0808, Internet:
<http://www.thomasregister.com/phoenix>, Contact: Herschel Lain - President
Group: Phoenix (USA) Est: 1992 Employees: 55
Associated Companies: Additional Sales Office(s):
Ford Gellat, Baton Rouge, LA
Tel: +1 504 752 0267, Fax: +1 504 751 3016
Product Types: Wrought alloys Columns & Towers, Fabrications, Specialty, Fittings, Heat Exchangers, Pipe, Welded, Piping System, Plate, Plate, CP, Reactors, Rings, Tanks & Vessels, Strip, Bar, Tube, Wire
Other Services: Cutting, Plasma, Equipment Field Services, Fabrication, Field Installations, Lathe Turning, Machining, Milling, Warehousing, Welding.
Notes: Phoenix is a fabricator of process equipment and a metal service center specializing in titanium and zirconium for industrial applications. In addition to the normal mill products such as sheet, strip, plate, bar, pipe, tube and wire. Phoenix stocks flanges, tube fittings and other special machined parts.

PHP - Pechiney High Purity [AI]

Immeuble Balzac, 10, Place des Vosges
F-92048 Paris La Défense
France
Tel: +33 1 46 91 49 96, Fax: +33 1 46 91 46 33, Contact: Mr. Jean Fevre
Group: Pechiney
Associated Companies: USA, Japan.
Alloys: 5N, 5N5 alloys, Gialloys97.
Product Types: Wrought alloys Cast alloys High-purity aluminium & alloys. Ingots. Slabs & plates. Ingot, Plate, Wire, slab
Applications: Electronics. I.C. industry. Sputtering targets. Low-background noise applications. Low temperature electrical conductors or stabilizers (superconductors). Bonding wire.
Tradenames: Gialloys97
Other Services: Custom products (purity, form - wires, plates, etc)
Notes: Part of Pechiney Group, PHP is a leading company in the production of high-purity aluminium & alloys.
PHP Technical assistance: Contact Dr. Jean Muller, Tel: +33 4 76 57 85 83, Fax: +33 4 76 57 85 99, Email: muller-j@mercus.amt.pechiney.fr

Pianimpianti International S.R.L. [Ti]

Corso Magenta 27
I-20123 Milano
Italy
Tel: +39 2 802071, Fax: +39 2 80207215, Telex: 334108
Group: Deutsche Titan (D)
Notes: Sales office (I) for Deutsche Titan (D).

Pilotech HB [AI]

Björnmossevågen 39
S-162 45 Vällingby
Sweden
Tel: +47 8 89 97 87 (Norway), Fax: +47 8 89 97 87, Contact: Mr. Per Johansson
Group: British Aluminium Holdings (UK)
Product Types: Wrought alloys.
Notes: Agent for Superform Aluminium (UK).

Pioneer Metals & Technology Inc. [Ti]

60 State St. 30th Floor, Boston, MA 02109
United States of America
Tel: +1 617 742 7825, Fax: +1 617 422 4286, Email:
john.keem@piog.com, Contact: John Keem - Executive Vice President
Group: The Pioneer Group, Inc. Est: 1990
Associated Companies: Company Subsidiaries: Pioneer Metals International.
Alloys: High purity.
Product Types: Powders, - High Purity, - TiAluminide.
Notes: Pioneer Metals and Technology, Inc. (PMT), based in Boston, MA and its wholly owned subsidiary, Pioneer Metals International (PMI), headquartered in St. Petersburg, Russia, produce high purity nonferrous metal powders.

Plas-Met Chem Corporation [AI]

No 4 M Byrappa Lane, P B No 7161, Ranasinghpet
Bangalore 560053
India
Tel: +91 80 6701120, 21, Fax: +91 80 6702121, Contact: Mr. Suresh Nahar - Executive
Group: Plas-Met Chem Corp
Product Types: Wrought alloys, Plate, Sheet, Strip, Wire, Extrusion.
Notes: Aluminium & Duralumin, Rods, Flats, Sheets, Strips, Pipes, Plates, Wires, Foil, Heat Sinks, etc. Also Notched Bars, Slabs, Shots & LM Series Alloys. Order for Specially Cut Blanks & Profiles also accepted.

Plymouth Tube Company [Ti]

29 West 150 Warrenville Road
P.O. Box 768, Warrenville, IL 60555-0768
United States of America
Tel: +1 630 393 3550, Fax: +1 630 393 3552, Email:
whitesls@plymouth.com, Internet: <http://www.plymouth.com>,
Contact: Bruce Long - Regional Sales Mgr.
Group: Plymouth Tube Co. Est: 1924 Employees: 1050
Associated Companies: Additional Sales Office(s):
Plymouth Tube Co.
Warrenville, IL United States of America
Tel: +1 630 393 3550, Fax: +1 630 393 3552
Plymouth Tube Co.
Los Angeles, CA United States of America
Tel: +1 310 417 8333, Fax: +1 310 417 8721
Product Types: Wrought alloys Bar - Hollow, Extruded Shapes, Extrusions, Tube.
Other Services: CAD/CAM, Chemical Milling, Cutting, Heat Treating, In-House Captive, Lathe Turning, Pickling, Sand Blasting, Sawing.
Notes: Manufacturer of carbon steel, stainless steel, nickel alloy and titanium extruded shapes in Hopkinsville, Kentucky plant. Plymouth Tube has nine U.S. plants manufacturing carbon steel, stainless steel and aluminum tubing. Plymouth Tube also has plants in Birmingham, England and Mexico City.

Portalex [AI]

See: Hydro Aluminio Portalex S.A.

Portal Products Ltd [AI]

Kingsditch Lane, Cheltenham, Gloucestershire GL51 9PB
 United Kingdom
Tel: +44 1242 263300, **Fax:** +44 1242 262518
Group: SAPA
Notes: Insulated panels for doors, conservatories, etc.

Powder Alloy Corporation [Ti]

5871 Creek Road, Cincinnati, OH 45242
 United States of America
Tel: +1 513 984 4016, **Fax:** +1 513 984 4017, **Contact:** E. Stephen Payne - President
Est: 1973 **Employees:** 30
Product Types: Powders: - Medical, - Low Chloride, - High Purity, - TiAluminide.
Notes: Powder Alloy Corporation has been a supplier of metal, ceramic, carbide, titanium, and specialty powders to the thermal spray, brazing, and centering industries for over 20 years.

Precision Extrusions Inc [AI]

720 East Green Street, Bensenville, IL 60106
 United States of America
Tel: +1 708 766 0340, **Fax:** +1 708 766 0495
Product Types: Wrought alloys. Heatsinks, enclosures, etc. Extrusion.
Other Services: Metal Finishing.

PREDIMAG [Mg]

c/o C.A.D.
 63 blvd Gergovia, F-63000 Clermont Ferrand
 France
Tel: +33 4 73 34 49 50, **Fax:** +33 4 73 34 49 51
Product Types: Cast alloys, Powders, Ingot
Notes: Technological & Industrial Centre for Magnesium (Clermont-Auvergne-Development). Provides information, R&D for magnesium activities. Large network of companies involved in the design & conception of applications; pattern & mould makers, casting companies, etc. [Information provided by the International Magnesium Association].

Productos Aluminio do Consumo SA [AI]

Calle do la Mancha 3
 E-28820 Coslada-Madrid
 Spain
Group: Alcan
Product Types: Wrought alloys Semi-rigid foil containers, Foil, semi-rigid containers.

Profiler [AI]

See: Hydro Aluminium Profiler a.s

Profiltechnik [AI]

See: Hoogovens Aluminium Profiltechnik GmbH

Queensland Metals Corp. Ltd. [Mg]

P.O. Box 445, Toowong, Brisbane, Queensland 4066
 Australia
Tel: +61 7 3371 6844, **Fax:** +61 7 3871 3308, **Email:** qldmetals@gil.ipswichcity.qld.gov.au, **Contact:** Mr. I Howard-Smith
Group: Queensland Metals Corp. Ltd. (Australia)
Notes: Mining & exploration company (1.2 billion tonnes of magnesite ore in Queensland). Collaborative research programme with CSIRO for magnesium production (by 2001). [Information provided by the International Magnesium Association].

Queensland Metals Corporation Limited [Mg]

Level 6, Toowong Tower, 9 Sherwood Road, Toowong
 Brisbane, Queensland 4066
 Australia
Tel: +61 7 3335 8400, **Fax:** +61 7 3335 8423, **Email:** qldmetals@gil.ipswichcity.qld.gov.au, **Contact:** Creagh O'Connor - Managing Director
Group: Queensland Metals Corp.
Notes: Queensland Metals Corporation Limited (QMC) has mining and exploration licenses covering 1.2 billion tonnes of magnesite ore in Central Queensland. QMC owns 60% of QMAG which produces high grade refractory magnesias and other magnesia products. QMC also has a collaborative research project with the Australian research group, CSIRO, for magnesium production which is expected to be in production by 2001.

RADI - Reynolds Aluminium Deutschland Inc. [AI]

Postfach 950 253
 D-21112 Hamburg [Finkenwerder Straße, D-21129 Hamburg]
 Germany
Tel: +49 40 74011 00, **Fax:** +49 40 74011 247/740 2989, **Telex:** 217677 reyal d, **Internet:** http: www.remc.com, **Contact:** Karsten Danker - Sales & Marketing Manager
Group: Reynolds Metals Co. Richmond VA, USA **Est:** 1975
Employees: 600.
Product Types: Wrought alloys, Sheet.

Ranshofen Walzwerk [AI]

See: AMAG Ranshofen Walzwerk GesmbH

Raufoss A/S [AI]

P.O. Box 2
 N-2831 Raufoss
 Norway
Tel: +47 61 15 26 04, **Fax:** +47 61 15 29 47, **Contact:** Per Eger
Group: Hydro
Alloys: Al ODS alloys - No details.
Notes: Structural components in light weight materials such as carbon fibre reinforced plastic (CFRP) and temperature resistant aluminum (ODS).

Raufoss ASA [AI]

P.O. Box 15
 N-2831 Raufoss
 Norway
Tel: +47 61 15 20 00, **Fax:** +47 61 15 25 99
Group: Norsk Hydro

Raufoss Automotive AS [AI]

P.O. Box 15
 N-2831 Raufoss
 Norway
Tel: +47 61 15 20 00, **Fax:** +47 61 15 20 02
Group: Norsk Hydro
Alloys: 6xxx & 7xxx alloys.
Product Types: Wrought alloys Extrusions and components for the automotive industry.
Applications: Automotive: roof rails, sunroof components, structural chassis components, crash management systems, body structural components, etc.
Other Services: Prototyping & testing. Machining, welding, bending, fabricating.

Raufoss Automotive Belgium NV [AI]

Skaldenstraat 72
 B-9042 Gent
 Belgium
Tel: +32 92 51 52 42, **Fax:** +32 92 51 53 10
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion,
Applications: Automotive.

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Raufoss Automotive Skultuna AB [AI]

Box 84
S-730 50 Skultuna
Sweden
Tel: +46 21 78 360, Fax: +46 21 78 375
Group: Norsk Hydro
Product Types: Wrought alloys, Extrusion.
Applications: Automotive.

Raufoss Automotive (UK) Ltd. [AI]

Bromyard Industrial Estate, Bromyard HR7 4HP
United Kingdom
Tel: +44 1885 488301, Fax: +44 1885 483174, Contact: Alan
Fisher - Project Manager
Group: Norsk Hydro
Alloys: 6xxx & 7xxx series alloys.
Product Types: Wrought alloys, extrusions.
Applications: Automotive.
Approvals: ISO 9002.

Raufoss Hydro Automotive [AI]

Research Centre a.s
P.O. Box 41
N-2831 Raufoss
Norway
Tel: +47 61 15 20 00, Fax: +47 61 15 27 61
Group: Norsk Hydro

Razno Alloys Ltd. [Mg]

Baarerstrasse 8, Postfach 485
CH-6301 Zug
Switzerland
Tel: +41 1 363 55 33, Fax: +41 1 363 50 78, Contact: Mr. Rolf
Walther
Notes: Market pure magnesium & alloys from Russian producers.
[Information from International Magnesium Association].

Reade Manufacturing [Mg]

[Div. of Magnesium Elektron]
100 Ridgeway Blvd., Lakehurst NJ 08733
United States of America
Tel: +1 908 657 6451, Fax: +1 908 657 6628, Contact: Mr. Bruce
Gwynne
Group: British Aluminium Holdings (UK)
Product Types: Cast alloys, Powders. Magnesium particulate
products (powder chunks & granules).
Applications: Steel industry (desulphurising steel). Flare-systems.
Notes: Manufacturing plant.

Refinados del Aluminio SA [AI]

See: REFINALSA

REFINALSA [AI]

Refinados del Aluminio SA
Ctra. de Cabezon, S/N
E- 47011 Valladolid (E-47080 Valladolid)
Spain
Tel: +34 983 206600, Fax: +34 983 256499
Product Types: Cast alloys, Ingot.
Notes: Information provided by ICEX (Instituto Español de
Comercio Exterior).

Reynolds Aluminium [AI]

1441 Elisworth Indus., Atlanta GA 30318
United States of America
Tel: +1 404 355 0310
Group: Reynolds Metals Co. Richmond VA, USA
Product Types: High duty, aircraft grades.

Reynolds Aluminium Deutschland Inc. [AI]

See: RADl - Reynolds Aluminium Deutschland Inc.

Reynolds Aluminium France [AI]

Guebwiller
France
Tel: +33 3 89 74 46 00, Fax: +33 3 89 74 46 35, Contact: Mr.
Rieber - Conseil Client
Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys strip (prelaque), Sheet, Strip,
Painted/coated sheet.

Reynolds Aluminium Holland B.V. [AI]

Postbus 30
NL-3840 AA Harderwijk [Industrieweg 15, NL-3846 BB Harderwijk]
Netherlands
Tel: +31 3410 64411, Fax: +31 3410 18380, Contact: C. Wiertz
Group: Reynolds Metals Co. Richmond VA, USA Est: 1960
Employees: 700.
Product Types: Extrusion, Fabricated extruded components.

Reynolds Aluminum Supply Company [AI]

P.O. Box 27003, 6601 West Broad Street
Richmond VA 23261-7003
United States of America
Tel: +1 804 281 2183, Fax: +1 804 281 3627, Internet: [http.www.rmc.co](http://www.rmc.co)
Group: Reynolds Metals Co. Richmond VA, USA

Reynolds International Inc. [AI]

P.O. Box 27003, 6601 West Broad Street
Richmond VA 23261-7003
United States of America
Tel: +1 804 281 3352, Fax: +1 804 281 4080, Internet: [http.www.rmc.co](http://www.rmc.co)
Group: Reynolds Metals Co. Richmond VA, USA
Notes: Exports/International Operations.

Reynolds International Service Company [AI]

2000 Town Centre, Suite 2050, Southfield MI 48075
United States of America
Tel: +1 810 354 1720, Fax: +1 810 354 1721, Internet: [http.www.rmc.co](http://www.rmc.co), - Manager
Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys Cast alloys, Extrusion, Automotive
wheels & components.
Notes: Wheels/Extruded components. Automotive, truck and
speciality vehicles products.

Reynolds Italy Slim SPA [AI]

Via R.S. Reynolds 18
I-04012 Cisterna di Latina. Latina
Italy
Tel: +39 6 968301, Fax: +39 6 9692323
Group: Reynolds Metals Co. Richmond VA, USA Est: 1980
Employees: 614
Product Types: Wrought alloys. Flats, Sheet, Foil.

Reynolds Metals Company [AI]

Product and Application Technology
1941 Reymet Road, Richmond VA 23237
United States of America
Tel: +1 804 743 6446, Fax: +1 804 743 6534, Internet: [http.www.rmc.co](http://www.rmc.co)
Group: Reynolds Metals Co. Richmond VA, USA
Notes: Corporate Research & Development.

Reynolds Metals Company [AI]

P.O. Box 27003, 6601 West Broad Street
 Richmond VA 23261-7003
 United States of America
 Tel: +1 804 281 2000, Telex: 827448, Internet: http.www. rmc.co
 Group: Reynolds Metals Co. Richmond VA, USA Est: 1919
 Employees: 29000

Designation systems: USA

Product Types: Wrought alloys Cast alloys Primary and reclaimed aluminium. Foil, sheet, plate, cans, extruded products (including heat-exchanger tubing, drive shafts, bumpers and window systems), flexible packaging, wheels, etc.

Applications: Aluminium beverage cans, packaging, consumer products, transportation, building and construction.

Tradenames: Reynolds Wrap, Tread-Brite, R-2000.

Notes: Over 100 manufacturing facilities in 24 countries.

Primary Ingot/Billet/Alloyed Foundry Ingot: National Industry Director, Metals Div. Tel: (toll free USA) 800 368 3488

Sheet/Plate: Business Unit Manager, Mill Products Div. Tel: +1 804 281 2808, Fax: +1 804 281 4129

Extrusions: Marketing Manager, Extrusion Div. Tel: +1 804 281 4743, Fax: +1 804 281 3520

Production Facilities:-

Primary Aluminium Plants: St Lawrence Reduction - Massena NY, Troutdale Reduction - Troutdale OR, Longview Reduction - Longview WA. **Secondary Aluminium Plant:** Bellwood Reclamation - Richmond VA. **Sheet Plants:** Alloys Plant - Sheffield AL, Bellwood Plant #44 - Richmond VA, McCook Sheet & Plate - McCook IL. **Plate Plant:** McCook Sheet & Plate - McCook IL. **Aluminum Composite Sheet Plant:** Architectural Plant - Eastman GA. **Extrusion Plants:** Bellwood Plant - Richmond VA, El Campo Aluminum - El Campo TX, Louisville Extrusion - Louisville KY. **Fabricated Extruded Components:** RAMCO Manufacturing Company - Auburn IN. **Distribution Centres (USA):** Birmingham AL, Pheonix AZ, Livermore CA, Los Angeles CA, San Diego CA, Wallingford CT, Newark DE, Jacksonville FL, Orlando FL, Atlanta GA, Louisville KY, Detroit MI, Grand Rapids MI, North Kansas City MO, St Louis MO, Charlotte NC, Cincinnati OH, Cleveland OH, Portland OR, Memphis TN, Nashville TN, Dallas TX, Richmond VA, Seattle WA. **Wheels (USA):** Beloit WI. **Ingot Billet (Canada):** Canadian Reynolds Metals Company - Baie Comeau - Quebec & Becanour - Quebec. **Finstock, Sheet & Foil (Canada):** Reynolds Aluminum Company of Canada - Cap de la Madeleine - Quebec. **Extrusions (Canada):** Reynolds Extrusion Company of Canada - Richmond Hill - Ontario & Ste Therese - Quebec. **Wheels (Canada):** Reynolds/Lemmerz Inc - Collingwood - Ontario. **Extrusions (Europe):** Aluminium Europe SA - Mons Ghlin (B), Industria Navarra del Alumino SA - Navarra (E), Reynolds Aluminium Deutschland Inc - Nachrodt (D), Reynolds Aluminium Holland BV - Harderwijk (NL), Wexal International Ltd - Wexford (IRL). **Fabricated Extruded Components (Europe):** Reynolds Aluminium Holland BV - Harderwijk (NL). **Secondary Aluminium Plant (Europe):** Reynolds Europe Recycling SPA - Iserna (I). **Sheet (Europe):** Aluminium Deutschland Inc - Hamburg (D). **Sheet/Foil (Europe):** Industria Navarra del Alumino SA - Navarra (E), SLIM SPA - Latina (I). **Painted/Coated Sheet (Europe):** Reynolds Aluminium France SA - Guebwiller (F). **Wheels (Europe):** Reynolds Wheels SPA - Ferrara (I). **Extrusions (S. America):** Alumino Reynolds de Venezuela SA - Maracay - Venezuela **Wheels (S. America):** Ruedas de Alumino CA - Valencia - Venezuela.

Reynolds Metals Company [AI]

Mill Products Division
 Richmond VA 23261
 United States of America
 Tel: +1 804 281 4778, Internet: http.www. rmc.co, - Market Manager
 Group: Reynolds Metals Co. Richmond VA, USA
Alloys: 1100, 1350, 2010, 2036, 3xxx series, 3003 (tread plate, trailer roof, etc.), 3104-H19 (can bodies), 5xxx series, 5182-H19 (can ends), 5454 (wheel stock), 6xxx series, 6010, 6061 (wheel stock, etc.), 6111, 7021 (bumper stock), Weldalite 049.
 Tempers: O, F, H112, H12, H32, H34, H131, H321, H116, T351, T851, T37, T87, T451, T651, T64, T7451, T7651, T7351, T6151.

Product Types: Wrought alloys Plate forms (t < 20cm, w < 335cm) cut to shape, Tooling plate, Tread plate, Machined plate, Automotive body sheet, brazing sheet, Bumper stock, Rigid container sheet, Trailer roof coil, Wheel stock.

Applications: Automotive, aerospace, brazing, canning, containers, reinforcement bumpers, tanks, tooling, vessels, wheels.

Notes: Production distributed between: Alloys Plant - Muscle Shoals AL (sheet & plate), Bellwood Plant - VA (coiled sheet) & McCook Plant - IL (sheet & plate).

Reynolds Metals Company [AI]

Mill Products Division - Detroit
 2000 Town Centre, Suite 300, Southfield MI 48075-1123
 United States of America
 Tel: +1 810 948 0283, Fax: +1 810 353 0041, Internet: http.www. rmc.co, - Automotive Sales & Engineering Manager
 Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys, Plate, Sheet, Strip.
Notes: Automotive Mill Products. Automotive, truck and speciality vehicles products.

Reynolds Metals Company [AI]

Extrusion Division - Detroit
 2000 Town Centre, Suite 300, Southfield MI 48075-1123
 United States of America
 Tel: +1 810 948 0282, Fax: +1 810 353 0041, Internet: http.www. rmc.co, - Automotive Business Manager
 Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys, Extrusion.
Notes: Automotive Extrusion Division. Automotive, truck and speciality vehicles products.

Reynolds Metals Company (Bellwood) [AI]

6603 W. Broad St., Richmond VA 23230
 United States of America
 Tel: +1 804 281 2882
 Group: Reynolds Metals Co. Richmond VA, USA
Product Types: Wrought alloys, extrusion, sheet

Rhenalu [AI]

See: Pechiney Rhenalu

RIMA Electrometalurgia SA [Mg]

Rod. BR 496 Km 103
 CEP 39.200-000 - Várzea da Palma/Minas Gerais
 Brazil
 Tel: +55 38 7311333, Fax: +55 38 7311202, Telex: 387037 rimebr
 Group: RIMA (Brasil)

RIMA Industrial SA [Mg]

Anel Rodoviário Km 4,5., Bairro Nova das Industria
 Belo-Horizonte Minas Gerais, CEP 31950-640
 Brazil
 Tel: +55 31 329 4000, Fax: +55 31 333 6942, Telex: 1414 riapa
 br, Contact: Luciano Silva Amaral - Assistant Sales Manager
 Group: RIMA (Brasil)
Alloys: Mg metal (99.8%), Mg crystal (99.2%), AZ91C, AZ91HP.
Product Types: Cast alloys, Powders Alloying additives & raw materials for casting industry. Ingot.

RIMA SA [Mg]

São Paulo Office
 Av. Paulista, 2073 - Salas 1105/6, 11 Andar - Edif. Horsa I
 CEP 01311-300 - São Paulo/SP
 Brazil
 Tel: +55 11 288 8251, Fax: +55 11 288 3587
 Group: RIMA (Brasil)

102 Supplier Addresses & Product Details

Rio Tinto Aluminium Ltd. [AI]

6 James Square, London SW1Y 4LD
United Kingdom
Tel: +44 171 753 2133, Fax: +44 171 753 2147, Contact: John Gardener
Group: RTZ/KACC Consortium Co. [Comalco]
Notes: Commercial offices.

Rio Tinto Japan [AI]

7F Shiroyama J.T. Mori Building
3-1 Toranomom 4-Chome Minato-ku, Tokyo 105
Japan
Tel: +81 35 401 2370, Fax: +81 35 401 2386, Contact: Alex Arase
Group: Comalco

RMI Titanium Company [Ti]

1000 Warren Avenue, P.O. Box 269, Niles, OH 44446-0269
United States of America
Tel: +1 330 544 7700, Fax: +1 330 544 7701, Contact: Fred A. Janowski - GM Sales & Prod. Dist.

Group: RMI Titanium Est: 1951 Employees: 902
Associated Companies: Additional Sales Office(s):
Brea, CA United States of America
Tel: +1 714 524 9911, Fax: +1 714 579 0110
Staffordshire, UK
Tel: +44 1 827 262601, Fax: +44 1 827 262602

Product Types: Wrought alloys Billet, Billet - CP, Fabrications, Ingot, Ingot - CP, Pipe - Seamless, Pipe - Welded, Piping Systems, Plate, Plate - CP, Powder, Buy Scrap, Sheet, Slab, Strip, Tube - Welded, Bar

Applications: The Company's products are used for fabricated components in commercial and military aircraft and engines, energy exploration and refining, chemical processing equipment, pulp and paper production facilities, medical implants and consumer goods.

Other Services: Alloy development, Superplastic forming
Notes: RMI manufactures titanium mill products (including ingot, billet, bar, plate, sheet, strip, seamless and welded pipe, and welded tubing), hot formed and superplastically formed parts, and engineering systems for energy related markets.

Rolltech A/S [AI]

Hjorring, Denmark
Group: Erbslöh AG
Product Types: Wrought alloys. Rolled profiles.

Rowan Cable Products Ltd. [AI]

Rowan House, Delamare Rd., Cheshunt
Waltham Cross EN8 9SP
United Kingdom
Tel: +44 1992 627377, Fax: +44 1992 628111, Contact: John Lingwood
Alloys: AA designations: 1050A, 6063. Stress relieved.
Product Types: Wrought alloys Electrical conductor wire & cable in 1050A & 6063 and wire for tea-bag staples.

RTZ [AI]

See: Anglesey Aluminium Metal Ltd.
See: Kaiser Aluminum International Incorporated
See: Rio Tinto Aluminium Ltd.

Russian National Aluminium-Magnesium Institute [AI Mg]

VAMI Ltd.
86 VO Stedny pr
RU-199026 St. Petersburg
Russia
Tel: +7 812 213 5458, Fax: +7 812 217 5966, Telex: 121598

Sandvik Special Metals Corp. [Ti]

PO Box 6027, Kennewick, Washington 99352-0027
United States of America
Tel: +1 509 586 4131, Fax: +1 509 582 3552, Contact: G.A. Grade - Manager Titanium
Group: Sandvik (S) Est: 1966 Employees: 300
Associated Companies: Worldwide.
Alloys: CP titanium, Ti 6Al 4V and Ti 3Al 2.5V.
Product Types: Wrought alloys Seamless titanium and titanium alloy tubing, OD: 6 to 45mm, Wall thickness: 0.4 to 3.5mm, Length up to 13m (longer on request).
Alloys, Commercial Products, Sporting Goods, Fabrications, Specialty, Medical, Pipe, Seamless, Tube, Tube, Hollow, Tube, Welded & Reduced, Tube.
Applications: Aerospace, chemical plant, sports, medical, oil industry.
Notes: SSM is a producer of nuclear and aerospace quality seamless tubing. We offer CP titanium, Ti 6Al 4V and Ti 3Al 2.5V seamless tubing with the OD, ID, and wall measured electronically to insure complete adherence to ordered dimensions, and in textured condition.

Sandvik Steel [Ti]

S-811 81 Sandviken
Sweden
Tel: +46 26 263741, Fax: +46 26 272020
Group: Sandvik (S)
Associated Companies: Worldwide.
Product Types: Wrought alloys Seamless titanium and titanium alloy tubing, OD: 6 to 45mm, Wall thickness: 0.4 to 3.5mm, Length up to 13m (longer on request).
Applications: Aerospace, chemical plant, sports, medical, oil industry.

SAPA AB [AI]

Box 5505, Humlegårdsgatan 17
S-114 85 Stockholm
Sweden
Tel: +46 8 459 59 40, Fax: +46 8 459 59 50
Group: SAPA
Notes: Group Management.

SAPA AB [AI]

S-574 81 Vetlanda
Sweden
Tel: +46 383 941 00, Fax: +46 383 185 02
Group: SAPA

SAPA AB [AI]

Box 72, S-612 22 Finspång
Sweden
Tel: +46 122 120 50, Fax: +46 122 101 83
Group: SAPA

SAPA AB [AI]

Box 6602, S-102 31 Stockholm
Sweden
Tel: +46 8 728 32 00, Fax: +46 8 728 32 20
Group: SAPA

SAPA AB [AI]

Box 174, S-685 34 Torsby
Sweden
Tel: +46 560 126 40, Fax: +46 560 127 50
Group: SAPA

SAPA AB [AI]

Box 17, S-915 21 Robertsfors
Sweden
Tel: +46 934 148 70, Fax: +46 934 148 35
Group: SAPA

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SAPA AB [A/]

Box 100, S-730 50 Skultuna
Sweden
Tel: +46 21 782 50, Fax: +46 21 750 54
Group: SAPA

SAPA AB [A/]

Stampgatan 34, S-411 01 Gothenburg
Sweden
Tel: +46 31 80 14 10, Fax: +46 31 15 37 22
Group: SAPA

SAPA Aluminium BV [A/]

Nijverheidsweg 9, Postbus 102
NL-9600 AC Hoogeveen
Netherlands
Tel: +31 5980 199 11, Fax: +31 5983 936 73
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Other Services: Anodising. Approvals: ISO 9002.

SAPA Aluminium France SNC [A/]

ZA du Garric, BP9
F-81450 Le Garric
France
Tel: +33 5 63 80 10 10, Fax: +33 5 63 80 10 11
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Notes: Extrusion plant.

SAPA Aluminium Profile AG [A/]

Hertizentrum 3, Postfach, CH-6303 Zug
Switzerland
Tel: +41 42 21 51 61, Fax: +41 42 21 57 58
Group: SAPA

SAPA Aluminium Profile GmbH [A/]

Industriestraße 10, Postfach 2380
D-77613 Offenburg
Germany
Tel: +49 781 50 60, Fax: +49 781 50 666, Telex: 752834,
Contact: Kåre Wetterberg
Group: SAPA Est: 1965 Employees: 197
Product Types: Wrought alloys, Extrusion.
Other Services: Anodising.
Notes: Production plant.

SAPA A/S [A/]

Postboks 33, Storgaten 16
N-2001 Lillestrøm
Norway
Tel: +47 63 89 21 00, Fax: +47 63 89 21 20
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Notes: Sales office. Extrusions for domestic, offshore, marine engineering, oil platforms, etc.

Oy SAPA Colt Ab [A/]

Skrakaby Industriområde
SF-02920 Esbo
Finland
Tel: +358 853 71 33, Fax: +358 84 12 36
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Other Services: Anodising and fabrication.
Notes: Sales office.

SAPA Danmark A/S [A/]

Rolshøjvej
DK-8500 Grenå
Denmark
Tel: +45 86 32 61 00, Fax: +45 86 32 66 63, Contact: Per Lund
Group: SAPA Est: 1970 Employees: 140
Product Types: Wrought alloys, Extrusion.
Approvals: ISO 9002.

SAPA Holdings Ltd. [A/]

Joseph Pitt House, Pitville Circus Road, Cheltenham
Gloucestershire GL52 2QE
United Kingdom
Tel: +44 1242 245333, Fax: +44 1242 520216
Group: SAPA
Associated Companies: Derby: Fax +44 1773 874389
Product Types: Wrought alloys, Foil, Extrusion.
Approvals: BS 5750, ISO 9002.
Notes: Parent company for SAPA UK operation. Aluminium extrusion and finishing, building products and systems, aluminium foil lidding.

SAPA Ltd. [A/]

Saw Pit Industrial Estate, Mansfield Road, Tibshelf, Alfreton
Derbyshire DE55 5NH
United Kingdom
Tel: +44 1773 872761, Fax: +44 1773 874389, Contact: Andrew Gay
Group: SAPA
Alloys: AA designations: 6005A, 6061, 6063, 6082.
Product Types: Wrought alloys Standard sections (round, square, hex, flat bar; angles; channel; Tee; tubes) in 6063 & 6082.
Custom extrusions up to 150mm dia or 265mm wide. Lineal wts.: 0.15 - 10 kg/m.
Other Services: In-house design & finishing facilities (anodizing, powder coating, Thermal break. Approvals: BS 5750, ISO 9002
Notes: UK extrusion (3 presses) and remelting plant.

SAPA Nederland BV [A/]

Nijverheidsweg 9, Postbus 102
NL-9600 AC Hoogeveen
Netherlands
Tel: +31 5980 192 15, Fax: +31 5980 953 49
Group: SAPA
Notes: Holding company for SAPA operations in the Netherlands.

SAPA Poland Ltd [A/]

Ul. Kopernika 18, 64-980 Trzcianaka
Skr. pocztowa nr 102
Poland
Tel: +48 67 16 23 00, Fax: +48 67 16 22 00
Group: SAPA Est: 1993
Product Types: Wrought alloys, Extrusion.
Applications: Construction industry, wholesale industry, transport.
Other Services: Anodising.
Notes: Extrusion and anodising plant.

SAPA - Skandinaviska Aluminium Profiler AB [A/]

Metallvägen, S-574 81 Vetlanda
Sweden
Tel: +46 383 941 00, Fax: +46 383 154 35
Group: SAPA Est: 1963 Employees: 3500
Alloys: No details.
Product Types: Wrought alloys Extrusions and extruded assemblies.
Applications: Automotive, architectural, marine engineering, consumer goods, heat exchangers, rail transport, electronic.
Other Services: Anodising, machining, bending, punching, powder painting, wet painting, welding, fabrication. Approvals: ISO 9001.
Notes: Head office. Recycled aluminium in conjunction with Gotthard/Gränges - Sweden. Bockab - specialist bending division.

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A/S SAPA / Vest. [AI]

Postboks 461, Ludolf Eidesgate 6
N-5501 Haugesund
Norway
Tel: +47 52 71 36 99, Fax: +47 52 71 59 91
Group: SAPA
Product Types: Wrought alloys, Extrusion.
Notes: Sales office. Extrusions for domestic, offshore, marine engineering, oil platforms, etc.

Saraf Metal Works [AI]

28, Amartolla Street, 2nd Floor, Room No. 205, Calcutta 700001
India
Tel: +91 33 25 7065, 3719, Contact: Mr O P Saraf - Proprietor
Group: Saraf Metal Works
Product Types: Cast alloys, Powders, Ingot.
Notes: Mfrs. of aluminium notch bars, ingots, shots, aluminium ash and dross of different purity & mesh. Tel(F):352-4180.

Scanmag a.s [AI]

Jarlsø Syd, P.O. Box 63, Jersøy
N-3108 Tønsberg
Norway
Tel: +47 33 32 95 11, Fax: +47 33 32 91 09
Group: Norsk Hydro
Product Types: Cast alloys.
Notes: Development of superior casting technology for magnesium wheels. Part of the joint venture company Hyspeed.

CV Scheuer Verzekeringen [AI]

Koude Horn 3, Postbus 1068
NL-1940 EB Beverwijk
Netherlands
Tel: +31 251 216217, Fax: +31 251 216610
Group: Hoogovens Groep

Schreiber [AI]

See: Carl Schreiber GmbH

SECO Aluminium Ltd. [AI]

Crittall Road, Witham, Essex CM8 3AW
United Kingdom
Tel: +44 1376 515 141, Fax: +44 1376 500 542, Contact: Paul Went
Alloys: AA designations: 6005A, 6063, 6063A, 6060, 6082, 6463, 7003, 7020, others on request. BS designations: HE9, SE70, HE30, SE82.
Product Types: Wrought alloys Extrusions (standard shapes & made to order). No stock held - all made to order. Bar: round, square, flat. Angles. Channel. Tee. Zed. Top hat. Half moon. I beam. Tube: round, square & rectangular. Range of standard complex shapes for specific purposes.
Applications: Automotive, coachwork, architectural, windows/doors/etc.
Other Services: Powder coating, anodising, chemical brightening, mechanical polishing, fabrication. Approvals: BS 7750:1994 No. 34529, BS EN ISO 9002:1994 No. FM34280.
Notes: Two 1600 T presses. Max. circumscribing circle: 168mm. Lineal weights (solid): 0.1 kg/m to 6 kg/m. Length: min. 25mm, max. 12.29m.

Securistyle Ltd [AI]

Kingsmead Industrial Estate, Princess Elisabeth Way
Cheltenham, Gloucestershire GL51 7RE
United Kingdom
Tel: +44 1242 221200, Fax: +44 1242 520828
Group: SAPA
Notes: Fittings for window, etc. systems and building products.

SENPOF Girebronzes [AI Ti]

25, Avenue Carnot
F-91349 Massy Cedex
France
Tel: +33 1 69 20 04 00, Fax: +33 1 64 47 11 77, Telex: 600054 f
Group: Girebronzes Est: 1988 Employees: 10
Alloys: NF: A5, AG3, AG4MC, AG5, AU4G, AU4PB, AU4G1, AU2GN, AGS; AA: 1050A, 2017A, 2024, 2030, 2618A, 5083, 5086, 5754, 6060.
Product Types: Wrought alloys Mainly cast copper-based alloys but also supply aluminium and titanium alloy products.

Shenwei Corporation [Mg]

Taiyuan Office, Box 95, Taiyuan University of Technology
Taiyuan, Shanxi 030024
China
Tel: +86 351 604 7294, Fax: +86 351 604 3976
Group: Shen Wei
Product Types: Cast alloys, Ingot.

Shen Wei East-West Trading Corp. Ltd. [Mg]

450 Memorial Drive, Suite 405, Chicopee MA 01020
United States of America
Tel: +1 413 594 5888, Fax: +1 413 592 0885, Contact: Mr. Li Shen
Group: Shen Wei
Alloys: ASTM B93/B93M-94 designations: AZ91D, AM60B, AM50A, etc. Designation systems: USA
Product Types: Cast alloys Pure magnesium and magnesium alloys in cast bars and wing-slab. Ingot.
Approvals: ISO 9002.
Notes: Material produced by Taiyuan East-United Smelt Magnesium Company Ltd. A Chinese-foreign equity joint venture between Shen Wei East-West Trading Corp. and Zhao Jiabu Enterprise Group Corp. - Northern China.

Shieldalloy Metallurgical Corporation [AI Mg Ti]

25 East 39th Street, New York, NY 10016
United States of America
Tel: +1 212 686 4010, Fax: +1 212 689 2218
Group: Metallurg (USA)
Product Types: Powders.

Skandinaviska Aluminium Profiler [AI]

See: SAPA Group

Slovalco a.s [AI]

Priemyselna 12
SK-96563 Ziar Nad Hronom
Slovakia
Tel: +421 857 78 71 12, Fax: +421 857 78 79 05, Email: askild_romsloe@slovalco.sk, Contact: Askild Romsloe - Sales Director
Group: Norsk Hydro
Notes: Other Email addresses:
General director: stefan_tesak@slovalco.sk
Production Director: jan_varsa@slovalco.sk
Technical Director: tiber_druga@slovalco.sk
Quality Manager: igor_kratky@slovalco.sk

SMG - Sté. Metallurgique de Gerzat [AI]

BP 7
F-63360 Gerzat
France
Tel: +33 4 73 23 64 00, Fax: +33 4 73 23 64 01, Telex: 283155 f
Contact: Mr. Torond
Group: Pechiney
Product Types: Wrought alloys Extruded tubes (also high-pressure bottles), Extrusion.
Applications: Extinguishers, industrial gases, diving equipment.
Notes: Affiliate of Pechiney Rhenalu. Concentrates on extrusion & precision drawing.

SMH [A/]

(d'Halluin - Agence Champagne Ardennes)
82 rue Docteur Lemoine, F-51100 Reims
France
Tel: +33 2 26 02 60 55, Fax: +33 2 26 02 60 52
Group: D'Halluin (F)
Alloys: See: d'Halluin Designation systems: USA NF.
Product Types: Wrought alloys, Plate, Sheet, Bar, Tube, Extrusion, Tread-plate.
Notes: Specialist metal stockist for the building/construction & general engineering industries. Supply both semi-finished standard products & finished items, e.g. hand-rail kits; profile sections/kits for conservatories, greenhouses, etc.

Société des Fonderies Girardot [A/]

See: Sofogir

Société Metallurgique de Gerzat [A/]

See: SMG - Sté. Metallurgique de Gerzat

SOFAB [A/]

ZI du Teinchurier, BP 532, F-19107 Brive Cedex
France
Tel: +33 3 55 88 90 50, Fax: +33 3 55 86 00 62, Telex: 580200
Group: Groupe Valfond Est: 1973 Employees: 190
Alloys: AS9U3, AS12, AS10G, AS12U, AG10, Calypso 49 R.
Designation systems: NF.
Product Types: Cast alloys, Die castings.
Applications: Automotive, domestic, etc.

Sofogir [A/]

Sté des Fonderies Girardot
Rue des Mineurs, BP 3, F-70250 Ronchamp
France
Tel: +33 3 84 20 65 44, Fax: +33 3 84 63 52 59, Telex: 362968 f,
Contact: J-L Girardot/Mme Mezquita
Est: 1858 Employees: 30
Product Types: Cast alloys.
Notes: Late entry.

Softal [A/]

6, Boulevard du Général Leclerc
F-92115 Clichy Cedex
France
Tel: +33 1 47 56 45 45, Fax: +33 1 46 91 52 45, Telex: 610865 f,
Contact: Claude Riss
Group: Pechiney Est: 1989 Employees: 726
Associated Companies: Through Almet (F, D, A, CH) with 45 branches & agencies, 6 service centres.
Alloys: No details ('soft' alloys).
Product Types: Wrought alloys, Extrusion.
Applications: Building industry. Engineering (truck sides, mechanical components, panels/signs).
Notes: Part of the Pechiney group Aluminium Metal Division, Extrusion & Distribution section. Concentrates on the manufacture & sales of soft aluminium alloy extrusions & profiles.
French extrusion plants: Ham (Somme) 22000T annual capacity; Nuits-Saint-Georges (Côte-d'Or) 18000T annual capacity; Aubagne (Bouches-du-Rhône) 8000T annual capacity.
German extrusion plants: (Pechiney Aluminium Presswerk): Landau, 11000T annual capacity; Crailsheim, 18000T annual capacity; Burg, 12000T annual capacity.

SOGEM Iberica SA [A/]

Jacomtrezo 4, E-28013 Madrid
Spain
Tel: +34 91 5229270, Fax: +34 91 5217310
Product Types: Wrought alloys Minerals/ Raw metals, Plate, Sheet, Extrusion.
Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Solikamsk Magnesium Works [Mg]

9 Pravda Street
Solikamsk Perm Region 618500
Russia
Tel: +7 342 2448, Fax: +7 342 535 2375, Contact: Mr. Anatoly Schelkonogov
Product Types: Cast alloys Ingot (primary pure & alloy) + recycled.
Other Services: Master alloys. Scrap buyers.
Notes: [Information from International Magnesium Association].

Sør-Norge Aluminium A/S [A/]

P.O. Box 85
N-5460 Husnes
Norway
Tel: +47 53 47 50 00, Fax: +47 53 47 53 90
Group: Norsk Hydro

Soro Ltd. [A/]

Hyde Works, Progress Way, Enfield, Middx. EN1 1UX
United Kingdom
Tel: +44 181 366 8800, Fax: +44 181 367 4644, Contact: Geoff Thwaites - Managing/Commercial Director
Est: 1927
Alloys: AA designations: 1050A, 1350, 6063, 6101, 5754, 5154, 2014A, 2117. Old BS designations: G1B, G1E, HG9, NG5, HR15. Tempers: O, H2, H4, H8, H9, TD.
Product Types: Wire and stranded conductors. Wire diameters: 0.5 to 11mm, stranded ropes/conductors up to 400 sq.mm. Wire, Solid conductor, Fastener stock, Flexible rope bunch/bunch conductor. Concentric stranded all aluminium circular/compacted conductor.
Applications: Electrical and general engineering.
Approvals: ISO 9002. BSI registered. (No. Q5852)
Notes: Formed by amalgamation of Soro Products Ltd. and E & E Kaye.

Spa Aluminium Ltd. [A/]

Unit 1, Chapman Way, Tunbridge Wells, Kent. TN2 3EG
United Kingdom
Tel: +44 1892 533911, Fax: +44 1892 542019
Group: Norsk Hydro (part-owned)
Product Types: Wrought alloys, Sheet, Extrusion.
Notes: Extrusion & sheet stock-holder. Offers an anodizing & fabrication service.

Spartal Ltd [A/]

Unit 69, Northwick Business Centre, Blockley
Gloucestershire GL56 9RF
United Kingdom
Tel: +44 1386 700898, Fax: +44 1386 701122, Contact: J.O. Hassall - Director
Alloys: All alloys in BS 1471 and others by negotiation.
Product Types: Wrought alloys Cold drawn Aluminium alloy tubes from 10mm to 150mm O.D.
Approvals: BSI registered. (No. FM 09907).

Speciality Metals Company SA [Mg]

42A rue Tenbosch
B-1050 Brussels
Belgium
Tel: +32 26 45 76 70, Fax: +32 26 47 73 53, Contact: Mr. Sylvian Beer-Gehler
Associated Companies: Moscow, Alma-Aty (Kazakhstan) & Hong Kong.
Alloys: No details.
Product Types: Cast alloys, Powders Primary (pure) ingot. Powder, chunks & granules.
Notes: Represents the UST-Kamenogorsk Titanium & Magnesium Plant. [Information provided by the International Magnesium Association].

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Spectrulite [Mg]

See also: ASP Spectrulite Ltd.

Spectrulite Consortium Inc. [Mg]

1001 College Streets, Madison IL 62060

United States of America

Tel: +1 618 452 5190, Fax: +1 618 452 3190, Contact: Mr. William A. Barnes

Product Types: Wrought alloys Cast alloys, Ingot, Billet, Plate, Sheet, Extrusion, anodes (extruded); forging & extrusion-billet.

Other Services: Toll conversion. Fabricated assemblies.

Notes: Manufacture of magnesium cast alloys (10 wrought; 3 refined die cast). Produce semi-finished products. (4 extrusion presses, 3 rolling mills). Plant also at: Findlay, OH (USA).

[Information provided by the International Magnesium Association].

Star [Al]

See: Lawson Mardon Star Ltd.

Structural Laminates BV [Al]

Kluyverweg 4

NL-2629 HT Delft

Netherlands

Tel: +31 15 262 6299, Fax: +31 15 257 0786

Group: Alcoa-Akzo (USA) Est: 1991

Product Types: Fibre metal laminates (ARALL, Glare). Sheet

Tradenames: ARALL, Glare.

Notes: Fibre-Metal laminates (ARALL & Glare).

Structural Laminates Co. [Al]

510 Constitution Blvd., New Kensington, PA 15068-6522

United States of America

Tel: +1 412 339 6888, Fax: +1 412 339 6978

Group: Alcoa-Akzo (USA) Est: 1991

Alloys: ARALL 2 (AA2024-T3/Aramid-Epoxy, lay up 2/1 to 6/5 UD), ARALL 3 (AA7475-T76/Aramid-Epoxy, lay up 2/1 to 6/5 UD), Glare 1 (AA7475-T76/Glass-Epoxy, lay up 2/1 to 6/5 UD), Glare 2 (AA2024-T3/Glass-Epoxy, lay up 2/1 to 6/5 UD), Glare 3 (AA2024-T3/Glass-Epoxy, lay up 2/1 to 6/5 X-ply), Glare 4 (AA2024-T3/Glass-Epoxy, lay up 2/1 to 6/5 X-ply), Glare 5 (AA2024-T3/Glass-Epoxy, lay up 2/1 X-ply), Glare 6 (AA2024-T3/Glass-Epoxy, lay up 2/1 X-ply).

Product Types: Fibre metal laminates (ARALL, Glare). Glare thicknesses: 0.86 to 4.4mm. Sheet.

Applications: Aerospace, aircraft structural and flight control surfaces.

Tradenames: ARALL, Glare.

Notes: Fibre-Metal laminates (ARALL & GLARE).

Sudal Industries Ltd. [Al]

26 Nariman Bhavan 227, Nariman Point, Mumbai 400 021

India

Tel: +91 22 202 3845/4053, Fax: +91 22 202 2893, Telex: 11-

82949, Contact: Mr. S C Chokhani - Managing Director

Employees: 140

Product Types: Wrought alloys, Extrusion.

Applications: Irrigation & sprinkler systems. Architecture.

Transport. Automotive parts.

Notes: Foreign collaboration: Technical assistance from Reynolds (Europe) Ltd. Export to Middle-East, USA, Europe.

Suisman Titanium Corp. [Ti]

P.O. Box 119, 500 Flatbush Avenue, Hartford, CT 05141

United States of America

Tel: +1 860 522 3123, Fax: +1 860 951 3367, Contact: John Lane - President

Group: Aerospace Metals, Inc. Est: 1982 **Employees:** 140

Product Types: Wrought alloys Briquettes, Feedstock, Bulk Weldables, Ferrotitanium, Buy, Recycle & Sell Scrap, Turnings, Turnings - Rotor Quality, Sponge, Turnings and scrap.

Other Services: Analytical Development, Consulting, Engineering, Grit Blasting, Recycling, Toll Processing.

Notes: Processor of high quality titanium scrap for the aerospace, steel and aluminum industries. Suisman is the sole producer of ST 2001 turnings products from which high density inclusions have been removed by a patented process.

Sumitomo Corporation of America [Ti]

334 Park Avenue, New York, NY 10154-0042

United States of America

Tel: +1 212 207 0622, Fax: +1 212 207 0847, Contact: Shuji

Oshiro - Product Manager

Group: Sumitomo Corporation (J) Est: 1952 **Employees:** 450

Associated Companies: Company Subsidiaries:

Summit Specialty Chemicals Corp. Premier Polmer, Inc. Auburn Steel Co

Additional Sales Office(s):

SCOA - Los Angeles, CA United States of America

Tel: +1 213 489 0353, Fax: +1 213 489 0311

Product Types: Sponge, Sponge - High Purity

Notes: Sumitomo Corporation is one of the world's leading traders and distributors of a wide range of commodities, industrial goods and consumer goods. Besides trading, Sumitomo Corporation is active as an investor in a diverse range of businesses. 9,071 employees work in Japan and 87 other countries.

Sumitomo Sitex Corp. [Mg Ti]

1 Higashihama-cho, Amagasaki, Hyogo 660

Japan

Tel: +81 64 134 306, Fax: +81 64 137 981, Email:

moriyaa@sitix.co.jp, Contact: Tetsuki Nagumo - General Sales Manager

Group: Sumitomo Corporation (J) Est: 1937 **Employees:** 2700

Associated Companies: Subsidiaries: Sumitomo Sitex Silicon, Inc. Sumitomo Sitex Europe Plc.

Additional Sales Office(s):

Tokyo Branch: Tokyo, Japan

Tel: +81 3 3282 9151, Fax: +81 3 3282 6595

Sumitomo Sitex Silicon, Inc.

Fremont, CA United States of America

Tel: +1 410 683 9100, Fax: +1 410 656 4200

Product Types: Cast alloys, Powders Primary (pure)

Ferrotitanium, Ingot, Ingot, CP, Mill Products, High Purity, Powder, Powder, Titanium: High Purity, Powder, Low Chloride, Scrap, Buy, Scrap, Recycle, Sponge, Sponge, High Purity.

Other Services: Melting (Ti).

Notes: Production of Mg metal by electrolysis of magnesium chloride; a by-product of titanium sponge production.

[Information from International Magnesium Association].

Sumitomo Sitex Corporation is well known as the former Osaka

Titanium Company (OTC). Large titanium sponge production capacity and semiconductor grade technology. Produce and sell metallic titanium and semiconductor silicon wafers.

Superform Aluminium [Al]

Cosgrove Close, Worcester WR3 8UA

United Kingdom

Tel: +44 1905 87 4300, Fax: +44 1905 87 4301, Contact: Mr.

A.M. Lowerson - Sales Manager

Group: British Aluminium Holdings (UK)

Alloys: 2004SPF, 5083SPF, 5251, 5754, 6061. Supral 100,

Supral 150.

Product Types: Wrought alloys Superplastic forming Aluminium alloys, Superplastic formed items.

Applications: Aerospace, rail transport, automotive, electronics, architecture. Structural and decorative panels, casings, etc.

Other Services: Component manufacture. Superplastic forming.

Approvals: BS 5750 part 2. BS EN ISO 9002.

Notes: Pioneers of the superplastic forming (SPF) process.

Worlds largest supplier of SPF components.

Superform USA Inc. [AI]

6825 Jurupa Ave., PO Box 5375, Riverside CA 92517-5375
United States of America

Tel: +1 909 351 4100, Fax: +1 909 351 1189, Contact: Mike Reynolds

Group: British Aluminium Holdings (UK)

Product Types: Wrought alloys aircraft, Superplastic formed items.

Other Services: Superplastic forming.

Notes: Pioneers of the superplastic forming (SPF) process. Worlds largest supplier of SPF components. Also aerospace structural composite parts & assemblies.

Supra Alloys Inc. [Ti]

351 Cortez Circle, Camarillo, CA 93012
United States of America

Tel: +1 805 388 2138, Fax: +1 805 987 6492, Email: sales@supraalloys.com, Internet: http://www.supraalloys.com, Contact: Jerry D. Breedlove - Sales Manager

Est: 1965 Employees: 17

Associated Companies: Additional Sales Office(s):

McGayesville, VA United States of America
Tel: +1 703 289 6565, Fax: +1 703 289 6470

Scottsdale, AZ United States of America
Tel: +1 602 905 3200, Fax: +1 602 905 0964

Product Types: Wrought alloys. Alloys, Fittings, Flats, Foil, Medical, Pipe Seamless & Welded, Plate, Rings, Sheet, Slab, Strip, Tube, Tube Welded, Wire & Wire Coil, Billet, Bar.

Other Services: Analytical Development, Chemical Milling, Cutting, Cutting, Plasma, Cutting, Waterjet, Grit Blasting, Heat Treating, Outside Processing, Hot Isostatic Pressing, (HIP), Inspection, FP, Inspection, Ultrasonic, Inspection, X-Ray, Milling, Roller Leveling, Sand Blasting, Sawing, Shearing, Stock Holding, Warehousing.

Notes: Supra Alloys is a metal service center specializing in titanium mill products for industrial, chemical and aerospace industries. Inventories include pure and alloy foil, sheet, plate, bar, billet, pipe and tube. In-house chemical milling, shearing, and saw cutting.

Taiyuan East-United Smelt Magnesium Co. [Mg]

48 Edgewood Avenue, Yonkers NY 10704-1618
United States of America

Tel: +1 914 776 1618, Fax: +1 914 776 5164

Group: Shen Wei

Product Types: Cast alloys Industrial, commercial premium grade magnesium (99.8%). All types of magnesium alloys. Ingot.

Notes: Agent for Taiyuan East-United Smelt Magnesium Co. (Northern China). [Information provided by the International Magnesium Association].

Taj Al Mulook Chemicals L.L.C. [AI]

PO Box No. 51688, Dubai
United Arab Emirates

Tel: +971 4 682 667, Fax: +971 4 629 259, Contact: Irfan Mulla

Group: Comalco

Notes: Distributor - Aluminium Pastes / Flakes: UAE, Saudi Arabia, Jordan, Syria, Kuwait

Talum [AI]

Tovarniske ulica 10, 62325 Kidncevo
Slovenia

Tel: +062 796-313, Fax: +062 796-269

Group: Norsk Hydro

TARAMM S.A. [Ti]

Titan & Alliages Rares Micro Moulés, Route de Baziège
F-31670 Labège
France

Tel: +33 5 61 39 96 56, Fax: +33 5 61 39 87 69, Contact: Mr.

Philippe Andrysiak - Quality Manager

Employees: 10

Alloys: T 40 (C2), TA6V.

Product Types: Cast alloys Investment castings.

Applications: Aeronautic, medical implants, military, marine, industrial pipe fittings, textile industry, sports, optical.

Approvals: ISO 9002.

Tatrarrex Precision Castings spol. sr.o. [AI]

Stefanikova 1163, 74221 Koprivnice
Czech Republic

Tel: +42 656 41243, Fax: +42 656 41241

Group: Hoogovens Groep

B.A. Taylor (Metals) Ltd. [AI Mg]

Phoenix Works, Great Bridge Street, West Bromwich
West Midlands B70 0BW
United Kingdom

Tel: +44 121 557 2491, Fax: +44 121 522 2195, Contact: Kit Taylor

Est: 1956

Alloys: Aluminium: BS 1490 alloys, wide range of international alloys. Magnesium: AZ91 Designation systems: USA BS DIN

Product Types: Cast alloys Ingots (refiners). Notched bars for alloying additions. BS1490, ASTM, DIN 1725. Alloy ingots. Ingot, Plunging blocks.

Applications: Plunging blocks for steel industry (desulphurization & nodulization).

Approvals: ISO 9002.

Technal Viking [AI]

Units 2-4 Hudswell Rd, Hunslet, Leeds, LS10 1AG
United Kingdom

Tel: +44 1132 96 1400, Fax: +44 1132 96 1414

Group: Alcan

Associated Companies: France (Toulouse): Tel +33 5 61 31 25 25, Fax +33 5 61 31 25 00; Portugal Tel +351 1 940 0341, Fax +351 942 0424. Spain: +34 3 573 0000, Fax +34 562 2250.

Product Types: Wrought alloys Glazing systems, Extrusion.

Applications: Commercial glazing. Architectural building & refurbishment.

Notes: Designs & markets a range of glazing systems for the commercial, architectural & building refurbishment.

Technal Viking [AI]

Unit J, The Loddon Centre, Wafe Road
Basingstoke, Hampshire RG2 4OP
United Kingdom

Tel: +44 1256 72 4900, Fax: +44 1256 72 4949

Group: Alcan

Product Types: Wrought alloys Glazing systems. Extrusion.

Notes: Designs & markets a range of glazing systems for commercial, architectural & building refurbishment.

Technalloy SA [Ti]

Lourdes Nave 10, Plgo Industrial Cova Solera
E-08191 Rubi - Barcelona
Spain

Tel: +34 93 5880115, Fax: +34 93 5880077

Product Types: Wrought alloys, Sheet, Bar, Tube, Extrusion, Profiles.

Notes: Information provided by ICEX (Instituto Español de Comercio Exterior).

Technicome [AI]

See: P. Balloffet-Technicome

Tecla Industries [AI]

Rue des Parcs, BP 9, F-90101 Delle Cedex
France

Tel: +33 3 84 36 73 00, Fax: +33 3 84 36 22 70

Group: Groupe Valfond Est: 1927 Employees: 370

Alloys: AS9U3, AS12, Zinc. Designation systems: NF.

Product Types: Cast alloys, Die castings.

Applications: Automotive.

108 Supplier Addresses & Product Details

Tecnilaca Lacagem de Metais, Lda. [AI]

Lugar de S. Carlos, Apartado 41, Mail: P.O.Box 41
P-2726 Mem Martins Codex
Portugal
Tel: +351 1 920 00 14, Fax: +351 1 921 66 21
Group: Norsk Hydro
Notes: Surface treatment company.

Teledyne-Allvac [Ti]

Abraham-Lincoln-Strasse 38-42
D-65189 Wiesbaden
Germany
Tel: +49 6 11 7636 136, Fax: +49 6 11 7636 155
Group: Allegheny Teledyne (USA)
Designation systems: USA.
Product Types: Wrought alloys Cast alloys, Ingot, Billet, Bar, Wire.
Notes: Sales office for Continental Europe.

Teledyne-Allvac [Ti]

Shosankan 8F, 1-3-2 Iidbashi, Chyoda-ku, Tokyo 102
Japan
Tel: +81 33 239 9080, Fax: +81 33 239 9021
Group: Allegheny Teledyne (USA)
Designation systems: USA.
Product Types: Wrought alloys Cast alloys, ingot, billet, bar, wire.
Notes: Sales office for Japan.

Teledyne-Allvac [Ti]

Leningradsky Prospekt 55
Moscow 125468
Russia
Tel: +7 95 943 9407, Fax: +7 95 943 9403
Group: Allegheny Teledyne (USA)
Product Types: Wrought alloys Cast alloys, ingot, billet, bar, wire.
Notes: Sales office for CIS (ex-USSR).

Teledyne-Allvac [Ti]

Formosa Plastics Bldg. 'B', 10th Floor 201 Tun-Hwa North Road
Taipei, Taiwan
Tel: +6 62 713 8101, Fax: +6 62 713 8108
Group: Allegheny Teledyne (USA)
Product Types: Wrought alloys Cast alloys, ingot, billet, bar, wire.
Notes: Sales office for Taiwan, Korea, Singapore, Malaysia & Philippines.

Teledyne-Allvac [Ti]

Unit 18 (Freeport Zone), The Gateway Trading Estate
Birmingham International Airport, Birmingham B26 3QD
United Kingdom
Tel: +44 121 782 9888, Fax: +44 121 782 9800, Contact: Vikki Brian - International Sales & Marketing
Group: Allegheny Teledyne (USA)
Associated Companies: UK: Sales Office & Depot at Birmingham (for UK, Scandinavia, Spain, Portugal, Israel), Westland Helicopters (Approved Titanium Stockist). USA (regional), D, Japan, Taiwan, CIS.
Alloys: ASTM: B348-Grade 5, B381 Grade F5, F1472, F136, F1295, F67, B348 Grade 1, F67, B348 Grade 2, F67, B348 Grade 3, F67, B348 Grade 4. Allvac 6-2-4-2, Allvac 6-2-4-6, Allvac 6-4, Allvac 6-4 ELI, Allvac 6-7, Allvac 8-1-1, Allvac 40+Pd. CP Ti grades: Allvac 30, Allvac 40, Allvac 50, Allvac 70.
Designation systems: USA ISO DIN Proprietary.
Product Types: Wrought alloys Cast alloys Mill product forms. Ingot, Billet, Bar, Wire.
Applications: Depends on alloy: Jet engine parts (compressor blades, discs & rings). Helicopter hubs. Pressure vessels. Aerospace (airframes, space capsule, rocket engine cases). Medical (implants). Forgings. Fasteners. Cryogenic vessels. Heat-exchangers. Chemical industry. Desalination plants. Condenser tubing. Ordnance components.
Tradenames: Allvac.

Other Services: Finishing operations. Inspection & laboratory testing/analysis. Approvals: CAA & CQC 103, BS EN ISO 9002.
Notes: Provides high-performance titanium-based alloys by plasma cold hearth melting. Manufacturing plants located in USA. Also nickel-based, speciality steels (ultra-strength alloy steels, high-speed & tool steels).

Teledyne-Allvac [Ti]

2020 Ashcraft Avenue, PO Box 5030, Monroe NC 28111-5030
United States of America
Tel: +1 704 289 4511, Fax: +1 704 289 4018, Contact: Michael Volas - Manager, Ti Tech.
Group: Allegheny Teledyne (USA) Est: 1957 Employees: 1500
Associated Companies: USA Sales Offices & Depots: Monroe, NC (& for Pacific Rim, Latin America) NE region (Agawam, MA), W region (Paramount, CA), Midwest region (Schaumburg, IL), SW region (Houston, TX), Central region (Solon, OH). USA Toll-free: 800-537-5551. Rest of the world: UK, D, F, Japan, Taiwan, CIS (ex-USSR).
United States of America Sales Offices:
Chicago, IL. Cleveland, OH. Springfield, MA. Los Angeles, CA. Monroe, NC. Houston, TX
Worldwide Sales Offices:
Birmingham, UK (44) 121 782 9888. Paris, France (33) 1 47 61 10 60. Tokyo, Japan (81) 3 3239 9080. Wiesbaden, Germany (49) 611 9276 136. Taipai, Taiwan (886) 2 713 8101. Moscow, Russia (7) 095 943 9540. Beijing, China (86) 10 6461 5712. Krakow, Poland (48 39) 12 18 56. Seoul, Korea (2) 538 3761. Singapore (65) 338 8077. Additional Sales Office(s): Allvac, United States of America
Tel: +1 800 537 5551, Fax: +1 704 289 4018

Designation systems: USA.

Product Types: Wrought alloys Cast alloys alloys, bar & rod, bar - hollow, billet & billet CP, Electrodes, TiAluminide, flats, ingot & ingot CP/TiAluminide, mill products, high purity, rolled shapes, scrap - buy, slab & slab CP, wire & wire coil, plate, sheet.

Other Services: Alloy Development, Applications Technology, Cold Finishing, Conversion Drawing, Grinding, Heat Treating, In-House Captive, Hot Working, Melting, Recycling, Reforging, Toll Processing, Warehousing.

Notes: Allvac is a fully integrated mill supplying titanium and titanium alloys. Allvac also manufactures nickel and cobalt base superalloys, specialty steels, high speed steels, and tool steels. Products include ingot, reforging billet, forged block, stepped and tapered shafts, machine hollow bar, round and rectangular bar, rolled shapes, rod, and wire.

Teledyne-Allvac S. A. [Ti]

738, rue Yves Kermen
F-92658 Boulogne-Billancourt Cedex
France
Tel: +33 1 47 61 08 08, Fax: +33 1 47 61 97 43
Group: Allegheny Teledyne (USA)
Designation systems: USA
Product Types: Wrought alloys Cast alloys, ingot, billet, bar, tube, wire.
Notes: Sales Office for France, Italy & Greece.

Tepro Metall [AI]

Friedrich Erbert Strasse 55
D-40210 Düsseldorf
Germany
Tel: +49 211 16698 0, Fax: +49 211 3613709
Group: Elval (Greece)
Product Types: Wrought alloys, Plate, Sheet, Strip, Foil.
Notes: Agent for ELVAL (Greece).
Product Types: Wrought alloys. Rolled products.

Terra 4 Titanium Inc. [Ti]

300 Berge du Canal, Ville St. Pierre, Quebec, H8R 1H3
Canada
Tel: +1 514 364 6664, Fax: +1 514 364 1237, Contact: Stan Lorenowich - President
Est: 1996 Employees: 10
Product Types: Wrought alloys Alloys, Bar & Rod, Billet & Billet - CP, Clad Products, Columns & Towers, Electroplating, Electrodes, Anodes, Equipment, Fittings, Forgings, Heat Exchangers, Pipe - Seamless & Welded, Piping System, Plate, Plate - Clad & CP, Reactors, Rings, Rolled Shapes, Shafts & Agitators, Sheet, Slab & Slab - CP, Strip, Tanks & Vessels, Tube & Tube - Finned, Tube - Welded, Wire & Wire Coil, Billet, Plate, Bar, Tube, Wire, forgings; fabricated systems; tanks, vessels, piping, etc.
Other Services: Applications Technology, CAD/CAM, Consulting, Cutting, Cutting, Plasma, Cutting, Waterjet, Engineering, Equipment Field Services, Fabrication, Lathe Turning, Machining, Sawing, Shearing, Welding, Custom.
Notes: Materials, engineering, design and ASME 'U' stamp fabrication shop.

Textron Systems [MMC]

Essex House, 141 Kings Road, Brentwood, Essex CM14 4DR
United Kingdom
Tel: +44 1277 229192, Fax: +44 1277 228745, Contact: Austen M. Slattery - Regional Sales Manager, Europe
Group: Textron
Product Types: Ti & Al alloy matrix MMC's.

Textron Systems [MMC]

201 Lowell Street, Wilmington MA 01887
United States of America
Tel: +1 978 657 2963, Fax: +1 978 657 2930
Group: Textron
Alloys: SiC continuous fibre-reinforced /Ti-alloy MMCs: SCS-6/Ti-6-4, SCS-9/Ti-6-4, SCS-6/Ti-6-2-4-2, SCS-6/Ti-41-21, SCS-6/Ti-15-3, SCS-6/Ti-15-3-3-3, SCS-9/Ti-15-3-3-3, SCS-6/Beta 21S, SCS-6/Ti-14-21. Titanium and aluminium alloy matrices for MMC's (plasma-spray or foil). Titanium: CP Ti, Ti-15-3, Ti-15-3-3-3, Ti-14-21, Ti-6-2-4-2, Ti-6-4, Beta 21S. Aluminium: 6061.
Product Types: Silicon-carbide fibre-reinforced titanium & aluminium MMC's. Boron fibre reinforced aluminium MMC's.
Applications: Aerospace, gas turbine/jet engine components, structural reinforcement for space shuttle.
Tradenames: Hy-Bor, SCS-6, SCS-9A, SCS-Ultra.
Notes: Composites produced by a variety of methods: Laying up fibres and metal foils. Woven fabric/foils. Plasma spraying. Co-wrapped fibre/ribbon. Spirally-wrapped fibre. CVD/PVD coated fibre. Tape casting. Then consolidating/diffusion bonding using heat and pressure.

Thyssen Aceros Especiales S.A. [Ti]

Poligono Industrial c/Sant Marti, S/N
E-08100 Martorelles (Barcelona)
Spain
Tel: +34 3 570 3441, Fax: +34 3 570 2042
Group: Deutsche Titan (D)
Notes: Sales office (E) for Deutsche Titan (D).

Thyssen Garfield [AI]

PO Box 2191, Middlemore Road, Birmingham B21 0BG
United Kingdom
Tel: +44 121 554 4949
Group: Thyssen Garfield Est: 1972 Employees: 240
Alloys: BS: L105, L111, L168; DTD5083F.
Product Types: Wrought alloys Aluminium alloy bar & tube:
Round bar - 3mm to 300mm. Rectangular bar - up to 150 x 150mm. Round tube - 6mm to 41mm OD. Bar, Tube.
Applications: Engineering, electrical products, transport, aircraft, aerospace, defence, food processing, lighting, building.
Approvals: BS EN ISO 9002, CAA Group C1, MoD, numerous industrial & aerospace approvals.
Notes: Headquarters.

Thyssen Garfield [AI]

Sales Office
Birmingham, West Midlands
United Kingdom
Tel: +44 121 558 8899, Fax: +44 121 558 7999, Contact: Craig Simpson
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield - Aerospace [AI]

7 Brunswick Industrial Park, BrunswickPark Road
New Southgate, London N11 1JL
United Kingdom
Tel: +44 181 368 6699, Fax: +44 181 368 6831, Contact: Nigel Cresswell - Sales Executive
Group: Thyssen Garfield
Product Types: Wrought alloys.
Applications: Aerospace products.

Thyssen Garfield Ltd. [AI]

Dublin, Ireland
Tel: +44 117 923 1444 (UK), Fax: +44 117 923 1555 (UK)
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield Ltd. [AI]

Glasgow, Scotland
United Kingdom
Tel: +44 141 946 0221, Fax: +44 141 946 1031
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield Ltd. [AI]

Units 3-4 Lawrence Way, Stanhope Rd, Camberley
Surrey GU15 3DL
United Kingdom
Tel: +44 1276 25974, Fax: +44 1276 23979
Group: Thyssen Garfield
Product Types: Wrought alloys Light-alloy tubes, extrusions.

Thyssen Garfield Ltd. [AI]

Unit E2, Normanton Industrial Estate, Tyler Close, Normanton
West Yorkshire
United Kingdom
Tel: +44 1924 891200, Fax: +44 1924 220926
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield Ltd. [AI]

Altringham, Cheshire
United Kingdom
Tel: +44 161 927 7979, Fax: +44 161 927 7665
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield Ltd. [AI]

Bristol, Avon
United Kingdom
Tel: +44 117 923 1444, Fax: +44 117 923 1555
Group: Thyssen Garfield
Product Types: Wrought alloys.

Thyssen Garfield Processing [AI]

Birmingham, West Midlands
United Kingdom
Tel: +44 121 554 5242, Fax: +44 121 551 9315
Group: Thyssen Garfield
Product Types: Wrought alloys.
Notes: Coil processing.

110 Supplier Addresses & Product Details

Thyssen Portugal

[Ti]

Aços Serviços Lda., Apartado 32, Quinta do Peixoto-Carregado
P-2580 Alenquer
Portugal
Tel: +351 63 819327, Fax: +351 63 83315, Telex: 14458
Group: Deutsche Titan (D)
Notes: Sales office (P) for Deutsche Titan (D).

Tico Titanium, Inc.

[Ti]

24581 Crestview Ct., Farmington Hills, MI 48335
United States of America
Tel: +1 810 478 4700, Fax: +1 810 478 0223, Contact: Lynn
Brace - Manager Inside Sales
Est: 1957 Employees: 30
Product Types: Wrought alloys Bar & Rod, Bar - Hollow, Billet &
Billet CP, Commercial Products, Fabrications, Specialty,
Fasteners, Fittings, Flats, Marine Hardware, Pipe Seamless,
Pipe Welded, Piping System, Plate & Plate CP, Shafts &
Agitators, Sheet, Strip, Tube, Tube Welded, Wire & Wire Coil.
Other Services: Cutting, Cutting, Plasma, Cutting, Waterjet,
Fabrication, Lathe Turning, Machining, Milling, Sawing,
Shearing, Warehousing.
Notes: TICO Titanium Inc. has one of the largest selections of CP
titanium items in the world; over 1400 items in stock.

TIMET

[Ti]

1999 Broadway, Suite 4300, Denver CO 80202
United States of America
Tel: +1 303 296 5600, Fax: +1 303 296 5640, Internet:
<http://www.timet.com>, Contact: Jeff Wise - Sales Director
Group: Titanium Metals Corp. (USA) Est: 1950 Employees: 2400
Associated Companies: USA:
Albany (OR) Tel: +1 541 926 711; Fax: +1 541 967 7786
East Windsor (CT) Tel: +1 860 627 7051; Fax: +1 860 627 8132
Grand Prairie (TX) Tel: +1 214 641 4410; Fax: +1 214 641 3022;
Pomona (CA) Tel: +1 909 595 7455; Fax: +1 909 598 305
Saint Louis (MO) Tel: +1 314 272 2240; Fax: +1 314 272 2233
Toronto (OH) Tel: +1 614 537 5629; Fax: +1 614 537 5753
Tustin (CA) Tel: +1 714 573 1000; Fax: +1 714 537 2777
Europe: TIMET UK, TIMET Savoie, TIMET, Paris, France;
Düsseldorf, Germany.
Product Types: Wrought alloys Cast alloys Alloys, Automotive,
Bar & Rod, Billet & Billet CP, Castings: Investment, Small Qty.
Commercial Products, Marine Hardware, Sporting Goods,
Electrodes - Remelting, Electroplating, Electrodes - Anodes,
Extruded Shapes, Extrusions, Fasteners, Ferrotitanium, Fittings,
Flats, Ingot & Ingot CP/TiAluminide, Pipe - Seamless, Pipe -
Welded, Piping System, Plate & Plate CP, Powder: High Purity -
Low Chloride, Scrap, Recycle Buy & Sell, Sheet, Slab & Slab
CP, Sponge & Sponge - High Purity, Strip, Tube, Tube Finned &
Hollow, Tube - Welded, Tube - Welded & Reduced, Wire & Wire
Coil, Ingot, Billet, Plate, Sheet, Strip, Bar, Tube, Wire, Extrusion,
electrodes, castings, scrap.
Applications: Products manufactured are used in jet engine and
airframe applications, as well as power operations, chemical
equipment, medical and golf applications.
Tradenames: TIMET, TIMETAL
Other Services: Alloy Development, Analytical Development,
Applications Technology, Consulting, Cutting, Melting, Melting -
Custom & Test, Research & Design, Stock Holding, Toll
Processing, Warehousing.
Notes: World head quarters for TIMET; a leading integrated
producer of titanium mill products and castings with
manufacturing locations and sales offices in the United States
and Europe. TIMET also has three service center locations in
the US and three in Europe. Company Subsidiaries: TIMET UK,
TIMET Savoie, TISTA, Timet Castings.

TIMET Castings Corporation

[Ti]

150 Queen Avenue Southwest, P.O. Box 908
Albany, OR 97321-0336
United States of America
Tel: +1 541 926 7711, Fax: +1 541 967 7786, Internet:
<http://www.timet.com>, Contact: Richard McKinney - President
Group: Titanium Metals Corp. (USA)
Associated Companies: Additional Manufacturing Facility:
Timet Castings Corporation
4000 W. Valley Blvd., Pomona, CA 91769
United States of America
Tel: +1 909 595 7455, Fax: +1 909 598 3005
Product Types: Cast alloys Automotive, Castings, Castings,
Investment, Castings, Small Quantity, Commercial Products,
Commercial Products, Marine Hardware, Commercial Products,
Sporting Goods, Jet Engine Cases, Scrap, Buy, Scrap, Recycle,
Turbine Products, castings.
Other Services: Alloy Development, Consulting, Heat Treating, In-
House Captive, Recycling.
Notes: Produces titanium investment casting for the aerospace,
commercial products, sporting goods and medical markets.

TIMET France

[Ti]

307 Square des Champs Elysées
F-91000 Evry
France
Tel: +33 1 60 77 15 75, Fax: +33 1 60 77 06 95, Telex: 600453 f,
Contact: Mr. G. Dufournet
Est: 1980 Employees: 3
Alloys: [See: TIMET UK].
Notes: Late entry.

TIMET Savoie

[Ti]

Immeuble Les Cerclades
2, Mail des Cerclades, BP 183
F-95023 Cergy Pontoise Cedex
France
Tel: +33 1 34.41.63.63, Fax: +33 1 34.41.63.60, Internet:
<http://www.timet.com>, Contact: Alain Soulié - Sales Manager
Group: Titanium Metals Corp. (USA) Est: 1996 Employees: 100
Associated Companies: Additional Sales Office(s):
TIMET Savoie, France
Tel: +33 4 79 89 73 04, Fax: +33 4 79 37 57 24
Alloys: Commercially Pure (CP) Timetal grades: 35A-100A; Code
12. Medium & High Strength Timetal alloys: 230, 62S, 6-4, 3-2.5,
367, 10-2-3, 550, 551, 6-6-2, 15-3, 21S. High temperature
Timetal alloys: 6-2-4-2, 17, 6-2-4-6, 679, 685, 8-1-1, 829, 834,
1100. Development Timet alloys: 21SRx, LCB, 5111.
Product Types: Wrought alloys Cast alloys Alloys, Bar & Rod,
Billet, Billet CP, Electrodes - Remelting, Extruded Shapes,
Extrusions, Flats, Ingot & Ingot CP, Pipe - Welded, Plate & Plate
CP, Buy - Recycle & Sell Scrap, Turnings, Sheet, Slab & Slab
CP, Strip, Tube, Tube - Welded, Wire & Wire Coil.
Tradenames: TIMET, TIMETAL.
Other Services: Alloy Development, Analytical Development,
Applications Technology, Research & Design, Stock Holding,
Warehousing.
Notes: Joint venture between TIMET and Cezus, TIMET Savoie is
a producer of long products (ingot to wire) - the production plant
is located in south France and TIMET Savoie is the French sales
representative for all TIMET group products (long, flat, tube).

TIMET UK Ltd [Ti]

P.O. Box 704, Witton, Birmingham B6 7UR
 United Kingdom
Tel: +44 121 356 1155, **Fax:** +44 121 356 5413, **Internet:**
<http://www.timet.com>, **Contact:** M.G. Hudson - Sales Manager
Group: Titanium Metals Corp. (USA) **Est:** 1996 **Employees:** 800
Associated Companies: USA: Albany, OR; E. Windsor, CT;
 Grand Prairie, TX; Pomona & Tustin, CA; Saint Louis, MO;
 Toronto, OH.

Alloys: Commercially Pure (CP) Timetal grades: 35A-100A; Code
 12. Medium & High Strength Timetal alloys: 230, 62S, 6-4, 3-2-5,
 367, 10-2-3, 550, 551, 6-6-2, 15-3, 21S. High temperature
 Timetal alloys: 6-2-4-2, 17, 6-2-4-6, 679, 685, 8-1-1, 829, 834,
 1100. Development Timetal alloys: 21SRx, LCB, 5111.

Product Types: Wrought alloys Bar & Rod, Billet, CP Billet,
 Extruded Shapes, Flats, Ingot, Plate, CP Plate, Sheet, Wire &
 Wire Coil, Strip.

Tradenames: TIMET; TIMETAL.

Other Services: Alloy Development, Applications Technology,
 Technical Assistance: ext. 308. **Approvals:** ISO 9002, ANSI-
 RAB, AQA.

Notes: TIMET UK is a manufacturer and service centre for
 titanium and titanium alloyed semi finished products.

Timminco Metals [Mg]

Div. of Timminco Limited, County Road 40, RR #2
 Pembroke, Ontario K8A 6W3
 Canada
Tel: +1 613 638 2501, **Fax:** +1 613 638 2777, **Contact:** Dave
 Bromley
Group: Timminco Ltd. - Canada

Timminco Metals [Mg]

P.O. Box 1160, Station A, Water Park Place, 9th Floor
 10 Bay Street, Toronto, Ontario M5J 2R8
 Canada
Tel: +1 416 364 5171, **Fax:** +1 416 364 3451, **Contact:** George
 Andruszczenko
Group: Timminco Ltd. - Canada
Product Types: Cast alloys. Powders Ingot (primary pure).
 Powder, chunks & granules. Chips & turnings. Ingot, Billet,
 Extrusion, anodes (cast & extruded).
Applications: Aerospace. Automotive. Nuclear energy.
 Pharmaceutical. Aluminium industry.
Notes: Primary producer of Mg metal & alloys. High-purity grades
 + speciality alloys. Plant at: Haley, Ontario (Canada).
 [Information provided by International Magnesium Association].

Timminco Metals [Mg]

A Division of Timminco Limited
 County Road 7, RR #1, Haley, Ontario K0J 1Y0
 Canada
Tel: +1 613 432 7551, 3621, **Fax:** +1 613 432 7897, 9457, **Telex:**
 06-218677, **Contact:** Andy De Ciccio - Product Apps. Engineer
Group: Timminco Ltd. - Canada
Alloys: Timminco Ultra Purity magnesium alloys: AZ91X,
 AZ91UX, AM60X, AM60SX, AZ63, AZ92. Anode alloys: AZ31,
 M-1 Hi-potential. MAG-CAL 70/30 alloy.
Product Types: Wrought alloys Cast alloys Mg casting alloys +
 anodes. Ultra purity magnesium alloys for improved corrosion
 resistance. Anodes for water heaters. Magnesium granules and
 particulate for the chemical industry (Grignard reagents).
 Magnesium/calcium Mag-Cal alloy for Lead refining (Kroll-
 Betterton process for removal of Bismuth). High purity
 magnesium. Ingot.
Tradenames: MAG-CAL.

Timminco Metals [Mg]

Div. of Timminco Limited
 1246-1, Kuden-cho, Sakee-ku, Yokohama 247
 Japan
Tel: +81 45 891 6689, **Fax:** +81 45 895 1222, **Contact:** Ken
 Shiraishi
Group: Timminco Ltd. - Canada

Timminco Metals [Mg]

Div. of Timminco Technologies Corp.
 750 Lake Cook Road, Suite 405, Buffalo Grove, IL 60089
 United States of America
Tel: +1 847 215 6770, **Fax:** +1 847 215 6774, **Contact:** Martin
 Bray
Group: Timminco Ltd. - Canada

Timminco Metals [Mg]

Div. of Timminco Technologies Corp.
 3330 Matlock Road, Suite 210, Arlington, TX 76015
 United States of America
Tel: +1 817 557 1135, **Fax:** +1 817 557 2393, **Contact:** Ralph
 Serralta
Group: Timminco Ltd. - Canada

Timminco Pty. Ltd. [Mg]

Unit 2, 1A Gibbon Road, PO Box 42, Baukham Hills
 New South Wales 2153
 Australia
Tel: +61 2 9838 8544, **Fax:** +61 2 9838 7690, **Contact:** Bram
 Pollack
Group: Timminco Ltd. - Canada
Applications: Cathodic protection anodes.

Timminco S.A. [Mg]

44, chemin de la Petite-Boisiere
 CH-1208 Geneva
 Switzerland
Tel: +41 22 786 63 56, **Fax:** +41 22 786 64 63, **Contact:** Bernard
 Closset
Group: Timminco Ltd. - Canada

Titania S.p.A. [Ti]

Viale B. Brin, 218
 I-05100 Terni
 Italy
Tel: +39 744 403320, **Fax:** +39 744 58390, **Contact:** Marco
 Stoppoloni - Chief Executive Officer
Group: AST S.p.A. (I) **Est:** 1988 **Employees:** 65
Associated Companies: Additional Sales Office(s):
 Titania S.p.A., Milano, Italy
Tel: +39 2 66104251, **Fax:** +39 2 643 8571
Product Types: Wrought alloys Bar & Rod, Billet, CP, Ingot, Plate,
 Sheet, Slab, Strip, Tube - Welded, Wire & Wire Coil.
Other Services: Alloy Development, Applications Technology,
 Cold Finishing, Cold Working, Consulting, Engineering, Grinding,
 Hot Working, Lathe Turning, Melting, Test, Milling, Pickling,
 Research & Design, Stock Holding.
Notes: Titania S.p.A. produces and sells titanium semi finished
 products in the range of flat and tubular products.

Titan & Alliges Rares Micro Moulés [Ti]

See: TARMM S.A.

Titanium Engineers, Inc. [Ti]

P.O. Box 1527, 4181 Bluebonnet Drive, Stafford, TX 77497
 United States of America
Tel: +1 281 265 2910, **Fax:** +1 281 265 2818, **Contact:** Mitchell
 Dziekonski - Technical Manager
Est: 1988 **Employees:** 7
Product Types: Wrought alloys Bar, Hollow, Billet, Commercial
 Products, Marine Hardware, Electroplating, Electrodes, Anodes,
 Pipe, Seamless, Shafts & Agitators, Tube, Bar, Tube.
Other Services: Alloy Development, Consulting, Engineering,
 Machining, Research & Design, Warehousing.
Notes: Specializes in the development of specialty titanium
 industrial equipment. Components can be manufactured on a
 turnkey basis for both prototype and production quantities.
 Stocks a variety of non standard titanium bar stock. Seamless
 tubing can be produced in a wide range of sizes.

112 Supplier Addresses & Product Details

Titanium Hearth Technologies, Inc. [Ti]

Morgantown Business Park, Hemlock Road
Morgantown, PA 19543
United States of America
Tel: +1 610 286 6100, **Fax:** +1 610 286 3831, **Contact:** William C. Acton - President
Group: Titanium Metals Corp. (USA) **Est:** 1972 **Employees:** 300
Associated Companies: Additional Sales Office(s):
THT, Inc. Vallejo Plant, Vallejo, CA United States of America
Tel: +1 707 552 4850, **Fax:** +1 707 552 8320
Alloys: CP & primary titanium.
Product Types: Wrought alloys Cast alloys Electrodes, Electrodes - Remelting, Furnaces - Electron Beam, Ingot - CP, Ingot - Hollow, Buy, Recycle & Sell Scrap, Slab, Slab - CP.
Other Services: Analytical Development, Melting, Recycling, Toll Processing.
Notes: Titanium Hearth Technologies produces a variety of titanium products using electron beam cold hearth melting techniques. The company offers commercially pure titanium ingot and cast slab. Both are suitable for direct rolling or forging. THT recycles most forms of titanium scrap.

Titanium Industries GmbH [Ti]

Tiefenbroicher Weg 35
D-40472 Düsseldorf
Germany
Tel: +49 211 418930, **Fax:** +49 211 4189313, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)
Approvals: BS, SBAC.

Titanium Industries Inc. [Ti]

110 Lehigh Drive, Fairfield NJ 07004-3044
United States of America
Tel: +1 201 808 0222, **Fax:** +1 201 808 9119, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)
Alloys: ASTM: Grade 1, Grade 2, Grade 3, Grade 4, Grade 5, Grade 6, Grade 7, Grade 9, Grade 11, Grade 12. Ti-4Al-4Mo-2.5Sn (550), Ti-10Fe-2V-3Al (10-2-3), Ti-15V-3Al-3Cr-3Sn (15-3), Ti-6Al-2Sn-4Zr-2Mo (6-2-4-2), Ti-6Al-2Sn-4Zr-6Mo (6-2-4-6), USA MIL-T-9046J & 9047G alloys.
Product Types: Wrought alloys Titanium mill products: Round - 12.5 to 100mm dia. Billet - 110 to 300mm dia. Sheet - 0.5 to 3.2mm. Plate - 4.8 to 75mm. Pipe - 12.5mm and greater. Fine wire/small bar - 0.013mm to 12.5mm. Tubing - 12.5 to 25mm dia. Billet, Plate, Sheet, Bar, Tube, Wire, fittings, fasteners.
Applications: Industrial, orthopaedic, aerospace.
Notes: Corporate offices.

Titanium Industries, Inc. [Ti]

Canada Eastern
5715 Chemin St Francois, Ville St-Laurent, Quebec H4S 1W6
Canada
Tel: +1 514 334 6727, **Fax:** +1 514 334 4280, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

Canada Western
7888 Alderbridge Way, Richmond, British Columbia V6X 2A5
Canada
Tel: +1 604 276 8433, **Fax:** +1 604 276 8483, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

Midwest Region - USA
801 Sivert Drive, Wood Dale, IL 60191
United States of America
Tel: +1 630 860 2606, **Fax:** +1 630 860 2877, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

Eastern Region - USA
181 Easy Halsey Road, Parsippany, NJ 07054
United States of America
Tel: +1 201 428 1900, **Fax:** +1 201 428 7250, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

South-East Region - USA
5151 Sunbeam Road, Suite 12, Jacksonville, FL 32257
United States of America
Tel: +1 904 730 2007, **Fax:** +1 904 730 0350, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

Western Region - USA
16030 South Carmenita Road, Cerritos, CA 90703
United States of America
Tel: +1 310 802 2889, **Fax:** +1 310 404 8972, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium Industries, Inc. [Ti]

48 South Street
Morristown, NJ 07960
United States of America
Tel: +1 973 984 8200, **Fax:** +1 973 984 8206, **Internet:**
<http://www.titanium.com>, **Contact:** James S. Paddock - President
Group: Oremet (USA) **Est:** 1972 **Employees:** 100
Associated Companies: United States Locations:
Parsippany, NJ +1 201 428 1900. Jacksonville, FL +1 904 730 2007. Grand Prairie, TX +1 972 606 1121. Cerritos, CA +1 562 802 2889. Bellevue, WA +1 206 453 6244. Wood Dale, IL +1 630 860 2606. Frackville, PA +1 717 874 0311. Windsor, CT +1 860 683 1920.
Worldwide Locations:
Ville St. Laurent, Quebec Canada +1 514 334 6727. Richmond, British Columbia Canada +1 604 276 8433. Birmingham, England +44 121 789 8030. Düsseldorf, Germany +49 211 418930
Product Types: Wrought alloys Cast alloys Alloys & CP Grades, Bar & Rod, Castings, Extruded Shapes, Fabrications, Specialty, Fasteners, Fittings, Flats, Foil, Forgings, Medical, Pipe - Seamless & Welded, Piping System, Plate, Plate - Clad & CP Alloy, Rolled Shapes, Scrap - Sell, Sheet, Strip, Tube, Tube - Welded & Reduced, Wire & Wire Coil.
Other Services: Applications Technology, Consulting, Conversion Drawing, Cutting, Cutting - Plasma, Cutting - Waterjet, Fabrication, Heat Treating, In-House, Lathe Turning, Machining, Milling, Pickling, Sawing, Shearing, Stock Holding, Warehousing, Welding, Wire Conversion. **Approvals:** ISO 9002.
Notes: Titanium Industries Inc. group is part of Oremet Inc. (USA). Distributor and first stage processor of all titanium mill products for the industrial and aerospace markets with warehouses in the United States of America, Canada, UK and Germany.

Titanium Industries, Inc. [Ti]

South-West Region - USA
1106 North Highway 360, Suite 200, Grand Prairie TX 75050
United States of America
Tel: +1 214 606 1121, **Fax:** +1 214 660 2179, **Internet:**
<http://www.titanium.com>
Group: Oremet (USA)

Titanium International Fabricators (Pty) Ltd. [Ti]

P.O. Box 783284, Sandton, Johannesburg 2146
South Africa
Tel: +27 11 393 1022, Fax: +27 11 393 1025, Contact: Ray Ferguson - Managing Director
Est: 1987 Employees: 22
Product Types: Wrought alloys Alloys, Bar & Rod, Columns & Towers, Electroplating, Electrodes, Anodes, Equipment, Fabrications, Specialty, Fasteners, Filters, Fittings, Flats, Heat Exchangers, Medical, Pipe, Piping System, Pipe - Seamless, Pipe - Welded, Plate & Plate - CP, Reactors, Scrap, Turnings, Shafts & Agitators, Sheet, Tanks & Vessels, Welded Tube, Welded & Reduced Tube, Wire & Wire Coil, Sheet.
Other Services: Coatings / Anodizing, Cold Working, Cutting, Cutting, Plasma, Cutting, Waterjet, Engineering, Equipment Field Services, Fabrication, Field Installations, Laser Drilling & Cutting, Lathe Turning, Machining, Milling, Sawing, Shearing, Stock Holding, Warehousing, Welding.
Notes: Stockists and fabricators of titanium and other special metals and nickel alloys for the chemical, petro chemical, pulp and paper, and mining industries.

Titanium International Ltd. [Ti]

Keys House, Granby Ave., Garrets Green
Birmingham, W. Midlands B33 0SP
United Kingdom
Tel: +44 121 789 8030, Fax: +44 121 784 8054, Telex: 338253,
Internet: <http://www.titanium.com>, Contact: Roger G. Hopper - Market Development Engineer
Group: Oremet (USA)
Alloys: ASTM: Grade 1, Grade 2, Grade 3, Grade 4, Grade 5, Grade 7, Grade 9. Titanium 6Al-4V alloys, etc. Zirconium 702 products: sheet, plate, bar, tube, pipe, wire.
Product Types: Wrought alloys Cast alloys, Billet, Plate, Sheet, Bar, Tube, Wire, flanges, fittings, castings.
Applications: Industrial, aerospace, medical. Metal finishing, Heat exchangers, Chemical plant, Off-shore, Piping systems, Sports equipment, Vessels - tanks, Spectacle frames, Motor racing.
Approvals: CAA: AMD/106/81, BAC/AG/2029/CHE, Rolls Royce: CQC 103, BSI registered - RSO 63.

Titanium Powder Specialists, LLC [Ti]

8728 South Little Cloud Road, Sandy, UT 84093
United States of America
Tel: +1 801 942 0297, Fax: +1 801 944 5183, Contact: Robert K. Fry - President
Est: 1995 Employees: 4
Product Types: Powders Alloying Additives, Alloys, Medical, Powder, Powder Alloys, Powder - High Purity, Powder - Low Chloride, Powder - Parts, Sponge, Sponge - High Purity.
Other Services: Consulting, Engineering.
Notes: The primary focus of our company is the custom screening of Commercially Pure and Alloyed Metallic Titanium Powder and titanium sponge fines, for various applications, including: Medical, Thermal Spray, and Powder Metallurgy Parts. We can, basically, screen material to any size range from 20 mesh through 325 mesh. Much of the powder we screen is for Thermal Spray applications and is in the minus 100 plus 325 mesh size range.

Titanium Products Ltd. [Ti]

96 Widney Lane, Solihull, West Midlands B91 3LL
United Kingdom
Tel: +44 121 705 1483, Fax: +44 121 733 1483, Contact: J.R. Turner - Director
Alloys: Commercially pure (CP Ti) Tempers: Fully annealed or residual cold-work.
Product Types: Wrought alloys Welded CPTi tube, diameter range 6-42mm, max. length 12m. Cold-drawn, thin-walled, small dia. tube (0.25-11.7mm bore, 0.90-12.7mm OD +/-0.025 cold-drawn, +/-0.0127mm ground), max. length 2m. Fully annealed or with residual cold-work. Thick-walled, welded/seamless tube (1.0-6.0mm wall, 3.0-35.0mm OD, 0.8-31.6mm ID, +/-0.050mm cold formed, +/-0.17mm ground.

Applications: Thin-walled, small dia. for medical/surgical instruments (especially key-hole surgery). Sheaths (sensitive instruments). Electrodes (electrochemical machining). Thick-walled for medical/surgical instruments, e.g. cannulars. Sheathing sensitive instruments.

Other Services: Cold-forming (drawing, swaging, etc.), machining, welding to produce various shaped semi- or finished components to customer drawings, e.g. OEM cycle manufacturers.

Titanium Products, Inc. [Ti]

890 N. Main, Independence, OR 97351
United States of America
Tel: +1 503 838 2898, Fax: +1 503 838 2910, Contact: Larry E. Lavoie - President
Group: Titanium Products Inc. (USA) Est: 1994 Employees: 30
Product Types: Wrought alloys, Powders Forgings, Forgings, Conventional, Forgings, Custom, Forgings, Impression Die, Forgings, Open Die, Powder, Parts, Forgings; powder parts.
Applications: Automotive, Marine Hardware, Commercial Products, Sporting Goods.
Other Services: CAD/CAM, Cold Working, Conversion Drawing, Engineering, Fabrication, Heat Treating, In-House Captive, Heat Treating, Outside Processing, Hot Isostatic Pressing (HIP), Hot Working, Inspection, CMM, Inspection, FP, Inspection, Ultrasonic, Inspection, X-Ray, Laser Drilling & Cutting, Machining, Sand Blasting, Sawing, Welding.
Notes: Titanium Products, Inc. specializes in stamping forming and forging of golf club components and non aerospace hardware.

Titanium Wire Corp. [Ti]

235 Industrial Park Road, Frackville, PA 17931
United States of America
Tel: +1 717 874 0311, Fax: +1 717 874 3198, Internet: <http://www.titanium.com>
Group: Oremet (USA)
Alloys: Commercially Pure Titanium: ASTM B 348 Grades 1,2,3,4; AWS A5.16 ERTi 1,2,3,4; ASTM F 67 Grades 1,2,3,4; AMS 4951; AMS 4921. Titanium Alloy 6Al 4V: ASTM B 348 Grade 5; AWS A5.16 ERTi 5; AMS 4954. Titanium Alloy 6Al 4V ELI: ASTM F 136; AMS 4956; AWS A5.16 ERTi 5 ELI. Titanium Alloy Ti 0.2 Pd: ASTM B 348 Grade 7 & 11, AWS A5.16 ERTi 7. Titanium Alloy Ti 0.3 Mo 0.8Ni: ASTM B348 Grade 12, AWS A5.16 ERTi 12. Titanium Alloy 5Al 2.5 Sn: AMS 4953; AWS A5.16 ERTi 6, ASTM B 348 Grade 6. Titanium Alloy 3Al 2.5 V: ASTM B 348 Grade 9, AWS A5.16 ERTi 9. Titanium Alloy TiNiobium: ASTM F 1295
Product Types: Wrought alloys Titanium Bar Diameters: 0.045 inches - 0.500 inches mill finish or centerless ground
Titanium Bar Lengths: Up to 20 feet
Titanium Weld Wire Diameters: 0.030 inches - 0.197 inches
Wire Spool Sizes: 2 inches - 12 inches
Titanium Fine Wire Diameters: 0.0015 inches - 0.030 inches.
Applications: Titanium fine wire and braided cable is being used more frequently in biomedical and industrial applications

Toyal Europe SA [AI]

14 rue Gambetta
F-78600 Le Mesnil-le-Roi
France
Tel: +33 1 39 12 00 14, Fax: +33 1 39 12 32 23, Telex: 698315
fralpat, Contact: Mme. M-B Bonvarlet - Chemical Engineer/Sales
Group: Toyo Aluminium KK (Japan) Est: 1982
Associated Companies: Toyal group companies:
Japan: Tokyo, Osaka, Hino, Shijo. USA: Toyo America Inc. Joliet, Chicago, Illinois. Canada: Montreal. Europe: Austria, Belgium, Finland, France: Paris, Accous; Italy, Luxembourg, Morocco, Netherlands, Portugal, Romania, Scandinavia, South Africa, Spain, Switzerland, Turkey, United Kingdom.
Alloys: Powder grades: 405, 416, 432S, 455, 462, 406S, 404N.
Product Types: Powders Atomised pure aluminium powders and pastes for pigments.
Applications: Paints, etc.
Approvals: ISO 9000, 9002 No. 4003:1995.

114 Supplier Addresses & Product Details

Toyo [AI]

See also: Alcan Toyo Europe

Toyo Aluminium KK [AI]

Midosuji Daiwa Bldg. 6-8 Kyutaro-machi 3-chome, Chuo-ku
Osaka 541

Japan

Tel: +81 6 271 3151, Fax: +81 6 245 4696

Group: Toyo Aluminium KK (Japan)

Product Types: Powders.

TSK Chemical Co., Ltd. [AI]

72/6-8 Moo 12, Bangplee-Samutprakarn Road
T. Bangpleeyai, A. Bangplee, Samutprakarn 10540

Thailand

Tel: +66 2 751 0410, Fax: +66 2 751 0430, Contact: Somchai Tan

Group: Comalco

Notes: Distributor - Aluminium Pastes / Flakes

Türk Maadin Sirketi AS [AI Mg Ti]

PK 33, 80002 Karaköy, Istanbul

Turkey

Group: Metallurg (USA)

Product Types: Powders.

TYK Corporation [AI Ti]

2349 Fairview St., Suite 219, Burlington, Ontario L7R 2E3
Canada

Tel: +1 416 681 1746, Fax: +1 416 681 2868

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [AI Ti]

Suite 100, 7333 Place des Roseraies, Anjou Montreal
Quebec H1M 2X6

Canada

Tel: +1 514 352 7820, Fax: +1 514 352 3800

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan.

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [AI Ti]

30 bis avenue Sainte Cecile

F-59130 Lambertsart

France

Tel: +33 3 20 92 12 24, Fax: +33 3 20 92 04 02

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan.

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [AI Ti]

Moerserstr. 17

D-47198 Duisburg

Germany

Tel: +49 2066 55057, Fax: +49 2066 12946

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [AI Ti]

Tekko Building, 1-8-2 Marunouchi, Chiyoda-ku, Tokyo 100

Japan

Tel: +81 3 3201 0821, Fax: +81 3 3213 3566, Telex: 222 5208

tofito j

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan.

Alloys: METACS 20 (silicon carbide particle reinforced A6061-T6
alloy MMC).

Ti-METACS TM6 (ceramic particle reinforced titanium MMC)

Ti-METACS TS7 (ceramic particle reinforced titanium MMC)

Designation systems: Japan.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

Notes: Part of TYK's Advanced Materials operation, developed
from their expertise in refractories and ceramics technology.

TYK Corporation [AI Ti]

38 Ta-yeh Street, Ta-Liao Hsiang, Ta-Fa Industrial Zone

Kaohsiung-Hsien

Taiwan

Tel: +6 7 787 3885, Fax: +6 7 787 3887

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan.

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [AI Ti]

Chiltern Way, Chiltern Industrial Estate

Chilton, Ferryhill, Durham DL17 0SD

United Kingdom

Tel: +44 1388 720210, Fax: +44 1388 720229

Group: TYK Corporation

Associated Companies: USA, Canada, UK, France, Germany,
Taiwan

Alloys: METACS & Ti-METACS metal matrix composites.

Product Types: Wrought alloys Cast alloys Metal matrix
composites (MMC), Billet.

Applications: Aluminium-based: engine components, sports
goods, aerospace items.

Tradenames: METACS; Ti-METACS.

TYK Corporation [Al Ti]

1905 Bernice Road, Lansing IL 60438
 United States of America
Tel: +1 708 895 6175, **Fax:** +1 708 895 6130
Group: TYK Corporation
Associated Companies: USA, Canada, UK, France, Germany, Taiwan.
Alloys: METACS & Ti-METACS metal matrix composites.
Product Types: Wrought alloys Cast alloys Metal matrix composites (MMC), Billet.
Applications: Aluminium-based: engine components, sports goods, aerospace items.
Tradenames: METACS; Ti-METACS.

TYK Corporation [Al Ti]

301 Brickyard Road, Clairton PA 15025
 United States of America
Tel: +1 412 384 4259, **Fax:** +1 412 384 4242
Group: TYK Corporation
Associated Companies: USA, Canada, UK, France, Germany, Taiwan
Alloys: METACS & Ti-METACS metal matrix composites.
Product Types: Wrought alloys Cast alloys Metal matrix composites (MMC), Billet.
Applications: Aluminium-based: engine components, sports goods, aerospace items.
Tradenames: METACS; Ti-METACS.

TYK Corporation [Al Ti]

Tri-mor Building, 3701 Nameoki Road, Granite City IL 62040
 United States of America
Tel: +1 618 452 0160, **Fax:** +1 618 452 0160
Group: TYK Corporation
Associated Companies: USA, Canada, UK, France, Germany, Taiwan.
Alloys: METACS & Ti-METACS metal matrix composites.
Product Types: Wrought alloys Cast alloys Metal matrix composites (MMC), Billet.
Applications: Aluminium-based: engine components, sports goods, aerospace items.
Tradenames: METACS; Ti-METACS.

TYK Corporation [Al Ti]

Suite 800, 20600 Eureka Road, Taylor, MI 48180
 United States of America
Tel: +1 313 281 4447, **Fax:** +1 313 281 2813
Group: TYK Corporation
Associated Companies: USA, Canada, UK, France, Germany, Taiwan.
Alloys: METACS & Ti-METACS metal matrix composites.
Product Types: Wrought alloys Cast alloys Metal matrix composites (MMC), Billet.
Applications: Aluminium-based: engine components, sports goods, aerospace items.
Tradenames: METACS; Ti-METACS.

UBE Beijing Office [Mg]

Room 25-10, China World Trade Center, Beijing 100004
 China
Tel: +86 10 505-1327~8, **Fax:** +86 10 505-1329, **Telex:** 22515
Group: UBE (J)
Notes: Sales Office.

UBE Chemical Industries, Ltd. [Mg]

1985 Oaza Kogushi, Ube, Yamaguchi, 755
 Japan
Tel: +81 836 31-0156, **Fax:** +81 836 21-9778
Group: UBE (J) **Est:** 1949
Notes: Production/sales of seawater magnesia, magnesium hydroxide, magnesium oxide, and others.

UBE Europe (España), S.A. [Mg]

c/o PROQUIMED, S.A.
 P.O. Box 118
 E-12080 Castellon
 Spain
Tel: +34 9 64 738068, **Fax:** +34 9 64 738074
Group: UBE (J)
Notes: Sales Office for UBE Industries products in Europe plus materials purchasing.

UBE Europe GmbH [Mg]

Immermann Hof, Immermannstr. 65B
 D-40210 Düsseldorf
 Germany
Tel: +49 211 178830, **Fax:** +49 211 3613297, **Telex:** 8587237
Group: UBE (J)
Notes: Sales Office for UBE Industries products in Europe plus materials purchasing.

UBE (Hong Kong) Ltd. [Mg]

Room 1413-6,14F, Sun Hung Kai Centre, 30 Harbour Road
 Hong Kong
Tel: +852 2877-1628, **Fax:** +852 2877-1262
Group: UBE (J)
Notes: Sales Office.

UBE Industries (America), Inc. [Mg]

666 Fifth Avenue
 New York, N.Y. 10103
 United States of America
Tel: +1 212 765-5865-7, **Fax:** +1 212)765-5263, **Telex:** 126187
Group: UBE (J)
Notes: Sales Office for UBE Industries products in America plus materials purchasing.

UBE Industries - Light Metal [Mg]

Ube Building, 2-3-11 Higashi-Shinagawa, Shinagawa-ku
 Tokyo 140
 Japan
Tel: +81 3 5460 3299, **Fax:** +81 3 5460 3417, **Contact:** Mr. Susumu Mizuno - Sales Department
Group: UBE (J)
Product Types: Cast alloys, Powders Ingot (primary - pure & alloy). Powder, chunks & granules. Ingot, anodes (cast).
Other Services: Machinery (die-casting/extrusion, etc).
Notes: One of the largest chemical houses in Japan. The main pillars of UBE's conglomerate operations consist of Chemicals & Plastics, Construction Materials, Machinery & Engineering, and Coal. Over 30 years of experience in Mg production & related products, inc: Magnesium, Magnesium alloys, Magnesium die-cast products. [Information from the International Magnesium Association]. Magnesium powder; magnesium-based chemicals [See: UBE Chemical Industries, Japan].

UBE International (Netherlands) B.V. [Mg]

Amsteldijk 166
 NL-1079 LH Amsterdam
 Netherlands
Contact: c/o UBE Europe GmbH. **Tel:** +49 211 3560851; **Fax:** +49 211 3613297.
Group: UBE (J) **Est:** 1990
Notes: Administration/services for UBE-affiliates in Europe & Asia.

UBE Singapore Office [Mg]

150 Beach Road, 20-05 Gateway West, Singapore 189720
 Singapore
Tel: +65 291-9363, **Fax:** +65 293-9039, **Telex:** 34651
Group: UBE (J)
Notes: Sales Office.

116 Supplier Addresses & Product Details

UBE Sydney Office [Mg]

1 York Street, Sydney, New South Wales 2000
Australia
Tel: +61 2 251 4124/5/6, Fax: +61 2 251 4293, Telex: 74203
Group: UBE (J)
Notes: Sales Office.

UBE (Thailand) Co. Ltd. [Mg]

22Flr, Thaniya Plaza Building, 52 Silom Road, Bangkok 10500
Thailand
Tel: +66 2 231 2410 - 2, Fax: +66 2 231-2413
Group: UBE (J)
Notes: Sales Office.

UBE Trading Co. Ltd. [Mg]

UBE Building, 3-11, Higashi-shinagawa 2-chome, Shinagawa-ku
Tokyo, 140
Japan
Tel: +81 3 5460-3470, Fax: +81 3 5460-3490
Group: UBE (J) Est: 1950
Notes: Product import/export, domestic sales.

Ulbrich [Ti]

See: Aerodyne Ulbrich Alloys

United Alloys Inc. [Ti]

3398 Leonis Boulevard, Vernon, CA 90058
United States of America
Tel: +1 213 264 5101, Fax: +1 213 262 1172, Contact: Ron Donn
- President
Est: 1971 Employees: 23
Associated Companies: Additional Sales Office(s):
United Alloys
Fort Jeferson, NY United States of America
Tel: +1 800 895 7262, Fax: +1 516 473 1683
Product Types: Wrought alloys Bar & Rod, Billet, Forgings, Open
Die Forgings, Plate, Rings, Sheet.
Other Services: Cutting, Turning.
Notes: United Alloys, Inc. is a manufacturer of titanium bar, plate
and open die forgings.

United Magnesium Company Ltd. [Mg]

1 Beiyan Rd, Da Yun Highway, Wen Xi, Shanxi 043800
China
Tel: +86 35970 21888, Fax: +86 35970 24088
Product Types: Cast alloys Primary pure ingot. Ingot
Notes: An American-Chinese joint venture in the P.R.C. Export
facilities. [Information from International Magnesium Association]

Universal Stainless Inc. [Al Mg Ti Be]

Box 8222704, South Florida, FL 33025
United States of America
Tel: +1 954 436 1961, Fax: +1 954 436 3803, Internet:
<http://www.covesoft.com/computer/univstain>, Contact: Andrew
Samuels - Sales Manager
Product Types: Wrought alloys, Bar, Tube.

Universal Steels & Aluminium Ltd. [Al Ti]

Unit 4, Dunlop Drive, Meadowhead Industrial Estate
Irvine, Ayrshire KA11 5AU
United Kingdom
Tel: +44 1294 316400, Fax: +44 1294 316401, Email:
sales@usanda.demon.co.uk, Internet:
<http://www.usanda.demon.co.uk>
Group: Universal Steels & Aluminium Ltd.
Alloys: Handle all current United Kingdom specifications as well
as most American specifications and a wide range of French and
German specification materials.
Product Types: Wrought alloys Aluminium:
Sheet: 0.012" (0,30 mm) to 0.250" (6,5 mm) thick, up to 79
inches wide and 35 feet long (2m x 10.6m)
Plate: 0.250" (6,5 mm) to 5.5" (140 mm) thick

Bar: 0.125" (3,2 mm) to 12" (305 mm) diameter, 0.250" (6,5 mm)
square to 5" x 9" (130 mm x 230 mm)
Tube: 0.125" (3,2 mm) diameter x 0.020" (0,5 mm) thick wall to
10" (260 mm) diameter x 1" (25 mm) thick wall
Extruded / Rolled Section: many commonly used sections in
stock - others are available to order. Titanium: Sheet / Plate:
0.018" (0,46 mm) thick to 5" (130 mm) thick.
Bar: 0.250" (6,5 mm) square to 4" (102 mm) square
Tube: 0.250" (6,5 mm) diameter x 0.022" (0,56 mm) thick wall to
2" (51 mm) diameter x 0.064" (1,6 mm) thick wall.
Plate, Sheet, Bar, Tube, Extrusion.

Applications: Aircraft industry.

Approvals: ISO 9002.

Universal Steels & Aluminium Ltd. [Al Ti]

7 Lostock Industrial Estate, Cranfield Road, Lostock
Bolton, Lancashire BL6 4SB
United Kingdom
Tel: +44 1204 669356, Fax: +44 1204 669358, Email:
sales@usanda.demon.co.uk, Internet:
<http://www.usanda.demon.co.uk>

Group: Universal Steels & Aluminium Ltd.

Alloys: Handle all current United Kingdom specifications as well
as most American specifications and a wide range of French &
German specification materials.

Product Types: Wrought alloys.[See: Universal Steels &
Aluminium Ltd., Ayrshire, UK].

US Vanadium Corporation [Ti]

Twin Towers Office Building, 4955 Steubenville Pike
Pittsburgh, PA 15205-9604
United States of America
Tel: +1 412 787 4700, Fax: +1 412 787 4727, Contact: Carl E.
Ruppel - Industry Manager
Group: Strategic Minerals Corp. Est: 1986 Employees: 131
Product Types: Cast alloys Alloying Additives, Alloys.
Other Services: Alloy Development, Melting, Melting, Custom,
Melting, Test, Research & Design. Approvals: ISO certified.
Notes: Manufactures and sells vanadium products to the titanium,
steel and chemical industries. Fully integrated producer of
vanadium aluminum master alloys. Supplies the titanium
industry worldwide with the highest quality products and services
from ISO certified plants in the U.S.

UTSC [Ti]

Shinagawa NSS Building, 2-13-31 Kohnan, Minato-ku, Tokyo 108
Japan
Tel: +81 33 458 4411, Fax: +81 33 458 4431, Contact: Mr. Yoichi
Arai - President
Est: 1990 Employees: 2
Associated Companies: Additional Sales Office(s):
Mitsui & Co. (U.S.A.), Inc.: New York, NY USA
Tel: +1 212 878 4133, Fax: +1 212 878 4121
Product Types: Cast alloys Sponge, Sponge - High Purity.
Notes: Offers vacuum distilled titanium sponge with the highest
quality. Parent companies: Toho Titanium Co. Ltd. Nippon Steel
Corp. Nippon Mining & Metals Corp. Mitsui & Co. Ltd. Mitsui
(U.S.A.) Inc.

VAMI [Al Mg]

See: Russian National Aluminium-Magnesium Institute

Vanalp Industry [Al]

11, Avenue Docteur Schweitzer, BP 48
F-69881 Meyzieu Cedex
France
Tel: +33 4 78 31 75 18, Fax: +33 4 72 02 85 47, Telex: 306951
vanalp f
Group: Groupe Valfond Est: 1985 Employees: 18
Alloys: AS9U3, LM24.
Product Types: Cast alloys, Ingot, Liquid metal by road transport.
Approvals: PSA - Renault (A 95).
Notes: Produce 11000 tonnes aluminium alloy. 2 x 40 T furnaces,
1 x 2 T, 21 x liquid metal delivery vehicles (6 T load).

VAW AG [AI]

Postfach 24 68
D-53014 Bonn [Georg-von-Boeselager-Straße 25, D-53117 Bonn]
Germany
Tel: +49 228 5 52 02, Fax: +49 228 5 52 2268, Telex: 8869607,
Contact: Jochen Schirner
Group: VAW (D) Est: 1917 Employees: 8000
Alloys: Primary Alloys: Silumin (G-AlSi11), Silumin Beta (G-AlSi9Mg), Silumin Delta (G-AlSi10 (H)), Silumin Kappa (G-AlSi11Mg), Pantal 7 (G-AlSi7Mg), Pantal 5 (G-AlSi5Mg (H)), Veral Si12CuNiMg (H), Veral Si12CuNiMg D (H), Veral Si18CuNiMg (H), Veral Si17Cu4Mg (H), Veral Mg3 (H), Veral Mg3Si (H), Veral Mg5 (H), Veral Mg5Si (H), Veral Mg9 (H), Veral Mg10 (H), Veral 100, Veral 100 G (G-AlZn2MgSi (H)), Autodur, Autodur D (G-AlZn10Si8Mg (H)), Veral Cu4Ti, Veral Cu4TiMg, Veral 99.5 (H), Veral 99.7 (H); Quasi-primary Alloys: Veral Si12 A, Veral Si12 (D), Veral Si10Mg A, Veral Si10Mg (D), Veral Si5Mg, Veral Si12CuNiMg, Veral Mg3, Veral Mg9; Secondary Alloys: Veral 231 A, Veral 231 (D), Veral 233, Veral 226 A, Veral 226 (D), Veral 225, Veral 241, Veral Zn10Si8CuMg **Designation systems**: CEN DIN VAW.
Product Types: Cast alloys in notched ingots (4 to 6 kg), large ingots (up to 1000 kg) and liquid metal by road transport.
Tradenames: Cast aluminium alloys: Silumin, Silumin Beta, Silumin Gamma, Silumin Delta, Silumin Kappa, Pantal, Autodur, Veral. Primary aluminium: Ertal, Raffinal, Reflectal, Kryal.
Other Services: Foundry consultancy & technical problem solving.

VAW AG [AI]

Büro München, Warngauerstraße 42
D-81539 München
Germany
Tel: +49 89 6 91 62 41, Fax: +49 89 6 92 21 78, Telex: 522582
Group: VAW (D) Est: 1917 Employees: 8000
Designation systems: CEN DIN VAW.
Product Types: Cast alloys.
Other Services: Foundry consultancy service.
Notes: Sales office for cast alloys.

VAW AG [AI]

Büro Berlin, Kurfürstendamm 42
D-10719 Berlin
Germany
Tel: +49 30 8 82 10 17, 18, Telex: 183387
Group: VAW (D) Est: 1917 Employees: 8000
Designation systems: CEN DIN VAW.
Product Types: Cast alloys.
Notes: Sales office for cast alloys.

VAW Aluminium [AI]

2 High Street, Ewell, Epsom
Surrey KT17 1TN
United Kingdom
Tel: +44 181 394 1700, Fax: +44 181 393 0365, Telex: 928419
Group: VAW (D)
Designation systems: DIN VAW.
Product Types: Wrought alloys Cast alloys.
Notes: Sales office covering UK & Ireland.

VAW Aluminium AG [AI]

Delegate Office - Latin America
Rua Tabapuã, 41-conj. 68, 04533 São Paulo
Brazil
Tel: +55 11 8 22 38 22, Fax: +55 11 8 22 84 34, Telex: 1131306
Group: VAW (D)
Product Types: Wrought alloys Cast alloys.

VAW Aluminium AG [AI]

Postfach 10 06 64
D-41513 Grevenbroich [Aluminiumstraße 1, Grevenbroich]
Germany
Tel: +49 21 81 66 01, Fax: +49 21 81 98 08, Telex: 8517164
Group: VAW (D)
Alloys: VAW Alloys: 41/04, 41/20, 61/03, 61/10, 61/15, 63/03, 63/37, 63/45, 63/52, 98/50, 99/00, 99/01, 99/52; AA Alloys: 1050, 1050A, 1200, 3003, 3004, 3005, 3105, 5042, 5052, 5182, X8011, 8011A, 8079; DIN Alloys: Al99, Al99.0Fe0.8, Al99.5, AlFeSi, AlMn1Cr, AlMn0.5Mg0.5, AlMn1Mg0.5, AlMn1Mg1, AlMg4.5Mn0.4, AlMnCu, AlMg2.5, AlMg3.5, AlMg3.5Mn. **Tempers** (Intl.): H0, H14, H16, H18, H19, H22, H24, H42, H44, H47, H48; (DIN): F15, F29, F32, F35, F38, G15, G19, (G21), G28, G29, G32, G37, W6, W8, W10, W13. **Designation systems**: USA DIN VAW.
Product Types: Wrought alloys Foils and thin strip.
Applications: Cable shielding foils, Thermal Insulation, Window blind strip, Rigid packaging strip, Can ends, tabs and bodies, Semi-rigid containers, food containers, sheet and strip for bottle closures.
Approvals: TUV: ISO 9002/EN29002.

VAW Aluminium AG [AI]

Delegate office - South East Asia
39 A Jalan Pemimpin 05-00
Tal Building, Singapore 2057
Singapore
Tel: +65 2 59 92 88, Fax: +65 3 53 06 19, Telex: 35999
Group: VAW (D)
Product Types: Wrought alloys. Cast alloys.

VAW Aluminium Italia S.r.l. [AI]

Via Gaeta 8
I-20025 Legnano (Mi)
Italy
Tel: +39 331 45 43 00, Fax: +39 331 59 37 71, Telex: 334327
Group: VAW (D)
Product Types: Wrought alloys. Cast alloys.

VAW France S.A. [AI]

16, Avenue de la Grande Armée
F-75017 Paris
France
Tel: +33 1 43 80 47 38, Fax: +33 1 42 67 60 86, Telex: 650017
Group: VAW (D) Est: 1964 Employees: 15
Alloys: VAW 99/52 (DIN Al99.5, EN 1050A), 98/50 (DIN AlFeSi, EN 8011A) **Designation systems**: DIN VAW.
Product Types: Wrought alloys Sheet & strip for closures.

VAW Iberica S.A. [AI]

Rua Passos Manuel 44,1
P-1100 Lisboa
Portugal
Tel: +351 1 54 09 56, 57, Fax: +351 1 57 10 43, Telex: 63131
Group: VAW (D)
Product Types: Wrought alloys. Cast alloys.

VAW Iberica S.A. [AI]

Muntaner 200
E-08036 Barcelona
Spain
Tel: +34 93 2 09 37 99, Fax: +34 93 2 02 07 32, Telex: 97267
Group: VAW (D)
Product Types: Wrought alloys. Cast alloys.

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VAW IMCO Guß und Recycling GmbH [AI]

Postfach 10 06 34
D-41490 Grevenbroich [Aluminiumstraße 2, D-41515
Grevenbroich]
Germany
Tel: +49 21 81 66 02, Fax: +49 21 81 66 23 92, Contact: I. A.
Poos

Group: VAW (D)

Alloys: CEN alloys (*Pressure die casting*): EN AC-44300 (AC-AISI12(Fe)), AC-43400 (AC-AISI10Mg), AC-46000 (AC-AISI9Cu3(Fe)), AC-46500 (AC-AISI9Cu3(Fe)(Zn)), AC-47100 (AC-AISI12Cu1(Fe)), AC-51200 (AC-AIMg9); (*General purpose*): AC-43000 (AC-AISI10Mg(a)), AC-43100 (AC-AISI10Mg(b)), AC-43200 (AC-AISI10Mg(Cu)), AC-44100 (AC-AISI12(b)), AC-44200 (AC-AISI12(a)), AC-45000 (AC-AISI6Cu4), AC-46200 (AC-AISI8Cu3), AC-47000 (AC-AISI12Cu), (*Special purpose*): AC-48000 (AC-AISI12CuNiMg), AC-51000 (AC-AIMg3(b)), AC-51100 (AC-AIMg3(a)), AC-51300 (AC-AIMg5), AC-51400 (AC-AIMg5(Si)); (*Special mechanical properties*): AC-21000 (AC-AICu4MgTi), AC-21100 (AC-AICu4Ti), AC-42100 (AC-AISI7Mg0.3), AC-42200 (AC-AISI7Mg0.6), AC-43300 (AC-AISI9Mg), AC-44000 (AC-AISI11); (*Other European alloys*): AC-41000 (AC-AISI2MgTi), AC-42000 (AC-AISI7Mg), AC-44400 (AC-AISI9), AC-45100 (AC-AISI5Cu3Mg), AC-45200 (AC-AISI5Cu3Mn), AC-45300 (AC-AISI5Cu1Mg), AC-45400 (AC-AISI5Cu3), AC-46100 (AC-AISI11Cu2(Fe)), AC-46300 (AC-AISI7Cu3Mg), AC-46400 (AC-AISI9Cu1Mg), AC-46600 (AC-AISI7Cu2), AC-71000 (AC-AIZn5Mg); **BS Alloys**: LM2, LM4, LM16, LM22, LM25, LM27; **NF Alloys**: A-S2GT, A-S5U3G, A-Z5G; UNI-3600, UNI-7369/3, L-2640. **VDS alloys** (*Pressure die casting*): 226/3, 226D, 230D, 231D, 239D, 349; (*General purpose*): 225, 226, 230, 231, 233, 239; (*Special purpose*): 242, 244, 245, 260. **Designation systems**: USA CEN BS DIN NF UNI, VDS.

Product Types: Cast alloys, Ingot. **Approvals**: ISO 9001.

Notes: Joint venture between VAW, Bonn (D) and IMCO Recycling Inc, Dallas TX (USA). Casting and recycling. VDS (Vereinigung Deutscher Schmelzhütten) is the Society of German Smelting Industries. AC designations for EN alloys signifies "Aluminium Casting".

VAW Products Inc. [AI]

666 Old Country Road
Garden City, New York 11530
United States of America
Tel: +1 516 222 1526, Fax: +1 516 222 2547

Group: VAW (D)

Product Types: Wrought alloys. Cast alloys.

VAW Skandinavien A/S [AI]

Høje Taastrup, Boulevard 33
DK-2630 Taastrup
Denmark
Tel: +45 1 43 71 50 50, Fax: +45 1 43 71 72 12, Telex: 27133
skavaw dk, Contact: K. Rasmussen
Group: VAW (D) Est: 1979 Employees: 7
Designation systems: DIN VAW.
Notes: Sales office for Scandinavia.

Verlap Quimica Ltda. [AI]

Rua Emilio Colella, 352
CEP - 05126/130, Sao Paulo
Brazil
Tel: +55 11 697 12491, Fax: +55 11 298 0511, Contact: Luiz Pinto
Group: Comalco
Notes: Distributor - Aluminium Paste / Flakes

Vetlanda Profilbäckning AB [AI]

Brudabäcksvägen
S-574 35 Vetlanda
Sweden
Tel: +46 383 186 20, Fax: +46 383 137 92
Group: SAPA

VIAM - All-Russian Institute of Aviation Materials [AI / Ti]

Foreign Trade Company
17 Radio Street, 107005 Moscow
Russia
Contact: L. Leschiner
Alloys: No details.
Notes: Late entry.

VIEXAL S.A. [AI]

2-4, Messogion Ave., Athens tower B-501
GR-115 27 Athens
Greece
Tel: +30 177 77010, 53607, Fax: +30 1775 2342, 1751, Telex:
225055 exem gr, Email: viexal@biznet.com.gr

Group: Viexal

Product Types: Wrought alloys, Plate, Sheet, Foil

Notes: Aluminium Foil

Household Foil (0.012 - 0.020 mm thickness) - Used for re-rolling into small reels for wrapping foodstuff etc.

Food container Foil (0.040 - 0.200 mm thickness) - Used in manufacturing of food containers.

Wrapping Foil (0.007 - 0.012 mm thickness) - Aluminium foil laminated to waxed paper and used as slitted reels for inner packaging by chocolate manufacturers.

Cigarette Foil (0.007 - 0.012 mm thickness) - Aluminium foil laminated to tissue or kraft paper by starch slitted in reels and used by cigarette manufacturers.

Duct Stock Foil (0.070 - 0.180 mm thickness) - Aluminium foil in coils / strips, used in manufacturing of flexible tubes (air ducts, exhaust fumes ducts, etc).

Fin Stock Foil (0.080 - 0.200 mm thickness) - Strips, used as cooling fins in manufacture of air conditioning units.

Aluminium Rolled Products

Aluminium Semis & their Applications: Aluminium Plain or Painted Coils & Sheets - In Architecture as plain or painted panels for walls, partitions, doors, etc. In Industry for decoration, refrigerations, air conditioning, buses, tramways, lifts, office furniture, etc; Aluminium Stucco Embossed Coils & Sheets - In Architecture plain or painted. In the Refrigeration Industry to cover inner walls of deep freezers, for home, commercial and truck transport refrigerators; In the manufacturing of cookers, refrigerators, etc; Aluminium Tread Plates in Sheets - Used as anti-slippery floor covering in factories, trucks, buses, metallic steps, refrigeration stores, etc

Aluminium Roofing Sheets (Plain or Painted) - Used as roof covering of metallic constructions for warehouses, industry, factories, parking spaces in ports, etc.

Aluminium Lithographic Sheets - Used as special quality sheets in the production of lithographic offset plates.

Aluminium Coils & Sheets for Closures - Special quality sheets or coils, used for the production of pilferproof caps, jam jar caps, etc.

Aluminium Coils for Can Stock - Special quality of aluminium coils, used for the production of cans (bodystock, end stock, tab stock) for beverages, and foodstuff.

Aluminium Strips Plain or Painted - Used in manufacturing of: venetian blinds - aluminum shutters - false ceilings, etc

Aluminium Discs (Circles) - Used in manufacturing of: kitchen utensils, pressure cookers, road signs, etc.

Vigeland Metal Refinery A/S [AI]

Postboks 6
N-4701 Kristiansand - Vennesla
Norway
Tel: +47 38 15 59 44
Group: Alcan (50%)
Product Types: Cast alloys. Super purity ingot.
Notes: Sales enquiries to Alcan Lochaber smelter (UK): Tel +44
1397 90 2233; Fax +44 1397 90 2200.

Viking [AI]

See: Technal Viking

VILS [Al Mg Ti]

Gorbunov Street 2, 121596 Moscow
Russia
Tel: +7 095 448 27 64, Fax: +7 095 446 18 01, Contact: B.T.
Bondarev - General Director
Est: 1933
Associated Companies: Additional Sales Office(s): VD VILS
Moscow, Russia. Tel: +7 095 448 27 64, Fax: +7 095 446 18 01
Product Types: Wrought alloys Cast alloys, Powders Alloys, Bar
& Rod, Billet, Billet - CP, Electrodes - In-Specification,
Electrodes - Remelting, Electrodes TiAluminide, Extruded
Shapes, Extrusions, Fasteners, Ferrotitanium, Filters, Foil,
Forgings, Forgings - Conventional, Forgings - Open Die,
Furnaces - Electron Beam, Furnaces - Vacuum, Furnaces -
Vacuum Arc, Furnaces - Vacuum, Induction, Ingot, Ingot - CP &
TiAluminide, Mill Products, High Purity, Pipe - Seamless, Pipe -
Welded, Plate, Plate - Clad & CP, Powder, Powder Alloys &
Parts, Powder - TiAluminide, Sheet, Slab, Slab - CP, Tube -
Welded, Wire & Wire Coil, Ingot, Billet, Plate, Sheet, Foil, Bar,
Wire, Extrusion, Electrodes, forgings.
Other Services: Alloy Development, Applications Technology,
Coatings, CVD, Cold Isostatic Pressing, Consulting, Heat
Treating, In-House Captive, Heat Treating, Outside Processing,
Hot Isostatic Pressing, Inspection, CMM & FP, Inspection,
Ultrasonic, Inspection, X-Ray, Laser Drilling & Cutting, Lathe
Turning, Pickling, Research & Design, Sand Blasting, Sawing,
Stock Holding, Wire Conversion.
Notes: A scientific technical centre specializing in creation,
production and application of semi finished and ready products
of Al-, Mg-, Ti- and heat resistant Ni- alloys.

VSG Netherland B.V. [Ti]

De Horst 4
NL-2501 CC Den Haag
Netherlands
Tel: +31 70 3810888, Fax: +31 70 3852102
Group: Deutsche Titan (D)
Notes: Sales office (NL) for Deutsche Titan (D).

VSMPO [Al Ti]

1, Parkovaya Street, Verkhnyaya Salda
Sverdlovsk Region, 624600
Russia
Tel: +7 343 452 0271, Fax: +7 343 452 4736, Telex: 721780 zima
ru, Contact: Valery A. Kutsankin - Marketing, Production and
Release
Est: 1933 Employees: 13000
Product Types: Wrought alloys Cast alloys Airfoils, Alloys,
Automotive, Bar & Rod, Bar, Hollow, Billet & Billet, CP, Castings,
Clad Products, Columns & Towers, Commercial Products,
Sporting Goods, Electrodes, In-Specification, Electrodes,
Remelting, Electrodes, TiAluminide, Extrusions & Shapes,
Fabrications, Specialty, Feedstock, Bulk Weldables,
Ferrotitanium, Fittings, Flats, Foil, Forgings, Forgings -
Conventional, Forgings - Custom, Forgings - Impression Die,
Hand Tools, Heat Exchangers, Ingot & Ingot - CP, Ingot - Hollow
& TiAluminide, Medical, Mill Products, High Purity, Pipe,
Seamless, Pipe, Welded, Piping system, Plate, Plate - Clad &
CP, Rolled Shapes, Sheet, Slab & Slab - CP, Strip, Tanks &
Vessels, Tube, Ingot, Plate, Sheet, Tube, Die forgings.
Other Services: Alloy Development, Applications Technology,
Brazing, Chemical Milling, Cold Finishing, Cold Working, Cold
Isostatic Pressing, Cutting, Cutting, Plasma, Engineering,
Equipment Field Services, Fabrication, Grinding, Heat Treating,
In-House Captive, Hot Isostatic Pressing, Inspection, Ultrasonic,
Inspection, X-ray, Melting, Melting, Test, Pickling, Reforging,
Research & Design, Sawing, Shearing, Welding, Custom.
Notes: Verkhnyaya Salda Metallurgical Plant is a joint stock
company. VSMPO manufactures ingots, slabs, sheets, plates,
pipes, sections and die forgings in titanium alloys. Shapes,
Tubes, Panels and Die forgings in aluminum alloys, sheets in
stainless steel, high percentage titanium.

Vulcanium Corp. [Ti]

3045 Commercial Ave., Northbrook, IL 60062
United States of America
Tel: +1 708 498 3111, Fax: +1 847 498 2810, Email:
titanium@vulcanium.com, Internet: http://www.vulcanium.com,
Contact: Richard E. Leopold - President
Group: Vulcanium Corp. (USA) Est: 1967 Employees: 50
Product Types: Wrought alloys Billet, Billet - CP, Clad Products,
Electroplating, Electrodes, Anodes, Fabrications, Fasteners,
Fittings, Flats, Heat Exchangers, Ingot, Ingot - CP, Pipe -
Seamless, Pipe - Welded, Plate, Plate - CP, Rolled Shapes, Buy
Scrap, Sheet, Strip, Tube, Wire & Wire Coil.
Other Services: Cutting, Fabrication, Machining, Milling,
Shearing, Stock Holding.
Notes: Vulcanium Corporation offers standard and custom
fabrication for the anodizing and electroplating industries. In
addition we offer titanium raw materials and semi finished
products for surface finishing, chemical, and sporting apps.

Wah Chang [Ti]

1600 NE Old Salem Road, P.O. Box 460, Albany, OR 97321-0460
United States of America
Tel: +1 541 967 6977, Fax: +1 541 967 6994, Internet:
http://www.twca.com, Contact: Gary Kneisel - Man. Ti/Nb Sales
Group: Allegheny Teledyne, Inc Est: 1956 Employees: 1200
Associated Companies: Additional Sales Office(s):
Allegheny Teledyne Wah Chang AG
Schaan, Switzerland
Tel: +41 752 4721, Fax: +41 752 9069
Alloys: Tiadyne 3510, Tiadyne 3515 (Alloy C), Titanium-45
Niobium.
Product Types: Wrought alloys Cast alloys, Powders Alloying
Additives, Alloys, Bar & Rod, Billet & Billet CP, Electrodes,
TiAluminide, Extruded Shapes, Extrusions, Flats, Foil, Forgings:
Conventional/Custom, Hand Tools, Ingot & Ingot
CP/TiAluminide, Medical, Mill Products, High Purity, Pipe -
Seamless, Plate & Plate CP, Powder, Powder - High Purity/Low
Chloride, Scrap, Turnings, Shafts & Agitators, Sheet, Slab &
Slab CP, Strip, Tube, Ingot, Billet, Plate, Sheet, Strip, Foil, Bar,
Tube, Extrusion, Forgings, electrodes.
Tradenames: Tiadyne.
Other Services: Alloy Development, Analytical Development, Cold
Finishing, Cold Working, Engineering, Grinding, Grit Blasting,
Heat Treating, In-House Captive, Hot Working, Lathe Turning,
Melting, Melting, Custom, Melting, Test, Reforging, Research &
Design, Sand Blasting, Sawing, Shearing, Toll Processing
Notes: Wah Chang produces and fabricates titanium, zirconium,
niobium, and vanadium in a full range of mill product forms. The
fully integrated manufacturing facility is also available for outside
conversion work. Wah Chang produces a variety of titanium
products, including high-purity bar stock and tube, pipe, sheet,
plate and powder in a range of grades and alloys (such as Ti-
45Nb). For specialized tubing in aerospace, Wah Chang
produces Titanium-3Aluminum-2.5Vanadium, which combines
light weight and excellent cold formability, a characteristic that
enables the tube to be bent into complex shapes for installation.
Wah Chang produces ultra-high-purity titanium for sputtering
targets, which are used in the production of smaller, faster
computer chips; dependable Tiadyne 3515 for aircraft exhaust
nozzles; titanium powders for coating artificial hip implants to
promote better adhesion to bone; and many other alloys for a
variety of applications. Recreational equipment: including bicycle
frames, baseball bats, and golf club shafts and club heads.
Together with a well-known aircraft manufacturer, Wah Chang
developed the manufacturing process for Alloy C (also called Ti-
1270) for more heat- and burn-resistant exhaust nozzles in
military aircraft engines, enabling them to supercruise at speeds
in excess of Mach 2. Alloy C exhibited very attractive high-
temperature and creep properties -- in fact, its creep strength
proved greater at elevated temperatures than that of the
strongest commercial alloys, such as Ti6-2-4-2. Alloy C was
successfully flight-tested in 1990.
Wah Chang markets Alloy C for aerospace applications such as
turbine ducts and nozzles, where high
strength-to-weight ratio, increased burn ratio, and corrosion
resistance can be critical design factors.

120 Supplier Addresses & Product Details

Westinghouse Electric Corporation [Ti]

P.O. Box 355
Pittsburgh, PA 15230
United States of America
Tel: +1 412 374 2199, **Fax:** +1 412 374 2326, **Email:**
kellysm@westinghouse.com, **Contact:** Susan Kelly - Senior
Planner
Group: Westinghouse Electric Corporation **Est:** 1979 **Employees:**
400
Product Types: Powders, - Alloys, - High Purity, - Low Chloride.
Notes: Westinghouse Electric Corporation is a diversified
company with businesses in industry, technology and
broadcasting. Our titanium and titanium alloy powders are
produced at the Westinghouse Powder Products Facility located
in Ogden, Utah. This state of the art facility uses the hydride / de
hydride process to produce a high quality, low oxygen titanium
and zirconium powder.

WICONA Bausysteme AG [A/]

Zürichstrasse 79, Mail: P.O.Box 812
CH-8010 Zürich
Switzerland
Tel: +41 1 822 11 62, **Fax:** +41 1 822 11 74
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Bausysteme GmbH [A/]

Söflinger Strasse 70
D-89077 Ulm
Germany
Tel: +49 731 39 84 0, **Fax:** +49 731 39 84 100
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Benelux N.V. [A/]

Diamantstraat 4, Industriezone Klein Gent
B-2200 Herentals
Belgium
Tel: +32 14 24 99 99, **Fax:** +32 14 21 85 11
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA S.A. [A/]

174, avenue de Pressensé, P.O. Box 108
F-69634 Venissieux Cedex
France
Tel: +33 4 72 78 21 21, **Fax:** +33 4 78 00 98 18, **Telex:** 301044
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Scandinavia AB [A/]

Hunnsvelvegen 12, P.O. Box 153
N-2831 Raufoss
Norway
Tel: +47 61 19 18 11, **Fax:** +47 61 19 19 21
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Scandinavia AB [A/]

Järnvägsgatan 45, Mail: P.O.Box 120
S-360 70 Åseda
Sweden
Tel: +46 474 108 20, **Fax:** +46 474 102 15
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Scandinavia AB (Danmark) [A/]

Jernbanegade 28, 1.th
DK-3600 Frederikssund
Denmark
Tel: +45 47 38 48 25, **Fax:** +45 47 38 48 24
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

WICONA Sp.z.o.o [A/]

ul. Malowiejska 1
PL-04-962 Warsaw - Falenica
Poland
Tel: +48 22 12 9845, 4156, **Fax:** +48 22 15 04 37
Group: Norsk Hydro
Tradenames: Wicona.
Notes: Wicona building systems (non-residential).

Williams Titanium Group [Ti]

915 Calle Amanecer, Suite D
San Clemente, CA 92672
United States of America
Tel: +1 714 361 9930, **Fax:** +1 714 361 9943, **Contact:** Bradley S.
Schmall - President & CEO
Est: 1995 **Employees:** 4
Product Types: Cast alloys Castings, Investment, Commercial
Products, Sporting Goods, Castings.
Other Services: Consulting, Grinding, Heat Treating, Outside
Processing, Hot Isostatic Pressing (HIP), Research & Design.
Notes: Williams Titanium Group represents the manufacturing of
titanium products. Investment casting, welding, heat treating,
polishing and grinding as well as consulting on the use of
titanium in applications such as golf, racing and a variety of
commercial industries.

CV Willis Corroon Scheuer [A/]

Havengebouw - De Ruijterkade 7, Postbus 1315
NL-1000 BH Amsterdam
Netherlands
Tel: +31 20 6263051, **Fax:** +31 20 6275700
Group: Hoogovens Groep

Worcester Aluminium Alloys Ltd. [A/]

226 Worcester Road, Droitwich
Worcestershire WR9 8AY
United Kingdom
Tel: +44 1905 795279, **Fax:** +44 1905 795231, **Email:**
100537.2736@compuserve.com, **Contact:** Ken Howson
Product Types: Wrought alloys. Extrusions (standards & custom).
Max. die 250 mm circumscribing circle. Flats (max): 250 mm
wide x 70 mm high.
Notes: Late entry.

Zamil Aluminium Industries [A/]

Saudi Arabia
Email: webmaster@zamil.com
Group: Zamil Aluminium Industries **Est:** 1973
Product Types: Wrought alloys, Extrusion.
Applications: Architecture/building.
Notes: One of two fabrication plants (other in Bahrain). Within the
Zamil group are companies producing a range of items for the
building sector; from automatic door systems, partitions to
ladders & louvers. One of the group companies, Zamil Schlege,
is a joint venture.

Robert Zapp AG [Ti]

Gewerbestraße 14
CH-8155 Niederhasli
Switzerland
Tel: +41 1 850 3500, **Fax:** +41 1 851 0500, **Telex:** 815334
Group: Deutsche Titan (D)
Notes: Sales office (CH) for Deutsche Titan (D).

Zinkal Ltd.

[AI]

27 Efal St.
Petach-Tikva 49131
Israel

Tel: +972 3 9223551/5, **Fax:** +972 3 9223374, **Email:**
info@zinkal.co.il

Group: Zinkal Ltd. **Est:** 1951

Alloys: 6063, 6061, 6115A, 6082. **Designation systems:** USA.

Product Types: Wrought alloys Profiles (extruded). Roll-formed
fuse welded tube/pipes 2-14 inch dia.). Fin tube sections. Billet,
Tube, Extrusion, extrusion-billet.

Applications: Building/architecture (doors, windows, curtain
walling, façade). Tubes for irrigation systems, potable water. Fin-
tube for water heaters.

Notes: Privately owned company, with several plants producing
semi-finished wrought products for industrial, agricultural &
building industries. Also reinforced plastic (GRP) pipe.

OTHER USEFUL ADDRESSES

Australia

CAST - CRC for Alloy and Solidification Technology

Head Office, Dept. Mining, Minerals & Materials Engineering
University of Queensland
St. Lucia, Queensland 4072
Australia
Tel: +61 7 3365 3574
Fax: +61 7 3365 3888
Email: castho@minmet.uq.edu.au

CAST is a joint venture between : CSIRO - Manufacturing Science and Technology, The University of Queensland, Comalco Aluminium Limited, Australian Magnesium Corporation Pty Ltd, Australian Automotive Technology Centre. CAST's Mission Statement: To develop and transfer technical "know-how" to the Australian light metals casting industry so that it can achieve world class performance in cost and quality.

Austria

DIN

im ON Österreichischen Normungsinstitut
Heinestraße 38
A-1021 Wien
Austria
Tel: +43 1 213 00 805
Fax: +43 1 213 00 818
Sales Office Wien (Vienna)

Bahrain

BSI - British Standards Institute

PO Box 11016
Diplomatic Area, Manama
Bahrain
Tel: +973 536 362
Fax: +973 536 361

Belgium

Association des Constructeurs Europeen d'Automobiles

Rue du Noyer 211
B-1040 Bruxelles
Belgium
Tel: +32 2 732 5550
Fax: +32 2 732 6001
European car constructors association.

Association Europeen des Metaux

Ave. de Broqueville 12
B-1150 Bruxelles
Belgium
Tel: +32 2 775 6311
Fax: +32 2 779 0523
Contact: Jacques Spaas - Secretary General
European metal association.

BIR - Bureau International de la Recuperation

Rue du Lombard 24, bte 14
B-1000 Brussels
Belgium
Tel: +32 2 514 2180
Fax: +32 2 514 1226
Email: bir.sec@skynet.be
Internet: <http://www.bir.org>
Contact: Francis Veys
BIR is the international federation of industries involved in the recovery and recycling of ferrous and non-ferrous metals, paper stocks, textiles and plastics. More than 50 countries are represented through companies and national associations. BIR's primary goals are to promote recycling and recyclability. It is a non-profit-making organisation financed by annual membership dues. The organisation is made up of commodity divisions and committees that assume its management in close collaboration with the General Secretariat, located in Brussels.

CEN - European Committee for Standardisation

Central Secretariat
rue de Stassart, 36
B-1050 Brussels
Belgium
Tel: +32 2 519 68 11
Fax: +32 2 519 68 19
Email: cen@cencelbel.be
Information is available from:
- National standards institutions, and
- National CEN/CENELEC organisations.

European Aluminium Association

Avenue de Broqueville 12
B-1150 Bruxelles
Belgium

European Metalworkers Federation in the Community

38 rue Fosse-aux-Loups, Boite 4
B-1000 Bruxelles
Belgium
Tel: +32 2 217 27 47
Fax: +32 2 217 59 63
Contact: Hubert Thierron - General Secretary

European Recovery and Recycling Association

83 Avenue E Mounier
B-1200 Bruxelles
Belgium
Tel: +32 2 772 5252
Fax: +32 2 772 5419
Promoting municipal or residential, recycling.

European Secretariat of Manufacturers of Light Metal Packages

c/o Fabrimetal
Rue des Drapiers 21
B-1050 Bruxelles
Belgium
Tel: +32 2 510 2503
Fax: +32 2 512 7059
Contact: Pierre Diederich - General Secretary

Federation des Enterprise Belgique

Rue Ravenstein 4B
B-1000 Bruxelles
Belgium
Tel: +32 2 515 0811
Fax: +32 2 515 0999

International Zinc Association

168 Avenue de Tervueren/Box 4
B-1150 Brussels
Belgium
Tel: +32 2 776 0070
Fax: +32 2 776 0089
Internet: www.iza.com

Tantalum-Niobium International Study Centre

Rue Washington 40
Brussels 1050
Belgium
Tel: +32 2 649 51 58
Fax: +32 2 649 64 47

Canada

AIAC - Aerospace Industries Association of Canada

Suite 1200, 60 Queen Street
Ottawa, Ontario K1P 5Y7
Canada
Tel: +1 613 232 4297
Fax: +1 613 232 1142
Internet: www.aiac.ca

CARI - Canadian Association of Recycling Industries

50 Gervais Dr., 502, Don Mills, Ontario M3C 1Z3
 Canada
 Tel: +1 416 510 1244
 Fax: +1 416 510 1248
 Email: cari1@cycor.ca
 Contact: Donna Turner - Associate Manager
CARI's mission is to promote net economic and social impact from commercial recycling activities.

Institute of Magnesium Technology

357 rue Franquet
 Saint-Foy, Quebec G1P 4N7
 Canada
 Tel: +1 418 650 2280
 Fax: +1 418 650 3190
 Email: jrenaud@itm.ca
 Contact: Jean Renaud - Director - Mg Applications Dev.
*Provide R&D and technical services in forming technologies to clients on a world-wide basis in order to expand markets for magnesium products. Members in USA, Europe & Far East. Various courses at IMA & SAE.
 Publish technical papers with topics ranging from metallurgy to casting and specific applications (e.g. automotive).*

International Council on Metals and the Environment

294 Albert Street, Suite 506
 Ottawa, Ontario K1P 6E6
 Canada
 Tel: +1 613 235 4263
 Fax: +1 613 235 2865
 Internet: www.icme.com

Nickel Development Institute

214 King St. West, Suite 510
 Toronto, Ontario M5H 3S6
 Canada
 Tel: +1 416 591 7999
 Fax: +1 416 591 7987

SMACNA-BC - British Columbia Sheet Metal Association

156 - 4664 Lougheed Highway
 Burnaby, British Columbia V5C 5T5
 Canada
 Tel: +1 604 299 4641
 Fax: +1 604 299 9304
 Internet: www.smacna-bc.org

Denmark**Danish Chamber of Commerce**

Børsen
 DK-1217 Copenhagen K
 Denmark
 Tel: +45 33 95 05 00
 Fax: +45 33 32 52 16
 Telex: 19520 chamco dk
 Contact: Tessie Christensen

Danmarks Statistik

Sejroegade 11
 P.O. Box 2550
 DK-2100 Copenhagen Ø
 Denmark
 Tel: +45 39 17 39 17
 Fax: +45 31 18 48 01

Dansk Industri

HC Andersen Boulevard 18
 DK-1787 Copenhagen V
 Denmark
 Tel: +45 33 77 3377
 Fax: +45 33 77 3300
 Contact: Birthe Rose
Confederation of Danish Industries. Private organisation representing Danish manufacturing industry. Main activity is promoting Danish exports world-wide.

Metallforeningen

Dag Hammerskjølds Allé 5
 DK-2100 Copenhagen Æ
 Denmark
 Tel: +45 31 26 1633
 Fax: +45 35 43 0014

Finland**FIMET - Federation of Finnish Metal, Engineering & Electrotechnical Industries**

P.O. Box 10
 Helsinki FIN-00131
 Finland
 Tel: +358 9 19231
 Fax: +358 9 624 462
 Internet: www.met.fi/ (Fin.), /english/index.html (Eng.)

France**AFNOR - Association Française de Normalisation**

Tour Europe
 F-92049 Paris la Défense
 France
 Tel: +33 1 42 91 55 55 / 33 / 34
 Fax: +33 1 42 91 56 56
 Telex: afnor 611 974 f
*French national standards organisation.
 Minitel: 3616 AFNOR
 Minitel: 3616 CATAFNOR - search & order AFNOR catalogue items
 Regional offices throughout France.*

Association Europeen des Constructeurs de Matériaux Aérospatiale

88 blvd Malesherbes
 F-75008 Paris
 France
 Tel: +33 1 45 63 82 85
 Fax: +33 1 42 25 15 48
European aerospace constructors.

Bureau Commercial MIFA

5, rue du Péage
 F-67000 Strasbourg
 France
 Tel: +33 3 88 45 06 23
 Fax: +33 3 88 61 83 12

Bureau Veritas

F-92087 Paris La Defense Cedex 44
 France
DNV - Det Norsk Veritas.

CETIM

52 ave. Felix Louat
 F-60304 Senlis Cedex
 France
Research and development organisation.

Chambre de Commerce et d'Industrie de Paris

Direction de l'Information Économique
 27 Avenue de Friedland
 F-75382 Paris Cedex 08
 France
 Tel: +33 1 42 89 72 42
 Fax: +33 1 42 89 72 10
 Contact: Mr. Igor Malceff
Provide (for a fee) information on French companies and industry sectors.

Chambre Syndicate des Société d'Etude et de Conseil

3, rue Léon Bonnat
 F-75016 Paris
 France
 Tel: +33 1 45 24 43 53
 Fax: +33 1 42 88 26 84
French engineering industries.

124 Other Useful Addresses

Comité des Constructeurs Français d'Automobiles

2, rue Presbourg
F-75008 Paris
France
Tel: +33 1 49 52 51 00
Fax: +33 1 47 23 74 73
Association of French car constructors.

Fédération des Chambres Syndicales des minerais, minéraux industriels et métaux non-ferreux

30 avenue de Messine
F-75008 Paris
France
Tel: +33 1 45 63 02 66
Provide information on minerals, ore & non-ferrous metals.

Fédération des Industries Electriques et Electroniques

11 - 17 rue Hamelin
F-75116 Paris
France
Tel: +33 1 45 05 70 70
Fax: +33 1 45 53 03 93
Federation of French electrical & electronic industries.

Fédération des Industries Mechaniques et Transformatricie des Métaux

39-41 rue Louis Blanc
Batiment D-C2
F-92400 Courbevoie Cedex 72
France
Tel: +33 1 47 17 60 00
Fax: +33 1 47 17 64 99

Fédération Francaise de la Recuperation

101 rue de Prony
F-75017 Paris
France
Tel: +33 1 40 54 01 94
Fax: +33 1 40 54 77 88
French recycling federation.

Fédération Nationale des Travaux Publics

3, rue de Berri
F-75008 Paris
France
Tel: +33 1 44 13 31 44
Fax: +33 1 44 56 04 47
Federation of French civil engineering industries.

Fédération Nationale du Bâtiment

9, rue de la Pérouse
F-75016 Paris
France
Tel: +33 1 40 69 51 00
Fax: +33 1 45 53 58 77
Federation of French civil building and construction industries.

Groupeement des Industries Françaises Aéronautiques et Spatiales

4, rue Galilée
F-75782 Paris Cedex 16
France
Tel: +33 1 44 43 17 00
Fax: +33 1 40 70 91 41
French aerospace industries.

Institut de la Soudure

BP 50362
F-95942 Roissy Cedex
France
French welding institute.

OECD - Organization for Economic Cooperation and Development

2, rue André-Pascal
F-75775 Paris CEDEX 16
France
Tel: +33 145 24 82 00
Fax: +33 145 24 85 00
Internet: www.oecd.org
Statistics and general trade information.

PREDIMAG

c/o C.A.D.
63 blvd Gergovia
F-63000 Clermont Ferrand
France
Tel: +33 4 73 34 49 50
Fax: +33 4 73 34 49 51
Technological & Industrial Centre for Magnesium (Clermont-Auvergne-Developpment). Provides information, R&D for magnesium activities. Large network of companies involved in the design & conception of applications; pattern & mould makers, casting companies, etc.

Societe Aveyronnaise de Metallurgie

BP 9
ZI des Prades
F-12110 Viviez
France
Tel: +33 5 65 43 67 00
Fax: +33 5 65 43 10 23
Contact: Mr. Jean-Paul Tamet
Regional metal processing society.

Union des Industries Métallurgiques et Minières

56, Avenue de Wagram
F-75017 Paris
France
Tel: +33 1 40 54 20 20
Fax: +33 1 47 66 22 74
French metals industries.

Germany

Bundersverband der Deutschen Industrie eV

Gustav Heinemann Ufer 84-88
Postfach 510548
D-50968 Köln
Germany
Tel: +49 221 370800
Fax: +49 221 3708730
Association of German industry.

BV der Deutschen Rohstoffwirtschaft e.V.

Brabanter Strasse 8
D-50674 Köln
Germany
Tel: +49 221 25 30 68
Contact: Birgit Paggen
Raw materials.

DIN - Beuth Verlag GmbH

Postfach 1107
Burggrafenstrasse 6
D-10787 Berlin
Germany
Tel: +49 30 2601 2260
Fax: +49 30 2601 1260
Email: tutas@vertr.din.de
Sales of DIN German national standards & others.

DIN - Deutsche Institut für Normung

D-10772 Berlin
Germany
Tel: +49 30 2601 2600
Fax: +49 30 2601 1260
Standards Enquiry Office
[See also: DIN - Beuth Verlag GmbH]

European Aluminium Association

Königsallee 30, Postfach 101262
D-40212 Düsseldorf
Germany
Tel: +49 211 80871
Fax: +49 211 324 098
Contact: Dr Hansgeorg Seebaner

European Aluminium Particulate Association

c/o Alugral GmbH Metallwerk
Hanstrasse 10
D-41460 Neuss
Germany
Tel: +49 2131 26 84 0
Fax: +49 2131 26 84 39
Membership of companies producing aluminium-based powders, pastes, pigments & flake for uses such as paints, inks, light-weight concrete, pyrotechnic devices, plastics, industrial processes:
Alugral GmbH Metallwerk (D)
ALPOCO - Aluminium Powder Co. Ltd (UK)
Benda Lutz Werk (A)
Carlfors Bruk (S)
Eckart-Werke (D)
NV A. van Lerberghe SA (B)
North Derbyshire Metal Products Ltd. (UK)
Pechiney Hermillon (F)
Carl Schlenk AG (G)
Shamrock Aluminium Ltd. (Ireland)
Siberline Ltd (UK)
Toyal Europe SA (F)
Wolstenholme International (UK)
[Information from ALFED]

European Zinc Institute

P.O. Box 2251
D-63171 Obertshausen
Germany
Tel: +49 6104 74401
Fax: +49 6104 75867

German Scrap, Recycling and Waste Disposal Association

Brabanter Str. 8
D-50674 Köln
Germany
Tel: +49 221 253 069
Fax: +49 221 252 190

Germanischer Lloyd

PO Box 11 16 06
D-2000 Hamburg
Germany

Institute für Ökologisches Recycling e.V.

Ecological Recycling Institute
Rhombos Verlag, Kerfuerstenstr. 17
D-10785 Berlin
Germany
Tel: +49 30 2616854
Fax: +49 30 2650366
Contact: Bernhard Reiser
Waste Reduction & Recycling.

OEA-Organisation of European Aluminium Smelters

Graf-Adolf Straße 18
Postfach 20 08 40
D-40105 Düsseldorf
Germany
Tel: +49 211 45 19 33
Fax: +49 211 43 10 09
Contact: Mr. G. Kirchner - General Secretary

TUV - Technischer Überwachungs Verein

Dudenstrasse 28
D-68167 Mannheim
Germany
Quality assurance.

Zentralverband Deutscher Ingenieure

Edelsbergstraße 8
Westpark
D-80686 Munich
Germany
Tel: +49 89 5700 7241
Fax: +49 89 5700 7260
German engineers association.

Greece

Confederation of Greek Industries

5 Xenofontos Str.
GR-10557 Athens
Greece
Tel: +30 1 323 7325/9
Fax: +30 1 322 2929

Technical Chamber of Greece

4 Kar. Servias Str.
GR-10248 Athens
Greece
Tel: +30 1 325 4590/9
Fax: +30 1 322 1772

Ireland

Confederation of Irish Industry

Confederation House
Kildare Street
Dublin 2
Ireland
Tel: +353 1779 801
Fax: +353 1777 823

Italy

Confederazione Generale dell'Industria Italiana

Viale dell'Astronomia 30
I-00144 Roma
Italy
Tel: +39 6 59031

Federazione Associazioni Industriali

Via Petitti 16
I-20149 Milano
Italy
Tel: +39 2 324 846
Italian federation of industry associations.

International Institute for High Technology & New Materials

c/o ICS
Adriatico Palace Hotel
Via Grignado 9
I-34100 Trieste
Italy
Tel: +39 40 224572
Fax: +39 40 224575

Istituto Italiano del Rame (IIR)

(Italian Copper Institute)
IIR Servizi S.r.l.
Milanofiori, Strada 4a, Palazzo A3
20090 Assago (MI)
Italy
Tel: +39 2 5750 1548
Fax: +39 2 8920 0774
Internet: www.iir.it/index.htm (It), /eindex (Eng)

Registro Italiano Navale

CP 1195
I-16128 Genova
Italy

126 Other Useful Addresses

Societa' Italiana Per Il Magnesio e Leghe di Magnesio SPA

Via A Volta 31, P.O. Box 436
I-39100 Bolzano
Italy
Tel: +39 471 934101
Fax: +39 471 200574
Contact: Mr. Pio Paolo Benvegna
Italian society for magnesium and magnesium alloys.

UNI - Ente Nazionale Italiano di Unificazione

Via Batistotti Sassi 11/b
I-20133 Milano
Italy
Italian national standards organisation

Jamaica

International Bauxite Association

36 Trafalgar Rd., Kingston 10
(P.O. Box 551, Kingston 5)
Jamaica
Tel: +1809 926 9288
Fax: +1809 929 4020
Contact: Mr. Nenad Altman - Secretary General

Jamaica Bauxite Institute

Hope Gardens
P.O. Box 355, Kingston 6
Jamaica
Tel: +1809 927 2073, 9
Fax: +1809 927 1159
Email: genjbi@toj.com
Contact: Parris Lyew-Ayee - Managing Director

Japan

Japan Aluminium Federation

1-3, Nihonbashi 2-chome, chuo-ku
Tokyo 103
Japan
Tel: +81 3 274 4551
Fax: +81 3 274 3179
Contact: T. Fujimoto

Japan Institute of Metals (JIM)

Aoba Aramaki, Aobaku
Sendai, 980, Japan
Tel: +81 22 223 3685
Fax: +81 22 223 6312
Internet: www.soc.nacsis.ac.jp/jim/index-j.html (J), [/index-e.html](http://index-e.html)
(Eng)

Japanese Magnesium Association

Nihonbashi Asahiseimei Bldg1-3
Nihonbashi
2-chome Chuo-Ku Tokyo 103
Japan
Tel: +81 33 242 1258
Fax: +81 33 213 2918
Contact: Shigeru Nemoto

Luxembourg

Confederation du Commerce Luxembourgeois

23 allée Scheffer
L-2520 Luxembourg
Luxembourg
Tel: +352 473 125

FEDIL - Federation des Industriels Luxembourgeois

P.O. Box 1304
7 rue Alcide de Gasperi
Kichberg
L-1615 Luxembourg
Luxembourg
Tel: +352 435 366/367
Fax: +352 435 328
Contact: Danielle Dichter - Attaché

Netherlands

European Aluminium Foil Assoc.

Laan Copes van Cattenburch 79
NL-2585 EW Den Haag
Netherlands
Tel: +31 70 360 3837
Fax: +31 70 363 6348
Contact: Dr. J.E.G. le Jeune - Secretary

Federation of Dutch Recycling Industries

P.O. Box 85645
NL-2508 CH Den Haag
Netherlands
Tel: +31 70 362 4610
Fax: +31 70 363 6348

Nederlandaise Organisatie van Ondernemers in de Metad-nijverheid

Wilhelminalaan 1
NL-3732 GJ DeBilt
Netherlands
Tel: +31 30 204811
Netherlands metalworking organisation.

TNO - Building & Construction Research

Lange kleiweg 5
Rijswijk
PO Box 49
NL-2600 AA Delft
Netherlands

Verbond van Nederlandse Ondernemingen

Prinses Beatrixlaan 5
Postbus 930093
NL-2509 AB Den Haag
Netherlands
Tel: +31 70 349 7373
Fax: +31 70381 9508
Industry association.

VVDS - Dutch Scrap Association

p.a. Bureau LeJeune
Ln. Copes v. Cattenburch 79
NL-2585 EW Den Haag
Netherlands
Tel: +31 70 603837
Contact: A.A. Nijkerk
Recycling.

New Zealand

NZ Metal Merchants & Processors Association

P.O. Box 141
Wellington
New Zealand
Contact: C.A. Purcell

Philippines

Asian Recycling Association

P.O. Box 82
Dumaguete City
Philippines

Portugal

Confederacao de Industria Portuguesa

Avenida 5
Ontubro 35 1 4
P-1000 Lisboa
Portugal
Tel: +351 1547 454
Fax: +351 1 545 094

Russia

Russian National Aluminium-Magnesium Institute

VAMI Ltd.
86 VO Stedny pr
RU-199026 St. Petersburg
Russia
Tel: +7 812 213 5458
Fax: +7 812 217 5966
Telex: 121598

South Africa

AAAMSA-Assoc. Architectural Aluminium Manufacturers S. Africa

PO Box 15852
Lyttelton 0140
South Africa
Tel: +27 11 315 6323, 4
Fax: +27 11 315 6321
Email: aaamsa@icon.co.za
Incorporating the Architectural Glass Industry. Aims: The professional organisation within South Africa which is uniquely committed to the disciplines and standards of quality which surround the manufacture and installation of architectural aluminium products, interior building systems, glass and glazing and associated activities. To provide a forum for the exchange of expertise and interaction between individuals and organisations to create a competitive advantage for the aluminium industry. To communicate to all stakeholders in the architectural aluminium industry the register of accredited members of AAAMSA who have satisfied the associations requirements of predetermined standards. Incorporating: SABISA South African Building Interior Systems Association, ASDA Aluminium Stockists and Distributors Association, SASA Skylight Association of Southern Africa

Aluminum Federation of South Africa

P.O. Box 85502
Emmentaria 2029
South Africa

COSATU - Congress of South African Trade Unions

P.O. Box 1019
Johannesburg 2000
South Africa
Tel: +27 11 339 4911
Fax: +27 11 339 5080
Internet: www.anc.org.za/cosatuu

NUMSA - National Union of Metalworkers of South Africa

York House, 9th Floor
46 Kerk St.
Johannesburg 2023
South Africa
Tel: +27 11 832 2030
Fax: +27 11 832 6330
Email: metalworker@ibi.co.za
Internet: http://www.numsa.org.za/

Southern African Institute for Industrial Engineering

P.O.Box 653044
Benmore 2010
South Africa
Tel: +27 11 884 2545
Fax: +27 11 883 7150
Email: ind.eng@pixie.co.za
Contact: Michael Hosking - Secretary General

Spain

Agrupacion Nacional de la Recuperacion

Pasaje Marimon No. 7- 2nd Ia
E-08021 Barcelona
Spain
Tel: +34 3 200 8290
Fax: +34 3 200 8399
Waste Management

ATESMEL

Asociacion Tecnica Espanola de Metales Ligeros
ETSI Aeronauticos Dpto Materiales
Ciudad Universitaria
E-28040 Madrid
Spain
Tel: +34 91 3366335
Fax: +34 91 3366334
Spanish light metals technical association.

CONFEDEM

Confederacion Nacional de Empresarios de Minería y Metalurgia
Nuñez de Balboa 37 3*
E-28001 Madrid
Spain
Tel: +34 91 4319402
Fax: +34 91 4319474

CONFEMETAL

Confederacion Española de Organizaciones Empresariales del Metal
Principe de Vergara 74 5*
E-28006 Madrid
Spain
Tel: +34 91 5625590
Fax: +34 91 5628477

ICEX - Instituto Español de Comercio Exterior

Ministerio de Economía y Hacienda
Paseo de la Castellana 14-16
E-28046 Madrid
Spain
Tel: +34 91 349 61 00
Fax: +34 91 431 6128
Telex: 44838
Contact: Jesus Medina Gomez - Dpto. Informacion
Export trade organisation.

Switzerland

DIN

in der SNV Schweizerischen Normen-Vereinigten
Mühlerbachstrasse 54
CH-8008 Zürich
Switzerland
Tel: +41 1 254 54 54
Fax: +41 1 254 54 82
Sales Office Wien (Vienna)

European Anodisers Association

c/o FIDES Trenhandels-gesellschaft
PO Box 656
CH-8027 Zurich
Switzerland
Tel: +41 1 249 25 13
Fax: +41 1 249 25 88

IMF - International Metalworkers' Federation

Case Postale 1516
54bis, Route des Acacias
CH-1227 Geneva
Switzerland
Tel: +41 22 308 50 50
Fax: +41 22 308 50 55
Email: imf@iprolink.ch
Internet: homepage.iprolink.ch/~imf/index.htm

International Magnesium Association (Europe)

Postfach 20
CH-7250 Klosters
Switzerland
Tel: +41 81 420 2552
Fax: +41 81 420 2551
Contact: Jim Wilde - European Representative

128 Other Useful Addresses

ISO - International Organisation for Standardisation

Central Secretariat
Case Postale 56, 1 rue de Varamb 
CH-1211 Geneve 20
Switzerland
Tel: +41 22 749 01 11
Fax: +41 22 734 10 79
Email: central@isocs.iso.ch
International standards organisation

SAMPE

(Society for the Advancement of Material & Process Engineering)
European Chapter
Unterloostra e 12, CH-8461 Oeligen
Switzerland
Tel: +41 52 43 31 43
Fax: +41 52 43 26 25
Contact: Heidi M ller - Membership Administration
Non-profit making association of European-based materials and process engineers. Organises conferences to promote information exchange between members.

Taiwan

Taiwan Regional Metal Smelters Association

77-1 Han Kau Street 3f
Taipei Sec.1
Taiwan
Tel: +886 311 5650

United Kingdom

ALFED - Aluminium Federation Ltd.

Broadway House, Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Email: 106037.3336@compuserve.com
Internet: <http://www.metalnet.co.uk>;
www.netlink.co.uk/users/pfc/alfhome.htm
Contact: Dr. David A Harris - General Secretary
The Aluminium federation (ALFED) is a trade association which represents the UK aluminium industry; from primary sector through to end-users & recycling sectors. Its mission is to 'expand the market for aluminium products in the UK and to promote the interests of ALFED membership'. Membership of over 200 companies (representing a work-force of over 30 00 people) which are grouped into several Associations:

*Aluminium Can Recycling Association
Aluminium Extruders Association
Aluminium Finishing Association
Aluminium Foil Container Manufacturers' Association
Aluminium Powder & Paste Association
Aluminium Primary Producers Association
Aluminium Remelt Association
Aluminium Rolled Products Manufacturers' Association
Aluminium Stock Holders Association
Association of Light Alloy Refiners
Council for Aluminium in Building
European Aluminium Particulate Association*

ALFED Direct Members:

*Alcoa manufacturing (GB) Ltd.
Bernhard Metals (UK) Ltd.
British Alcan Aluminium plc
Glynwed Metal Services Ltd.
Hoogovens Aluminium UK Ltd
Lawson Mardon Star Ltd.
London & Scandinavian Metallurgical Co. Ltd.
Norsk Hydro UK Ltd.
Associate Members of ALFED:
Alumasc Ltd.
ASP International Ltd.
Kvaerner Davy Ltd. (equipment manufacturers & suppliers)
Fielding & Platt International (equipment manufacturers & suppliers)
Stein Atkinson Stordy Ltd (equipment manufacturers & suppliers)*

Aluminium Can Recycling Assoc.

5 Gatsby Court,
176 Holliday St.
Birmingham B1 1TJ
United Kingdom
Tel: +44 121 633 4656
Fax: +44 121 633 4698
Email: alucan@dial.pipex.com
Internet: www.alucan.org.uk
Contact: Alex Griffin - National Manager
Established by five major aluminium can sheet producers to co-ordinate UK activities of collection & recycling of used aluminium beverage cans. Educational role. Guarantees markets for collected cans to ensure closed-loop recycling. [Information from ALFED].

Aluminium Extruders Association

Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Contact: R.E. Mount - Technical Enquiries
*Member companies, information from ALFED:
Alumax Extrusions Ltd.
Capalex - Capital Aluminium Extrusions Ltd.
Hydro Aluminium Alupres Ltd.
Hydro Aluminium Century Ltd
Indalex Ltd
Kaye Aluminium plc
SAPA Ltd.
SECO Aluminium Ltd.*

Aluminium Finishing Assoc.

Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Contact: Dr. D.A. Harris - General Secretary
*Association divided into:
Coatings Group (member companies provide coating services; associate members - companies supplying coating materials.
Anodising Group (member companies providing anodising services).
[Information from ALFED]*

Aluminium Foil Container Manufacturer's Assoc.

c/o Smallfield & Co.
Wickfield House, 18-22 Disney Place,
London SE1 1HS
United Kingdom
Tel: +44 171 403 8123
Fax: +44 171 378 8718
Contact: P.D. Cody - Secretary
*Member companies mainly concerned with food-packaging (all in the UK):
Ekco Packaging Ltd.
Rexam Foil & Paper Ltd.
Coppice Alupack Foil Containers Ltd.
Lawson Mardon Picopac*

Aluminium Powder & Paste Association

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274
*Association of UK manufacturing companies. Member companies:
ALPOCO - Aluminium Powder Co. Ltd, W. Midlands.
North Derbyshire Metal Products Ltd, Derbyshire.
Siberline Ltd, Fife.
Wolstenholme International Ltd, Lancashire.
[Information from ALFED]*

Aluminium Primary Producers Assoc.

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Contact: Dr. D.A. Harris - General Secretary

Members:

Alcan Smelting & Power UK (Lynemouth, Lochaber, Kinlochleven Smelters).
Anglesey Aluminium Metal Ltd.
[Information from ALFED]

Aluminium Radiator Manufacturer's Association

Tropical House
Charleswoods Rd., East Grinstead
W. Sussex RH19 2HJ
United Kingdom
Tel: +44 1342 410188
Fax: +44 1342 315362
Contact: G. Marshall - Secretary

Aluminium Remelt Assoc.

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Contact: R.E. Moulton - Secretary

Members:

Alcan Recycling
Alcoa Manufacturing (GB) Ltd.
Anglo Blackwells Ltd.
Calder Aluminium Ltd.
Deeside Aluminium Ltd.
Kaye Aluminium plc,
Lawson Mardon Star Ltd.
London & Scandinavian Metallurgical Co. Ltd.
SAPA Ltd.
[Information from ALFED]

Aluminium Rolled Product Manufacturer's Assoc

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274/452 1897
Contact: Mrs. G. Robinson - Secretary

Members:

Alcan Rolled Products UK (Gwent, Falkirk, Glasgow)
Alcoa manufacturing (GB) Ltd.
Lawson Mardon Star Ltd.

Aluminum Can Recycling Association

Gatsby Court, Unit 5
176 Holloway Street
Birmingham B1 1TJ
United Kingdom
Tel: +44 121 633 4698
Fax: +44 121 633 4656

ASA - Aluminium Stock Holders Association

PO Box 111
Todd Rd. St.Helens
Merseyside WA9 1JD
United Kingdom
Tel: +44 1744 23051
Fax: +44 1744 24757
Contact: Frank Morgan - Secretary
Trade association for stockists of aluminium and its alloys.
Affiliated to the Aluminium Federation (UK).
Produces annual market statistics for UK aluminium consumption.
Publications: Handbook (annual), ASA review, 'About Aluminium', 'Metrication'.
Member companies. (Information from ALFED):

Ace Engineers Ltd.
John Adams (Coach Supplies) Ltd
W & S Allely Ltd.
All Metal Services Ltd.
Alphamet UK Ltd.
Apollo Metals plc
Aquarius Metals Ltd.
BACO Metal Centres
Chiltern Metals Ltd.
Doré Metals Services (Southern) Ltd.
JE Eltherington & Son (Aluminium) Ltd.
Friardown Ltd.
Glywed Metal Services Ltd.
Hoogovens Aluminium UK Ltd.
Klochner Aluminium Services Ltd
Metalfast Ltd.
Righton Ltd.
Smiths Metal Centres Ltd.
SPA Aluminium Ltd.
Thyssen Garfield Ltd.

Association of Light Alloy Refiners

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274

Members:

Alenoy Ltd.
Aldec Ltd (W. Bromich, Lanarkshire)
Bernhard Metals (UK) Ltd.
The Brock Metal Company
A. Cohen & Co. (GB) Ltd
Coleshill Aluminium Ltd.
J McIntyre (Aluminium) Ltd
Mil-Ver Metal Co Ltd.
FE Mottram (Non-Ferrous) Ltd.
Norton Aluminium Products Ltd.
W Whitehead Alloys Ltd.
[Information from ALFED]

Association of Metal Traders

97 Leather Lane
London EC1N 7TS
United Kingdom
Tel: +44 171 831 2109
Fax: +44 171 831 0176

ASTM Standards

American Technical Publishers Ltd.
68A Wilbury Way
Hitchin
Hertfordshire SG4 0SX
United Kingdom
Tel: +44 1462 31525

130 Other Useful Addresses

BEAMA

Fed. of British Electrotechnical & Allied Manufacturers' Associations
Westminster Tower
3 Albert Embankment
London SE1 7SL
United Kingdom

Tel: +44 171 793 3042

Fax: +44 171 582 8020

Contact: A.A. Bullen - Director

Trade association. A federation of 18 industrial electrical & electronic manufacturers associations, representing between them some 520 member companies.

BEAMA members:

AMA Association of Manufacturers Allied to the Electrical and Electronic Industry

AXrEM Association of X-ray Equipment Manufacturers

BCMA BEAMA Capacitor Manufacturers' Association

BECCAMA BEAMA Electrical Cable and Conductor Accessory Manufacturers' Association

BTDA BEAMA Transmissions and Distribution Association

BESA British Electrical Systems Association

BIMSA BEAMA Interactive and Mains Systems Association

BMA BEAMA Metering Association

EEIA Electrical and Electronic Insulation Association

EIEMA Electrical Installation Equipment Manufacturers' Association

GAMBICA The association for the instrumentation, control and automation industry in the United Kingdom

ICMMA Industry Cleaning Machine Manufacturers' Association

PGCA Power Generation Contractors Association

PSMA Power Supply Manufacturers' Association

PWMA Pressure Washer Manufacturers' Association

REMA Rotating Electrical Machines Association

TACMA An Association of Control Manufacturers

WMA Welding Manufacturers' Association

Publications:

Kompass/BEAMA Buyers guide; Electronic/electrical products.

Kompass/GAMBICA Buyers guide instrumentation & control.

BECCAMA

(BEAMA Electrical Cable & Conductor Accessory Manuf. Assoc.)

Westminster Tower
3 Albert Embankment
London SE1 7SL
United Kingdom

Tel: +44 171 793 3000

Fax: +44 171 793 3003

Contact: A.A. Bullen - Director

Trade association for manufacturers of electrical cable & conductor fittings (22 member companies in UK).

BICTA - British Investment Casting Trade Assoc.

Bordesly Hall, The Holloway

Alvechurch

Birmingham B48 7QA

United Kingdom

Tel: +44 1527 584770

Fax: +44 1527 584771

All aspects of investment casting. Conferences, library & publications.

BRE - Building Research Establishment

Bucknalls Lane

Garston, Watford

Hertfordshire WD2 7JR

United Kingdom

Tel: +44 1923 664040

Fax: +44 1923 664010

Telex: 923220 brsbre g

British Metals Federation

16 High Street, Brampton

Huntingdon PE18 8TU

United Kingdom

Tel: +44 1480 455249

Fax: +44 1480 453680

Email: admin@britmetfed.org.uk

Internet: <http://www.britmetfed.org.uk>

Contact: R J Wilcox - Executive Director

The BMF is a federation of UK regional associations and special interest groups: Scottish Metals Association, Northern Metals Association, North Western Metals Association, Midwest Metals Association, Southern Metals Association, Ulster Metals Associations, International Members, Special Members (Service), Exporters' Group, Shredders' Division.

British Scrap Federation

16 High Street, Brampton

Huntingdon PE18 8TU

United Kingdom

Tel: +44 1480 455249

Contact: J.A. Clubb

Recycling.

British Secondary Metals Association

Park House, 25 Park Road

Runcorn, Cheshire WA7 4SS

United Kingdom

Tel: +44 192 85 72400

Fax: +44 151 420 4300

BSI - British Standards Institute

Maylands Avenue

Hemel Hempstead HP 2 4SQ

United Kingdom

Tel: +44 1442 230442

Fax: +44 1442 231442

BSI Testing

BSI - British Standards Institute

QED Centre

Main Avenue, Treforest Estate

Pontypridd

Mid Glamorgan CF37 5YR

United Kingdom

Tel: +44 1443 841381

Fax: +44 1443 841373

BSI - British Standards Institute

PO Box 375

Milton Keynes MK14 6LL

United Kingdom

Tel: +44 1908 312636

Fax: +44 1908 695157

BSI Product Certification & BSI Quality Assurance.

BSI - British Standards Institute

Scottish Office

Quality House

2000 Academy Park, Gower Street

Glasgow G51 1PP

United Kingdom

Tel: +44 141 427 2825

Fax: +44 141 427 5989

BSI - British Standards Institute

British Standards House

389 Chiswick High Road

London W4 4AL

United Kingdom

Tel: +44 181 996 9000

Fax: +44 181 996 7400

BSI Head Office, BSI Standards & BSI Training Services. British national standards organisation. Foreign standards - customer services: +44 181 996 7000; Fax +44 181 996 7001. PERINORM database of standards & technical regulations (Europe or International versions) on CD-ROM.

CAB - Council for Aluminium in Building

191 Cirencester Road
Charlton Kings
Cheltenham
Gloucestershire GL53 8DF
United Kingdom
Tel: +44 1242 578 278
Fax: +44 1242 578 283

*Combination of three trade associations:
Architectural Aluminium Association
Patent Glazing Contractors Association
Aluminium Window Association
[Information provided by ALFED].*

Cobalt Development Institute

Suite 22, Riverside House
Lower Southend Road
Wickford, Essex SS11 8BB
United Kingdom
Tel: +44 1268 570014
Fax: +44 1268 570015

Cranfield Institute of Technology

School of Industrial and Manufacturing Sciences
Cranfield
Bedford MK43 0AL
United Kingdom
Tel: +44 1234 750111
Fax: +44 1234 750875

DTI - Department of Trade and Industry

United Kingdom
Email: Doreen.Shaw@msv.dti.gov.uk
Internet: <http://www.dti.gov.uk>, www.open.gov.uk
Statistics and general information.

ESDU International plc

27 Corsham Street
London, N1 6UA
United Kingdom
Tel: +44 171 490 5151
Fax: +44 171 490 2701

*Produce design data and computer programs for engineers
working in a range of engineering fields.*

European Automotive Group

UK Branch
Southam Road
Banbury
Oxon. OX16 7SA
United Kingdom
Tel: +44 1295 27 2626
Fax: +44 1295 27 4216

*A technical engineering organisation dedicated to assessing &
developing market opportunities for aluminium in autobody
construction.*

European Investment Casters Federation

c/o BICTA
Bordesly Hall, The Holloway
Alvechurch
Birmingham B48 7QA
United Kingdom
Tel: +44 1527 584770
Fax: +44 1527 584771
Contact: R.F. Smart - Secretary

European Powder Metallurgy Assoc.

Old Bank Buildings
Shrewsbury
SY1 1HU
United Kingdom
Tel: +44 1743 248899
Contact: Bernard Williams - Executive Secretary

European Pressure Die Casting Committee

c/o Zinc Development Agency
42 Weymouth Street
London W1N 3LQ
United Kingdom
Tel: +44 171 499 6633
Fax: +44 171 493 1555
Contact: A.J. Wall - Secretary

FERFA

First Floor, 241 High Street
Aldershot, Hampshire GU11 1TJ
United Kingdom
Tel: +44 1252 342072
Fax: +44 1252 333901

*The Trade Federation of Specialist Contractors and Material
Suppliers to the Construction Industry.*

Finishing Publications Ltd

PO Box 70
105 Whitney Drive, Stevenage
Hertfordshire SG1 4BL
United Kingdom
Tel: +44 1438 745115
Fax: +44 1438 364536

- Manager
*Specialist publisher producing books, journals and electronic
products on: surface engineering and treatment; metal finishing;
electroplating; anodising; etching; pickling, plating, PCB
manufacture. In-house library and industry statistics.*

Foil Container Bureau

Bridge House
High Street
Bidford-on-Avon
Warwickshire B50 4BG
United Kingdom
Tel: +44 1789 490 609
Fax: +44 1789 490 391
*Part of: Aluminium Foil Container Manufacturer's Association.
[Information from ALFED]*

The Institute of Materials

1, Carlton House Terrace
London SW1Y 5DB
United Kingdom
Tel: +44 171 976 1338
Fax: +44 171 839 2078
Contact: H. Turkdogan - Marketing Manager
*Professional association of materials scientists. Publish monthly
journal and organise meetings, seminars, etc.*

The Institute of Packaging

Sysonby Lodge, Nottingham Road
Melton Mowbray
Leicestershire LE11 3TU
United Kingdom
Tel: +44 1664 500055
Fax: +44 1664 64164

International Cadmium Association - European Office

42 Weymouth Street
London W1N 3LQ
United Kingdom
Tel: +44 171 499 8425
Fax: +44 171 486 4007
Email: atherton@cadmium.org

International Lead and Zinc Study Group (ILZSG)

2 King Street
London SW1Y6QP
United Kingdom
Tel: +44 171 839 8550
Fax: +44 171 930 4635
Internet: www.ilzsg.org

132 Other Useful Addresses

International Molybdenum Association (IMOA)

Unit 7 Hackford Walk,
119-123 Hackford Road
London, SW9 0QT
United Kingdom
Tel: +44 171 582 2777
Fax: +44 171 582 0556
Internet: www.itia.org.uk/imoa/

IPIA - International Primary Aluminium Institute

Trafalgar Place
2-4 Cockspur Street
London
SW1Y 5BQ
United Kingdom
Tel: +44 171 930 0528
Fax: +44 171 321 0183
Aluminium industry and products; Energy Requirements; statistics; developments; environment, health & safety.

Lead Development Association International

42 Weymouth Street
London WIN 3LQ
United Kingdom
Tel: +44 171 499 8422
Fax: +44 171 493 1555
Email: yearlywine@aioa.org
Internet: www.ldaint.org

Light Metal Founders' Assoc.

136 Hagley Rd
Birmingham B16 9PN
United Kingdom
Tel: +44 121 454 4141
Fax: +44 121 454 4949

LLoyd's Register of Shipping

71 Fenchurch Street
London
EC3M 4BS
United Kingdom

Mechanical & Metal Traders Confederation

Savoy Tower
77 Renfrew St.
Glasgow G2 3BZ
United Kingdom
Tel: +44 141 332 0826
Fax: +44 141 332 5788
Contact: J. Carruthers - Chief Executive

Metal Bulletin Books

London
United Kingdom
Tel: +44 171 827 9977
Fax: +44 171 827 5290
Email: 100635.2433@compuserve.com
Internet: <http://www.metbul.com>
Contact: Ulla Norton/Carol Alcock
Books, journals, industry statistics, etc.

Metalnet

Park House,
Park Terrace,
Worcester Park KT4 7HY
United Kingdom
Tel: +44 171 827 9977
Fax: +44 181 337 8943
Email: sales@metalnet.co.uk
Internet: <http://www.metalnet.co.uk>
Statistics, information and metals trading - subscription service.

MetalWorld

United Kingdom
Internet: <http://www.metalworld.com>
MetalWorld is a world wide information trading site and was established to promote trade in the Metals Industry.

Midwest Scrap Association

1 Cornwall Street
Birmingham B3 2DT
United Kingdom
Tel: +44 121 233 1666
Fax: +44 121 236 3379
Contact: J.G. Hughes
Recycling.

Minor Metals Traders Assoc.

5 High Timber Street,
Upper Thames St.
London EC4V 3PA
United Kingdom
Tel: +44 171 329 0950
Fax: +44 171 329 4218
Contact: N.B. Jaynes - Secretary

MMMA - Metalforming Machinery Makers Association

Queensway House
2, Queensway, Redhill
Surrey RH1 1QS
United Kingdom
Tel: +44 1737 768611
Fax: +44 1737 760467
Telex: 948669
- Secretary
*Trade association (formerly British Power Press Manufacturers Assoc.); Metal forming machinery trade.
Publications: "Sheet Metal Industries".*

MPMA - Metal Packaging Manufacturers Association

Elm House, 19 Elmshott Lane
Cippenham
Slough SL1 5QS
United Kingdom
Tel: +44 1628 605203
Fax: +44 1628 665597
- Director
Trade association. Covering: Metal packaging; cans, tins, drums & other containers & boxes; closures; waste recovery; health & safety; statistics of the industry.

National Metal Traders Federation

77 Renfrew St.
Glasgow G2 3BZ
United Kingdom
Tel: +44 141 332 0826
Fax: +44 141 332 5788
Contact: A. Shaw - Secretary

OEA - Organisation of European Aluminium Smelters

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274

Qualanod UK

c/o ALFED
Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 1103
Fax: +44 121 456 2274

Recycler's World

United Kingdom
Internet: <http://www.recycle.net>
Recycling information and companies.

Shapemakers Information Service

Broadway House
Calthorpe Rd. Fiveways,
Birmingham B15 1TN
United Kingdom
Tel: +44 121 456 2276
Fax: +44 121 456 2274
Provides free advice on all matters relating to aluminium extrusions.
Shapemakers member companies are:
Hydro Aluminium Alupres Ltd.
Hydro Aluminium Century Ltd
Kaye Aluminium Ltd
Indalex Ltd
Capital Aluminium Extrusions Ltd
SAPA Ltd
SECO Aluminium Ltd.

TIG - Titanium Information Group

c/o Bunting Titanium Ltd.
34 Middlemore Ind. Est.
Smethick, Warley
West Midlands B66 2EE
United Kingdom
Tel: +44 121 558 5814
Fax: +44 121 558 8072

TWI - The Welding Institute

Abington Hall, Abington
Cambridge CB1 6AL
United Kingdom
Tel: +44 1223 891162
Fax: +44 1223 892588
Telex: 81183 weldx g

UK Aluminium Conductor Group

United Kingdom
Contact: Mr. H.D. Sleeman

WMI - World Metal Index

Sheffield Libraries & Information Services
Central Library
Surrey Street, Sheffield
South Yorkshire S1 1XZ
United Kingdom
Tel: +44 114 273 4714, 44
Fax: +44 114 275 7405
Telex: 54243
- Information Officer
Local government, information service. Information on alloy grades, tradenames and properties worldwide.

World Bureau of Metal Statistics

27A High Street, Ware
Hertfordshire SG12 9BA
United Kingdom
Tel: +44 1920 461274
Fax: +44 1920 461274
Telex: 817746
*Formerly "British Bureau of Non-ferrous Metals Statistics".
Statistics on production and consumption, world-wide and by country, of the major non-ferrous metals including Aluminium, Magnesium and Titanium.*

Zinc Development Association

42 Weymouth Street
London W1N 3LQ
United Kingdom
Tel: +44 171 499 6636
Fax: +44 171 493 1555

United States of America

ABMS - American Bureau of Metal Statistics

200 Candlewood Commons
Howell, NJ 07731
United States of America
Tel: +1 908 905 6699
Fax: +1 908 905 7755
Internet: www.abms.com
Contact: Brian D. Simpson - Executive Director

Abrasive Engineering Society

P.O. Box 3157
Butler, PA 16003
United States of America
Tel: +1 412 282 6210
Fax: +1 412 282 6210
Email: grind@nauticom.net
Internet: www.nauticom.net/www/grind

ABS - American Bureau of Shipping

2 World Trade Center
106th Floor
New York, NY 10048-0681
United States of America
Tel: +1 212 839 5000
Fax: +1 212 836 5130
Internet: www.eagle.org

AEC - Aluminum Extruders Council

1000 N. Rand Rd., Suite 214
Wauconda, IL 60084
United States of America
Tel: +1 847 526 2010
Fax: +1 847 526 3993
Internet: aec.org
Contact: Donn W. Sanford - President

AEDC - American Economic Development Council

9801 West Higgins Road
Suite 540
Rosemont, IL 60018-4726
United States of America
Tel: +1 847 692 9944
Fax: +1 847 696 2990
Email: aedc@interaccess.com
Internet: www.aedc.org/hqtrs
Contact: James Ahr - President

AFS - American Foundrymens Society Inc.

505 State Street
Des Plaines, IL 60016-8399
United States of America
Tel: +1 847 824 0181
Fax: +1 847 824 7848
Internet: www.afsinc.org
Contact: David P. Kanicki - Executive Vice President
Toll Free: 800-537-4237 (US and Canada)

AIAA - Aerospace Industries Association of America

1250 Eye St., NW
Washington DC 20005
United States of America
Tel: +1 202 371 8400
Fax: +1 202 371 8470
Contact: Don Fuqua - President

AICHE - American Institute of Chemical Engineers

345 East 47th Street
New York, NY 10017
United States of America
Tel: +1 212 705 7338
Fax: +1 212 705 8400
Internet: www.iche.org
Contact: Dr. Richard E. Emmert - Executive Director

134 Other Useful Addresses

AIME - American Institute of Mining Metallurgical & Petroleum Engineers

345 East 47th Street, 14th Floor
New York, NY 10017
United States of America
Tel: +1 212 705 7695
Fax: +1 212 371 9662
Internet: <http://www.idis.com/aime>

AISE - Association of Iron and Steel Engineers

Three Gateway Center, Suite 1900
Pittsburgh, PA 15222-1004
United States of America
Tel: +1 412 281 6323
Fax: +1 412 281 4657
Internet: www.aise.org

AISI - American Iron and Steel Institute

Automotive Applications Committee
2000 Town Center
Southfield, MI 48075
United States of America
Tel: +1 810 351 2667
Fax: +1 810 351 2691
Internet: www.autosteel.org; www.steel.org

AISI - American Iron and Steel Institute

1101 17th St., NW, 13th Fl.
Washington DC 20036-4700
United States of America
Tel: +1 202 452 7100
Fax: +1 202 463 6573
Internet: www.steel.org

AJI - American Joining Institute

10628 Dutchtown Rd
Knoxville TN 37932
United States of America
Tel: +1 615 675 2150
Fax: +1 615 675 6081

Alaska Miners Association

501 W. Northern Lights Blvd., Ste. 203
Anchorage, AK 99503
United States of America
Tel: +1 907 276 0347
Fax: +1 907 278 7997
Internet: www.info-mine.com/assoc-inst/alaska/Welcome.html
Contact: Steven Borell - Executive Director

The Aluminum Association Inc.

900 19th St. NW
Suite 300
Washington DC 20006
United States of America
Tel: +1 202 862 5100
Fax: +1 202 862 5164
Internet: <http://www.aluminium.org>
Contact: David Lane

Trade association for the aluminium industry in the USA. Membership consists of producers of primary & secondary aluminium, aluminium alloys, semi-fabricated wrought & cast products + related items. Develops industrial policy for legislative & regulatory matters in government. Organises forums for discussion. Disseminates technical information, health & safety, environmental advice, etc. Promotes recycling. Publishes a wide range of materials (books, journals, promotional literature, etc). Maintaining US & International registers of alloy designations & tempers. Develops & maintains product standards.

Aluminum Foil Container Manufacturers Association

14 Bluff Oak Retreat
Savannah, GA 31411
United States of America
Tel: +1 912 598 8463
Fax: +1 912 598 8465
Contact: Brock Richardson - Executive Secretary

American Bureau of Metal Statistics

Box 1405, Plaza Stn., 400 Plaza Dr.
Secaucus NJ 07094-0405
United States of America
Tel: +1 201 863 6900
Fax: +1 201 863 6050
Contact: John Barna

American Copper Council

2 South End Ave., #4C
New York, NY 10280
United States of America
Tel: +1 212 945 4990
Fax: +1 212 945 4992
Contact: Mary C. Boland - Executive Director

American Gear Manufacturers Association

1500 King St., Suite 201
Alexandria, VA 22314
United States of America
Tel: +1 703 684 0211
Fax: +1 703 684 0242
Internet: [www.agma.org](http://wwwAGMA.org)
Contact: J.T. Franklin, Jr. - Executive Director

American Railway Car Institute

700 North Fairfax Street
Alexandria, VA 22314-2098
United States of America
Tel: +1 703 549 5662
Fax: +1 703 548 0058
Internet: www.idsonline.com/business/rpi/arci.htm
Contact: Robert A. Matthews - Executive Director

American Welding Society

550 N.W. LeJeune Road
Miami, FL 33126
United States of America
Tel: +1 305 443 9353
Fax: +1 305 443 7559
Internet: www.amweld.org
Toll Free (USA): 800-443-9353

American Zinc Association

1112 16th St., NW, Suite 240
Washington, DC 20036
United States of America
Tel: +1 202 835 0164
Fax: +1 202 835 0155
Internet: www.zinc.org
Contact: George F. Vary - Executive Director

AMT - The Association for Manufacturing Technology

7901 Westpark Drive
McLean, VA 22102-4206
United States of America
Tel: +1 703 893 2900
Fax: +1 703 893 1151
Internet: www.mfgtech.org
Contact: Albert W. Moore - President

ANSI - American National Standards Institute

11 West 42nd Street
New York, NY 10036
United States of America
Tel: +1 212 642 4900
Fax: +1 212 398 0023
Internet: www.ansi.org
Contact: Sergio Mazza - President

APICS - American Production & Inventory Control Society

500 W. Annandale Road
Falls Church, VA 22046-4274
United States of America
Tel: +1 703 237 8344
Fax: +1 703 237 8450
Internet: www.industry.net/apics

Appliance Recycling Information Center

701 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20004
United States of America
Tel: +1 202 434 7492
Internet: www.aham.org/mfrs/anic/anic.htm

ARI - Air-Conditioning & Refrigeration Institute

1501 Wilson Boulevard, 6th Floor
Arlington, VA 22209
United States of America
Tel: +1 703 524 8800
Fax: +1 703 528 3816
Internet: www.ari.org
Contact: Clifford H. "Ted" Rees, Jr - President

Arizona Mining Association

2702 North Third Street, Suite 2015
Phoenix, AZ 85004
United States of America
Tel: +1 602 266 4416
Fax: +1 602 266 4418
Contact: Charles W. Shipley - President

ASCE - American Society of Civil Engineers

World Headquarters
1801 Alexander Bell Drive
Reston, VA 20191-4400
United States of America
Tel: +1 703 295 6000
Internet: www.asce.org
Contact: James E. Davis - Executive Director
Toll Free (USA): 800-548-2723
Other branches:
ASCE - New York, Tel: +1 212-705-7010; Fax: +1 212-705-7712
ASCE - Washington, Tel: +1202-789-2200; Fax: +1 202-289-6797

ASM International

9639 Kinsman Road
Materials Park, OH 44073-0002
United States of America
Tel: +1 216 338 5151
Fax: +1 216 338 4634
Internet: www.asm-intl.org
Contact: Michael J. DeHaemer - Managing Director
Toll Free: 800-336-5152 (U.S. and Canada)

ASME - American Society of Mechanical Engineers

345 East 47th Street
New York, NY 10017
United States of America
Tel: +1 212 705 7722
Fax: +1 212 705 7739
Internet: www.asme.org
Contact: Dr. David L. Belden - Executive Director

ASME - American Society of Mechanical Engineers

ASME Information Central
22 Law Drive
P.O. Box 2900
Fairfield, NJ 07007-2900
United States of America
Tel: +1 201 882 1167
Fax: +1 201 882 5155
Internet: www.asme.org

Association of Container Reconditioners - NABADA

8401 Corporate Dr., # 425
Landover MD 20785-2224
United States of America
Tel: +1 301 577 3786
Fax: +1 301 577 6476
Email: dworchester@igc.apc.org
Internet: <http://www.reconditioners.com>
Contact: D. Worcester
RECONET, or the Reconditioners Network, is a voluntary commercial service created to provide a prompt, reliable, efficient, and environmentally safe disposition option for container users. To use the network, contact a reconditioner in your area and ask for the "Responsible Container Management Representative." Additional information on responsible container management, including proper emptying practices, is also available through the association.

Association of Home Appliance Manufacturers (AHAM)

20 N. Wacker Drive, Suite 1231
Chicago, IL 60606
United States of America
Tel: +1 312 984 5800
Fax: +1 312 984 5823
Internet: www.aham.org

ASTM - American Society for Testing and Materials

1916 Race Street
Philadelphia, PA 19103
United States of America
Tel: +1 215 299 5400
Fax: +1 215 977 9679
Internet: www.astm.com
Contact: James A. Thomas - President
ASTM standards and other information.

ASTM - American Society for Testing Materials

100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
United States of America
Tel: +1 610 832 9585
Fax: + 610 832 9555
Email: service@local.astm.org
Internet: <http://www.astm.com>
Standards Enquiry Office: <http://www.astm.com>

Automotive Recyclers Association

3975 Fair Ridge Drive
Suite 20, Terrace Level North
Fairfax, VA 22033-2924
United States of America
Tel: +1 703 385 1001
Fax: +1 703 385 1494
Internet: www.autorecyc.org

AWMI - Association of Women in the Metal Industries

National Headquarters
515 King Street, Suite 420
Alexandria, VA 22314-3103
United States of America
Tel: +1 703 739 8335
Fax: +1 703 684 6048
Internet: www.awmi.com
Contact: Susan Ferns - President

BSI - British Standards Institute Inc.

Tycon Towers at Tyson Corner
8000 Towers Crescent Drive, Suite 1350
Vienna, VA 22182
United States of America
Tel: +1 703 760 7828
Fax: +1 703 761 2770

136 Other Useful Addresses

Builders Hardware Manufacturers Association

355 Lexington Ave., 17th Fl.
New York, NY 10017
United States of America
Tel: +1 212 661 4261
Fax: +1 212 370 9047
Internet: www.bhma.com

Can Manufacturers Institute

1625 Massachusetts Ave, NW
Washington DC 20036
United States of America
Tel: +1 202 232 4677
Fax: +1 202 232 5756
Email: dthompson@cancentral.com
Internet: http://www.cancentral.com
Contact: Dorie Thompson
Can Central is the World Wide Web site of the Can Manufacturers Institute (CMI) created to provide the industry, its customers, the media, and ultimately, consumers with a resource for information about the attributes of the can as well as the importance of the can manufacturing industry. Allows access to industry programs, policies, and other general information.

Cast Metals Institute Inc.

505 State Street
Des Plaines, IL 60016
United States of America
Tel: +1 847 824 0181
Fax: +1 847 824 7848
Internet: www.castmetals.com

CISA - Casting Industry Suppliers Association

455 State Street, Suite 104
Des Plaines, IL 60016
United States of America
Tel: +1 847 824 7878
Fax: +1 847 824 7908
Email: cisa@ix.netcom.com
Internet: www.industry.net/cisa
Contact: Ronald A. Mutch - President

Commercial Refrigerator Manufacturers Association

1200 19th St., NW, Suite 300
Washington, DC 20036
United States of America
Tel: +1 202 857 1145
Fax: +1 202 223 4579

Construction Industry Manufacturers Association

111 E. Wisconsin Ave., Suite 940
Milwaukee, WI 53202
United States of America
Tel: +1 414 272 0943
Fax: +1 414 272 1170
Internet: www.cimanet.com
Contact: James H. Stollenwerk - President & Secretary

Contract Manufacturers Association

3310 W. Big Beaver, Suite 403
Troy, MI 48084
United States of America
Tel: +1 248 643 6807
Fax: +1 248 643 0856
Contact: Patrick Witherspoon - Executive Director

Cookware Manufacturers Association

P.O. Box 531335
Mountain Brook, AL 35253
United States of America
Tel: +1 205 802 7600
Fax: +1 205 802 7610

Copper Development Association Inc. (CDA)

260 Madison Avenue
New York, NY 10016
United States of America
Tel: +1 212 251 7200
Fax: +1 212 251 7234
Internet: www.copper.org

Electrochemical Society

10 S. Main Street
Pennington, NJ 08534-2896
United States of America
Tel: +1 609 737 1902
Fax: +1 609 737 2743
Internet: www.electrchem.org
Contact: Roque J. Calvo - Executive Director

Electronic Industries Association

2500 Wilson Blvd.
Arlington, VA 22201
United States of America
Tel: +1 703 907 7500
Fax: +1 703 907 7501
Contact: Peter F. McCloskey - President

Equipment Manufacturers Institute (EMI)

10 South Riverside Plaza
Room 1220
Chicago, IL 60606
United States of America
Tel: +1 312 321 1470
Fax: +1 312 321 1480
Internet: www.emi.org

Fabricators & Manufacturers Association, International

833 Featherstone Road
Rockford, IL 61107
United States of America
Tel: +1 815 399 8700
Fax: +1 815 399 7279
Internet: www.fmametalfab.org
Contact: John Nandzik - President & CEO

Forging Industry Association

25 Prospect Avenue
West, Suite 300
Cleveland, OH 44115
United States of America
Tel: +1 216 781 6260
Fax: +1 216 781 0102
Internet: www.forging.org
Contact: Charles H. Hageman - Executive Vice President

Forging Industry Educational & Research Foundation

25 Prospect Avenue
West, Suite 300
Cleveland, OH 44115
United States of America
Tel: +1 216 781 5040
Fax: +1 216 781 5065
Internet: www.worldscan.com/FIERF

Grinding Wheel Institute

30200 Detroit Road
Cleveland, OH 44145-1967
United States of America
Tel: +1 216 899 0010
Fax: +1 216 892 1404

Helicopter Association International

1635 Prince Street
Alexandria, VA 22314
United States of America
Tel: +1 703 683 4646
Fax: +1 703 683 4745
Internet: www.rotor.com

IMA - International Magnesium Assoc.

1303 Vincent Place Suite 1
 McLean VA 22101
 United States of America
 Tel: +1 703 442 8888
 Fax: +1 703 821 1824
 Email: ima@bellatlantic.com, intlmag@cais.com
 Contact: Byron B Clow - Executive Vice President
The International Magnesium Association is a world-wide organisation representing companies involved in magnesium production, marketing, processing & use. Since 1943 IMA has promoted & represented the magnesium industry by collection & dissemination of information, supporting research, promotion & recognition of innovation and new uses of Mg.

Industrial Fasteners Institute

1105 East Ohio Building
 Cleveland, OH 44114
 United States of America
 Tel: +1 216 241 1482
 Fax: +1 216 241 5901
 Internet: www.industrial-fasteners.org

Industrial Perforators Association

710 N. Plankinton Ave.
 Milwaukee, WI 53203
 United States of America
 Tel: +1 414 271 2263
 Fax: +1 414 271 5154

Institute of Industrial Engineers

25 Technology Park/Atlanta
 Norcross, GA 30092
 United States of America
 Tel: +1 770 449 0460
 Fax: +1 770 263 8532
 Internet: www.iienet.org
 Contact: Dr. Woodrow W. Leake - Executive Director

International Copper Association Ltd.

260 Madison Ave., 16th Fl.
 New York, NY 10016
 United States of America
 Tel: +1 212 251 7240
 Fax: +1 212 251 7245
 Internet: www.copper.org

International Technology Institute

7125 Saltsburg Road
 Pittsburgh, PA 15235-2297
 United States of America
 Tel: +1 412 795 5300
 Fax: +1 412 795 5302
 Contact: Dr. I.S. Tuba - Executive Director

International Titanium Association

1871 Folsom Street, Suite 100
 Boulder, CO 80302-5791
 United States of America
 Tel: +1 303 443 7515
 Fax: +1 303 443 4406
 Internet: http://www.titanium.net
 Contact: John C. Monsees - Executive Director
*ITA represents the interests of companies engaged in all aspects of the titanium industry, such as casters, extruders, miners, forgers, recyclers, producers, fabricators & end-users. (Also suppliers & brokers/traders).
 Worldwide membership of companies.*

Investment Casting Institute

8350 N. Central Exp., Suite M1110
 Dallas, TX 75206-1602
 United States of America
 Tel: +1 214 368 8896
 Fax: +1 214 368 8852
 Contact: H.T. Bidwell - Executive Director

ISRI - Institute of Scrap Recycling Industries

1325 G St., NW, Suite 1000
 Washington, DC 20005-3104
 United States of America
 Tel: +1 202 737 1770
 Fax: +1 202 626 0900
 Email: 104521.2345@compuserve.com
 Internet: http://www.isri.org
 Contact: Dr. Herschel Cutler
ISRI is a national trade association whose 1,600 industry member companies process, broker, and consume scrap commodities, including metals, paper, plastics, glass, rubber, and textiles. Members also include suppliers of equipment and services to the industry. There are 24 affiliated chapters. Its primary publications are: Scrap magazine; Phoenix: Voice of the Scrap Recycling Industries; and Scrap Specifications Circular: Guidelines for Ferrous Scrap, Non-ferrous Scrap, Paper Stock, Plastic Scrap, Glass Scrap. The association also publishes a variety of newsletters exclusively for members. ISRI sponsors an annual convention and exposition, seminars, commodities roundtables, and workshops.

Material Handling Industry

8720 Red Oak Blvd., Suite 201
 Charlotte, NC 28217
 United States of America
 Tel: +1 704 522 8644
 Fax: +1 704 522 7826
 Internet: www.industry.net/mhi/
 Contact: A.L. Leffler - Chief Executive Officer

Materials Research Society

9800 McKnight Road
 Pittsburgh, PA 15237-6006
 United States of America
 Tel: +1 412 367 3004
 Fax: +1 412 367 4373
 Internet: www.mrs.org

Metal Building Manufacturers Association

1300 Sumner Avenue
 Cleveland, OH 44115
 United States of America
 Tel: +1 216 241 7333
 Fax: +1 216 241 0105
 Internet: www.taol.com/mbma
 Contact: Charles M. Stockinger

Metal Bulletin Inc

New York NY
 United States of America
 Tel: +1 212 213 6202
 Fax: +1 212 213 1870
 Email: sales@metbul.com
 Internet: http://www.metbul.com
 Contact: Migdalia Perez
North and South America. Books, journals, industry statistics, etc.

Metal Construction Association (MCA)

1101 14th St., N.W., Suite 1100
 Washington, DC 20005
 United States of America
 Tel: +1 202 371 1243
 Fax: +1 202 371 1090

Metal Finishing Suppliers Association

801 N. Cass Ave., Suite 300
 Westmont, IL 60559-1131
 United States of America
 Tel: +1 630 887 0797
 Fax: +1 630 887 0799
 Email: rcrain211@aol.com
 Contact: Richard Crain - Executive Director

138 Other Useful Addresses

Metal Powder Industries Federation

105 College Road East
Princeton, NJ 08540
United States of America
Tel: +1 609 452 7700
Fax: +1 609 987 8523
Internet: www.mpif.org/
Contact: Donald G. White - Executive Director

Metal Treating Institute

302 Third St., Suite 1
Neptune Beach, FL 32266
United States of America
Tel: +1 904 249 0448
Fax: +1 904 249 0459
Internet: www.industry.net/metaltreat
Contact: M. Lance Miller

Minerals, Metals & Materials Society

See: TMS.

Mining and Metallurgical Society of America

9 Escalle Lane
Larkspur, CA 94939
United States of America
Tel: +1 415 924 7441
Fax: +1 415 924 7463
Contact: Henry R. Colen - President

NAAD - National Association of Aluminum Distributors

1900 Arch Street
Philadelphia, PA 19103-1498
United States of America
Tel: +1 215 564 3484
Fax: +1 215 963 9785
Internet: naad.org
Contact: Kenneth R. Hutton - Executive Vice President

NACE - National Association of Corrosion Engineers

P.O. Box 218340, Houston, TX 77218
United States of America
Tel: +1 713 492 0535
Internet: www.nace.org

NAM - National Association of Manufacturers

1331 Pennsylvania Avenue, NW
Suite 1500 - North Tower
Washington DC 20004-1790
United States of America
Tel: +1 202 637 3000
Fax: +1 202 637 3182
Internet: www.nam.org/
Contact: Jerry Jasinowski - President

National Association of Metal Finishers

209 Elden Street, Suite 202
Herndon, VA 20170
United States of America
Tel: +1 703 709 8299
Fax: +1 703 709 1036
Contact: Brad Parcels - Executive Director

National Center for Excellence in Metalworking Technology

1450 Scalp Ave.
Johnstown, PA 15904
United States of America
Tel: +1 814 269 2731
Internet: www.ncemt.ctc.com
Operated by Concurrent Technologies Corp. for the U.S. Navy's Manufacturing Technology (ManTech) program.

National Coil Coaters Association

401 North Michigan Avenue
Chicago, IL 60611
United States of America
Tel: +1 312 321 6894
Fax: +1 312 527 6640

National Electrical Manufacturers Association

1300 N. 17th St., Suite 1847
Rosslyn, VA 22209
United States of America
Tel: +1 703 841 3200
Fax: +1 703 841 3300
Internet: www.nema.org

National Mining Association (NMA)

1130 17th Street, N.W.
Washington, DC 20036
United States of America
Tel: +1 202 463 2621
Fax: +1 202 833 9636
Internet: www.nma.org

National Screw Machine Products Association

6700 W. Snowville Road
Brecksville, OH 44141
United States of America
Tel: +1 216 526 0300
Fax: +1 216 526 5803
Internet: www.pmpa.org

NTMA - National Tooling & Machining Association

9300 Livingston Road
Fort Washington, MD 20744
United States of America
Tel: +1 301 248 6200
Fax: +1 301 248 7104
Internet: www.ntma.org
Contact: Matthew B. Coffey - President

PMPA - Precision Machined Products Association

6700 W. Snowville Road
Brecksville, OH 44141
United States of America
Tel: +1 216 526 0300
Fax: +1 216 526 5803
Internet: www.pmpa.org
Contact: Jack D. McNaughton - Executive Vice President

Precision Metalforming Association

27027 Chardon Road
Richmond Heights, OH 44143
United States of America
Tel: +1 216 585 8800
Fax: +1 216 585 3126
Internet: www.industry.net/metalforming
Contact: Jon E. Jenson - President

Railway Progress Institute (RPI)

700 North Fairfax Street, Suite 601
Alexandria, VA 22314-2098
United States of America
Tel: +1 703 836 2332
Fax: +1 703 548 0058
Internet: www.idsonline.com/business/rpi/

Rare Earth Information Center

255 Spedding Hall
Ames IA 50011-3020
United States of America
Tel: +1 515 294 2272
Fax: +1 515 294 3709
Contact: Karl Gschneder Jr.

Recreation Vehicle Industry Association

P.O. Box 2999
Reston, VA 22090
United States of America
Tel: +1 703 620 6003
Fax: +1 703 620 5071

Resistance Welder Manufacturers Association

1900 Arch Street
Philadelphia, PA 19103-1498
United States of America
Tel: +1 215 564 3484
Fax: +1 215 963 9785
Contact: Kristina Hagman-Goldfield - Executive Director

Robotic Industries Association

900 Victors Way, P.O. Box 3724
Ann Arbor, MI 48106
United States of America
Tel: +1 313 994 6088
Fax: +1 313 994 3338
Internet: www.robotics.org

SAE - Society of Automotive Engineers

400 Commonwealth Drive
Warrendale, PA 15096-0001
United States of America
Tel: +1 412 776 4841
Fax: +1 412 776 5760
Internet: www.sae.org
Contact: Max E. Rumbaugh, Jr. - Executive Vice President

SAMPE - Society for Advancement of Material & Process Engineering

1161 Parkview Drive
P.O. Box 2459, Covina, CA 91722
United States of America
Tel: +1 818 331 0616
Fax: +1 818 332 8929
Internet: www.et.byu.edu/~sampe
Contact: Daun White - Managing Director
Non-profit making association of American-based materials and process engineers. Organises conferences to promote information exchange between members. Publishes bimonthly SAMPE Journal and quarterly Journal of Advanced Materials.

Scaffolding, Shoring & Forming Institute Inc.

1300 Sumner Avenue
Cleveland, OH 44115-2851
United States of America
Tel: +1 216 241 7333
Fax: +1 216 241 0105
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Sheet Metal Workers' International Association

1750 New York Ave., N.W.
Washington DC 20006
United States of America
Tel: +1 202 783 5880
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Internet: www.smwia.org
Contact: Arthur Moore - General President

Silver Institute

1112 16th St., NW, Suite 240
Washington, DC 20036
United States of America
Tel: +1 202 835 0185
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Silver Users Association

1730 M St., NW, Suite 911
Washington, DC 20036
United States of America
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SME - Society of Manufacturing Engineers

One SME Drive
P.O. Box 930, Dearborn, MI 48121
United States of America
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Fax: +1 313 271 2861
Internet: www.sme.org
Contact: Philip Trimble - Executive Director & General Manager

Society for Mining, Metallurgy and Exploration

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Littleton, CO 80162
United States of America
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Fax: +1 303 973 3845
Internet: www.smenet.org

Spring Manufacturers Institute

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Suppliers of Advanced Composite Materials Association

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Titanium Development Association

See: International Titanium Association.
United States of America

TMS - The Minerals, Metals & Materials Society

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Internet: http://www.tms.org
Professional organisation that encompasses the entire range of materials and engineering, from minerals processing and primary metals production to basic research and the advanced applications of materials. Included among its nearly 13,000 professional and student members are metallurgical and materials engineers, scientists, researchers, educators, and administrators from more than 70 countries on six continents.

Tube & Pipe Association International/FMA

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Contact: John Nandzik - President

Valve Manufacturers Association of America

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Washington, DC 20036
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Wire Association International

1570 Boston Post Road
P.O. Box 578
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Tel: +1 203 453 2777
Fax: +1 203 453 8384
Internet: www.wirenet.org
Contact: Paul R. Casteran - Executive Director

Wire Reinforcement Institute

301 E. Sandusky St.
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Part 3 : Alloy Data

This part contains details of metals and alloys grouped as:

- Aluminium alloys:
 - Wrought
 - Cast
 - Powder
- Magnesium alloys
- Titanium alloys
- Beryllium alloys

Composite materials are included in the appropriate base-metal section. Within each section, alloys are listed alphanumerically. Each alloy has a data sheet.

DATA SHEET

Example

<i>Alloy designation number or name (proprietary)</i>	<i>Details of alloy</i>	<i>Alloy designation system with country or company name</i>	<i>Type</i>					
1050A		AA (USA)	Wrought					
<p>Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Others: Each 0.03, Aluminium 99.5 min. Density (kg.m⁻³) 2710</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Rod, Bar, Wire, Rivet stock</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA1050A, DOA 1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Australia:</i> A1050; <i>Canada:</i> 995; <i>France:</i> A5; <i>Germany:</i> A199.5; <i>Wk.</i> 3.0255; <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005; <i>Proprietary:</i> Alcan 1S, 1B; VAW 99/52</p> <p>Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers, litho plates (Welding wire and rod to BS 2901: pt 4). Tensile strength of drawn, seamless tube 75-146 MPa. See AA documentation for method of expressing Al content.</p>								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	27	-	80	40	69	21HB	Typical	(BAI Plate)
F11 [-]	90	-	110	6	-	-	Minimum	(Alcan Rolled Prod.)
F15 [-]	130	-	150	3	-	-	Minimum	(Alcan Rolled Prod.)
H8 (fully hard) [-]	130	-	145	-	-	-	Typical	(Raufoss)
H14 [-]	85	-	125	3	-	-	EI. min.	(Aalco (Glynwed))
H14 [-]	70	-	100	-	-	28HB	Typical	(P. Balloffet)
<i>Condition and form</i>	<i>Typical mechanical properties</i>				<i>Data source</i>			

142 Key to Alloy Data

Key

Each data sheet contains a basic set of information. Where no details were available, these have been omitted from the data sheet.

Composition – lists the alloying elements, by their chemical symbol, followed by the percentage content. These are shown as a range, a maximum or a minimum figure. All single values are maximum if not stated otherwise. When known, the limits on composition that may vary with form, e.g. between the ingot and a finished die-casting, are stated. A composition is prefixed by:

- **Official** – that of the registered alloy, e.g. as controlled by the Aluminium Association (wrought and cast alloys) or by the stated designation system.
- **Nominal** – where the complete range of alloying elements and impurities are not given, e.g. 'rounded' alloying contents or no details of Others or Each; or where the composition has been obtained from literature other than official documentation, e.g. relevant specification/standard.
- **Proprietary** – compositions of alloys produced by the specified manufacturer.
- **Approximate** – where few details exist.
- **None** – no details available/provided by manufacturers, or alloys listed as 'inactive' by the alloy register (aluminium only)

Density (kgm^{-3}) – approximate value for metal/alloy

Identified product forms – a summary of the forms of materials that are normally available. Note: this is not a comprehensive listing but an indication of whether the literature has shown particular alloys to be available in particular forms, e.g. ingot for a specified casting process, wires for manufacture of rivets, etc.

Similar/Equivalent Alloys – by country and standard organisation, e.g. European (CEN), alloys which are considered within the industry to be equivalent or similar (slight variations in compositions). Most suppliers quote equivalent alloys for their proprietary products.

Comments – general remarks relating to the alloys, its applications, uses and processing. These include (where available) specific comments relating to: Corrosion resistance; Weldability; Machinability; Finishing.

Typical properties are given for an alloy. These are an indication of the properties possible and must not be used for design purposes.

Condition – the stated temper, either as a recognised H or T temper within a national or international designation system, e.g. T6, or as a description, e.g. As-cast; Age hardened; ST = solution treated; ST/A = solution treated & aged; Ppt = precipitation treated; AC = air cooled; OQ = oil quenched. Specific details of the heat-treatment (e.g. time/temperature) are given when necessary.

[Form] – product, e.g. chill cast test piece, foil of a given thickness, extrusion, etc. [-] = not stated.

PS (MPa) – Proof Stress at 0.2% offset, unless otherwise stated.

YS (MPa) – Yield stress.

UTS (MPa) – Ultimate tensile strength

EI (%) – percentage elongation.

E (GPa) – Young's modulus

Hardness – value with stated test method and scale; HB = Brinell, HV or VPN = Vickers, HRC = Rockwell C-scale, etc.

Notes – relating to the properties stated (e.g. Min. values). All properties are typical if not stated.

(Source) – for the properties given. These have been compiled from official standards, manufacturers/suppliers literature and recognised reference works. Names of companies indicates that they supplied data.

References (For mechanical property data):

- #1 Aluminum Association – AA (USA)
- #2 Aluminium Federation – ALFED (UK)
- #3 *Metals Handbook*, ASM International, 1992
- #4 *Materials Selector*, Chapman & Hall, 1997
- #5 *Smithell's Metals Reference Book*, Butterworth.

Aluminium Alloys (wrought)

03 British Alcan (AHDE) (UK) Wrought

Proprietary composition: Si 1, Cu 1.5, Mg 1, Mn 0.7, Aluminium rem.

Identified Product forms: Tube, Extrusion

Comments: Aerospace. Good properties at elevated temperatures.

3.0255 (Al99.5) - Wk. DIN (Germany) Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA:* AA1050A; *European (CEN):* EN573 AW-1050A (*ISO:* Al99.5; *Canada:* 995; *France:* A5; *Germany:* Wk. 3.0255 (Al99.5); *Italy:* 9001/2; 4507; P-ALP 99.5; *Japan:* A1050; *Spain:* L-3051; *Sweden:* 4007; *Switzerland:* Al99.5; *UK:* BS1470:1050A; BS 1B; BS 5L36; G1B; *Others:* (CZ) CSN 42 4004, 42 4005

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F10 (H14) [Rod]	70	-	100	6	-	30HB	Drawn	(Elisental)
F10 (H14) [Wire]	70	-	100	4	-	30HB	Drawn	(Elisental)
F13 (H18) [Rod]	110	-	130	3	-	38HB	Drawn	(Elisental)
F14 (H18) [Wire]	115	-	140	2	-	38HB	Drawn	(Elisental)
W6 (O) [Wire]	55	-	60	18	-	20HB	Soft	(Elisental)
W7 (O) [Rod]	60	-	65	23	-	20HB	Soft	(Elisental)

3.0257 (E-Al) - Wk. DIN (Germany) Wrought

No composition: -

Identified Product forms: Wire

Similar/Equivalent alloys: *USA:* AA1350A; *European (ISO):* E-Al99.5; *France:* A5/L; *Germany:* E-Al; 3.0257; *Italy:* 9001/5; *Spain:* L3052; *UK:* (BS 1E)

3.0285 (Al99.8) - Wk. DIN (Germany) Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA:* AA1080A; *European (CEN):* EN573 AW-1080A (*ISO:* Al99.8(A); *France:* A8; *Germany:* Al99.7, Al99.8; Wk.3.0275, 3.0285; *Italy:* 4509; 9001/4; P-ALP 99.8; *Japan:* A1080; *Spain:* L-3081; *Sweden:* 4004; *Switzerland:* Al99.8; *UK:* BS1470:1080A; BS 1A; *Others:* Al99.8

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F11 (H18) [Rod]	90	-	110	4	-	30HB	Drawn	(Elisental)
F12 (H18) [Wire]	95	-	120	2	-	30HB	Drawn	(Elisental)
F9 (H14) [Rod]	60	-	90	7	-	25HB	Drawn	(Elisental)
F9 (H14) [Wire]	60	-	90	5	-	25HB	Drawn	(Elisental)
W6 (O) [Wire]	50	-	55	16	-	18HB	Soft	(Elisental)

3.0305 (Al99.9) - Wk. DIN (Germany) Wrought

Approximate composition: Aluminium 99.9 min.

Identified Product forms: Extrusion, Forging stock/Billet, Wire

Similar/Equivalent alloys: *USA:* AA1090; *European (CEN):* EN573 AW-1090; *France:* (A99); *Germany:* Wk. 3.0305 (Al99.9); *Others:* Al99.9; *Proprietary:* Otto Fuchs E

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F11 (H18) [Wire]	-	-	110	3	-	25HB	Drawn	(Elisental)
F7 (H14) [Wire]	-	-	70	6	-	20HB	Drawn	(Elisental)
W4 (O) [Wire]	-	-	40	20	-	15HB	Soft	(Elisental)

3.0315 (AlMn1) - Wk. DIN (Germany) Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA:* AA3103, UNS A93103; *European (CEN):* EN573 AW-3103 (*ISO:* AlMn1; *Canada:* M1; *France:* A-M1; (A-M); *Germany:* AlMn; AlMn1; Wk.3.0515; *Italy:* 9003/3; 3568; FA60-3103; P-AlMn1.2; *Russia (GOST):* 1400; *Spain:* L-3811; *Sweden:* 4054; *Switzerland:* AlMn; 10848; *UK:* 3103; BS N3, (NS 3); *Others:* (CZ) CSN 42 4432

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F13 (H14) [Rod]	90	-	130	5	-	40HB	Drawn	(Elisental)
F13 (H14) [Wire]	90	-	130	3	-	35HB	Drawn	(Elisental)
F16 (H18) [Rod]	130	-	160	3	-	45HB	Drawn	(Elisental)
F16 (H18) [Wire]	130	-	160	1	-	45HB	Drawn	(Elisental)
W10 (O) [Wire]	40	-	95	16	-	25HB	Soft	(Elisental)

144 Aluminium Alloys (wrought)

3.0385 (Al99.98R) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Wire								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
F11 (H18) [Wire]	-	-	110	3	-	25HB	Drawn (Elisental)	
F7 (H14) [Wire]	-	-	70	6	-	20HB	Drawn (Elisental)	
W4 (O) [Wire]	-	-	40	20	-	15HB	Soft (Elisental)	
3.0400 - Wk.		DIN (Germany)						Wrought
Approximate composition: Aluminium 99.99 min.								
Identified Product forms: Extrusion, Forging stock/Billet								
Similar/Equivalent alloys: <i>Proprietary:</i> Otto Fuchs R								
3.0915 (AlFeSi) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA:</i> AA8011A; <i>European (CEN):</i> EN573 AW-8011A (<i>ISO:</i> (AlFeSi); <i>France:</i> A4/L; 8011; <i>Germany:</i> Wk. 3.0915 (AlFeSi); <i>Italy:</i> 8011								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
G12 (H24) [Wire]	-	-	120	12	-	-	Reannealed (Elisental)	
3.1255 (AlCuSiMn) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Rod								
Similar/Equivalent alloys: <i>USA:</i> AA2014, UNS A92014, AMS 4028, 4029; <i>European (CEN):</i> EN573 AW-2014 (2014A); AW-AlCu4SiMg(A) (<i>ISO:</i> AlCu4SiMg (<i>AECMA:</i> AL-P12; <i>Canada:</i> CS41N; <i>France:</i> A-U4SG; 2014; <i>Germany:</i> AlCuSiMn; Wk.3.1255; LW3.1254; <i>Italy:</i> 3581; 9002/3; FA60-2014; <i>Japan:</i> A3X1; A2014; A2014P; <i>Russia (CIS):</i> 1380, 1185; <i>Spain:</i> L-3130; <i>Sweden:</i> 14.4338; <i>UK:</i> (BS H15); <i>Others:</i> (CZ) CSN 42 4207								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
F43 (T6) [Rod]	350	-	430	6	-	120HB	Artificially aged (Elisental)	
F44 (T6) [Rod]	360	-	440	7	-	120HB	Artificially aged (Elisental)	
F46 (T6) [Rod]	400	-	460	6	-	125HB	Artificially aged (Elisental)	
3.1305 (AlCu2.5Mg0.5) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA:</i> AA2117; <i>European (ISO):</i> AlCu2.5Mg, AlCu2Mg (<i>AECMA:</i> AL-P14; <i>Austria:</i> AlCuMg0.5; <i>Canada:</i> CG30; <i>France:</i> A-U2G; <i>Germany:</i> AlCu2.5Mg0.5; Wk.3.1305; <i>Italy:</i> P-AlCu2.5MgSi; 9002/1; 3577; <i>Japan:</i> A2117; <i>Spain:</i> L-3180; <i>UK:</i> BS 3L86								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
F18 (H14) [Wire]	100	-	220	7	-	50HB	Drawn (Elisental)	
F27 (T4) [Wire]	150	-	270	5	-	75HB	Naturally aged (Elisental)	
F31 (T3) [Wire]	200	-	310	3	-	90HB	Naturally aged, drawn (Elisental)	
3.1325 (AlCuMg1) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Rod, Wire								
Similar/Equivalent alloys: <i>USA:</i> AA2017A; <i>European (CEN):</i> EN573 AW-2017A; AW-AlCu4MgSi(A) (<i>ISO:</i> AlCu4MgSi(A); <i>France:</i> A-U4G; <i>Germany:</i> AlCuMg1; Wk.3.1325; <i>Italy:</i> 3579; 9002/2; <i>Japan:</i> A2017P; <i>UK:</i> 2017A; BS L93, L 94; <i>Others:</i> European aerospace P-2017A								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
F22 (H14) [Wire]	120	-	260	5	-	65HB	Drawn (Elisental)	
F33 (T4) [Rod]	200	-	330	6	-	110HB	Naturally aged (Elisental)	
F36(T4) [Rod]	220	-	360	7	-	110HB	Naturally aged (Elisental)	
F38 (T4) [Rod]	260	-	380	8	-	110HB	Naturally aged (Elisental)	
F38 (T4) [Wire]	250	-	380	4	-	100HB	Naturally aged (Elisental)	
F40 (T4) [Rod]	270	-	400	8	-	110HB	Naturally aged (Elisental)	
F42 (T3) [Wire]	290	-	420	2	-	105HB	Naturally aged, drawn (Elisental)	
3.1355 (AlCuMg2) - Wk.		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Rod, Wire								
Similar/Equivalent alloys: <i>USA:</i> AA2024, UNS A92024, AMS 4037; <i>European (CEN):</i> EN573 AW-2024; AW-AlCu4Mg1 (<i>ISO:</i> AlCu4Mg1.5 (<i>AECMA:</i> AL-P13; <i>Austria:</i> AlCuMg2; <i>Canada:</i> CG42; <i>France:</i> A-U4G1; 2024; AIR 9048-630; <i>Germany:</i> AlCuMg2; Wk.3.1355; LW3.1354; <i>Italy:</i> P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; <i>Japan:</i> A2024P; <i>Russia (CIS):</i> 1160; <i>Spain:</i> L-3140; <i>Switzerland:</i> AlCu4Mg1.5; <i>UK:</i> 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; <i>Others:</i> USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
F26 (H14) [Wire]	150	-	300	4	-	75HB	Drawn (Elisental)	
F40 (T4) [Rod]	260	-	400	6	-	105HB	Naturally aged (Elisental)	
F42 (T4) [Wire]	280	-	420	3	-	110HB	Naturally aged (Elisental)	
F44 (T4) [Rod]	310	-	440	8	-	115HB	Naturally aged (Elisental)	
F47 (T4) [Rod]	330	-	470	6	-	120HB	Naturally aged (Elisental)	
F48 (T3) [Wire]	340	-	480	2	-	125HB	Naturally aged, drawn (Elisental)	

3.1855 (AlCuBiPb) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA*: AA2011, UNS A92011; *European (CEN)*: EN573 AW-2011 (*ISO*): AlCu6BiPb; *Canada*: CB60; *France*: A-U5PbBi; *Germany*: AlCuBiPb; Wk.3.1655; *Italy*: 9002/5; 6362; *Japan*: A2011; *Spain*: L-3192; *Sweden*: 4355; *UK*: 2011; BS FC1

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F28 (T4) [Rod]	210	-	280	10	-	90HB	Naturally aged	(Elisental)
F30 (T4) [Rod]	250	-	300	10	-	90HB	Naturally aged	(Elisental)
F32 (T4) [Rod]	270	-	320	8	-	90HB	Naturally aged	(Elisental)
F37 (T6) [Rod]	270	-	370	6	-	110HB	Artificially aged	(Elisental)

3.2305 (AlMgSi) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Wire

Similar/Equivalent alloys: *USA*: AA6101A; *European (CEN)*: EN573 AW-6161A (*ISO*): E-AlMgSi(A), EAlMgSi0.5; *France*: E-AlMgSi; *Germany*: Wk. 3.2305 (AlMgSi); *Italy*: 9006/3; *Spain*: L-3431; *Sweden*: 14,4102; *UK*: 6101A; BS 91E

3.2315 (AlMgSi1) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA*: AA6082, UNS A96082; *European (CEN)*: EN573 AW-6082; AW-AISi1MgMn (*ISO*): AlMgSi1Mn (*AECMA*): AL-P21; *Canada*: GS11R; *France*: A-SGM, A-SGM0.7; 6082; *Germany*: AlMgSi1; Wk.3.2315; *Italy*: 9006/4, 3571; FA60-6082; P-AISi1M8Mn; *Spain*: L-3453; *Sweden*: 14,4212; *Switzerland*: AlMgSi1Mn; 10850; *UK*: 6082; BS H30 (HE30, HS 30); *Others*: (CZ) CSN 42 4400; Eur. aerospace P-6082

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F15 (H14) [Wire]	100	-	150	3	-	40HB	Drawn	(Elisental)
F20 (T4) [Wire]	100	-	200	7	-	45HB	Naturally aged	(Elisental)
F21 (T4) [Rod]	110	-	205	12	-	45HB	Naturally aged	(Elisental)
F25 (T3) [Wire]	180	-	250	5	-	60HB	Naturally aged, drawn	(Elisental)
F27 (T6) [Rod]	200	-	270	-	-	75HB	Artificially aged	(Elisental)
F28 (T6) [Rod]	200	-	275	10	-	70HB	Artificially aged	(Elisental)
F28 (T6) [Wire]	200	-	275	4	-	65HB	Artificially aged	(Elisental)
F30 (T6) [Rod]	240	-	300	-	-	70HB	Artificially aged	(Elisental)
F31 (T6) [Rod]	260	-	310	8	-	75HB	Artificially aged	(Elisental)
F32 (T9) [Wire]	250	-	320	3	-	85HB	Artificially aged, drawn	(Elisental)
W11 (O) [Wire]	-	-	110	9	-	30HB	Soft	(Elisental)

3.3206 (AlMgSi0.5) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: *USA*: AA6060; *European (CEN)*: EN573 AW 6060 (*ISO*): AlMgSi, AlMgSiFe; *France*: A-GS; *Germany*: AlMgSi0.5; Wk.3.3206; *Italy*: 9006/1; 3569; P-AlMgSi; *Japan*: A6063; *Spain*: L-3442; *Sweden*: 4103; *Switzerland*: AlMgSi0.5; *UK*: (BS H9); *Others*: (CZ) CSN 42 4401

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F12 (H14) [Wire]	80	-	120	3	-	40HB	Drawn	(Elisental)
F13 (T4) [Rod]	65	-	130	13	-	45HB	Artificially aged	(Elisental)
F15 (T4) [Wire]	70	-	150	9	-	45HB	Naturally aged	(Elisental)
F19 (T6) [Rod]	160	-	215	10	-	70HB	Artificially aged	(Elisental)
F20 (T3) [Wire]	130	-	200	6	-	60HB	Naturally aged	(Elisental)
F22 (T6) [Wire]	160	-	215	5	-	65HB	Artificially aged	(Elisental)
F23 (T6) [Rod]	195	-	245	8	-	75HB	Artificially aged	(Elisental)
F27 (T3) [Wire]	240	-	270	3	-	80HB	Naturally aged	(Elisental)
F30 (T9) [Wire]	250	-	300	2	-	85HB	Artificially aged	(Elisental)
W9 (O) [Wire]	-	-	90	10	-	30HB	Soft	(Elisental)

3.3208 (Al99.9MgSi) - Wk.

DIN (Germany)

Wrought

Approximate composition: Mg, Si, Aluminium 99.9 min.

Identified Product forms: Wire

Similar/Equivalent alloys: *USA*: AA6443; *Germany*: Wk. 3.3208 (Al99.9MgSi); *UK*: BTR6E6; *Proprietary*: Otto Fuchs ES90

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F24 (T6) [Wire]	195	-	240	-	-	75HB	Artificially aged	(Elisental)

3.3211 (AlMg1SiCu) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod

Similar/Equivalent alloys: *USA*: AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161; *European (CEN)*: EN573 AW-6061; AW-AlMg1SiCu (*ISO*): AlMg1SiCu; *Canada*: GS11N; *France*: A-GSUC; 6061; AIR 9048-660; *Germany*: AlMgSi1Cu; AlMgSiCu; Wk.3.3211; LW3.3214; *Italy*: 9006/2; 6170-68; FA60-6061; *Japan*: A6061P; *Spain*: L-3420; *UK*: 6061; BS H20; BS L117, L118; *Others*: USA-WW-T-700/6; Eur. aerospace P-6061

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Rod]	110	-	210	16	-	60HB	Naturally aged	(Elisental)
T6 [Rod]	245	-	290	9	-	90HB	Artificially aged	(Elisental)
T6 [Rod]	240	-	260	9	-	90HB	Artificially aged	(Elisental)

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3.3308 (AI99.9Mg0.5) - Wk.	DIN (Germany)						Wrought
Approximate composition: Mg 0.5, Aluminium 99.9 min.							
Identified Product forms: Extrusion, Forging stock/Billet, Wire							
Similar/Equivalent alloys: <u>Germany</u> : Wk. 3.3308 (AI99.9Mg0.5); <u>Proprietary</u> : Otto Fuchs E05							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F10 (H14) [Wire]	-	-	100	3	-	30HB	Drawn (Elisental)
F13 (H18) [Wire]	-	-	130	1	-	38HB	Drawn (Elisental)
W7 (O) [Wire]	-	-	70	16	-	23HB	Soft (Elisental)
3.3309 - Wk.	DIN (Germany)						Wrought
Approximate composition: Mg 0.5, Aluminium rem.							
Identified Product forms: Extrusion, Forging stock/Billet							
Similar/Equivalent alloys: <u>Proprietary</u> : Otto Fuchs R05							
3.3315 (AlMg1) - Wk.	DIN (Germany)						Wrought
No composition: -							
Identified Product forms: Rod, Wire							
Similar/Equivalent alloys: <u>USA</u> : AA5005, UNS A95005; <u>European (CEN)</u> : EN573 AW-5005 (<u>ISO</u>): AlMg1, AlMg1(B); <u>France</u> : A-G0.6; 5005; <u>Germany</u> : AlMg1; Wk.3.3315; <u>Italy</u> : 9005/1; 5764-66, 4510; FA60-5005; P-AlMg0.8; P-AlMg0.9; <u>Japan</u> : A5005, A2X8; <u>Russia (CIS)</u> : 1510; <u>Spain</u> : L-3350; <u>Sweden</u> : 4106; <u>Switzerland</u> : Al-1Mg, 10849; <u>UK</u> : 5005; BS N41							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F14 (H14) [Rod]	90	-	140	5	-	40HB	Drawn (Elisental)
F14 (H14) [Wire]	90	-	140	4	-	40HB	Drawn (Elisental)
F19 (H18) [Rod]	155	-	185	3	-	55HB	Drawn (Elisental)
F19 (H18) [Wire]	155	-	185	1	-	50HB	Drawn (Elisental)
W10 (O) [Wire]	40	-	100	14	-	30HB	Soft (Elisental)
3.3318 - Wk.	DIN (Germany)						Wrought
Approximate composition: Mg 1, Aluminium 99.9 min.							
Similar/Equivalent alloys: <u>Proprietary</u> : Otto Fuchs E1							
3.3318 (AI99.9Mg1) - Wk.	DIN (Germany)						Wrought
No composition: -							
Identified Product forms: Wire							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F13 (H14) [Wire]	-	-	130	3	-	40HB	Drawn (Elisental)
F16 (H18) [Wire]	-	-	160	1	-	50HB	Drawn (Elisental)
W10 (O) [Wire]	-	-	100	15	-	30HB	Soft (Elisental)
3.3319 - Wk.	DIN (Germany)						Wrought
Approximate composition: Mg 1, Aluminium rem.							
Identified Product forms: Extrusion, Forging stock/Billet							
Similar/Equivalent alloys: <u>Proprietary</u> : Otto Fuchs R1							
3.3326 (AlMg1.8) - Wk.	DIN (Germany)						Wrought
No composition: -							
Identified Product forms: Wire							
Similar/Equivalent alloys: <u>USA</u> : AA5051A; <u>European (CEN)</u> : EN573 AW-5051A; <u>Germany</u> : AlMg1.8, DIN 3.3326							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F15 (H14) [Wire]	50	-	145	-	-	40HB	Drawn (Elisental)
3.3523 (AlMg2.5) - Wk.	DIN (Germany)						Wrought
No composition: -							
Identified Product forms: Wire							
Similar/Equivalent alloys: <u>USA</u> : AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B; <u>European (CEN)</u> : EN573 AW-5052; AW-AlMg2.5 (<u>ISO</u>): AlMg2.5 (<u>AECMA</u>): AL-P31; <u>Canada</u> : GR20; <u>France</u> : A-G2; A-G2.5C; 5052; <u>Germany</u> : AlMg2; AlMg2.5; DIN 3.3523; <u>Italy</u> : P-AlMg2.5; 3574; 9005/2; FA60-5052; <u>Japan</u> : A2X1; A5052P; <u>Sweden</u> : 14.4120; <u>Switzerland</u> : 10849; <u>UK</u> : 5052; BS N4; BS L80, L81, 2L55, 2L56							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F21 (H12) [Wire]	155	-	210	3	-	55HB	Drawn (Elisental)
F25 (H16) [Wire]	210	-	250	1	-	70HB	Drawn (Elisental)
G24 (H26) [Wire]	190	-	240	5	-	65HB	Reannealed (Elisental)
W17 (O) [Wire]	70	-	170	8	-	43HB	Soft (Elisental)
3.3526 (AlMg2Mn0.3) - Wk.	DIN (Germany)						Wrought
No composition: -							
Identified Product forms: Rod, Wire							
Similar/Equivalent alloys: <u>USA</u> : AA5251, UNS A95251; <u>European (CEN)</u> : EN573 AW-5251; AW-AlMg2 (<u>ISO</u>): AlMg2; <u>France</u> : A-G2M; 5251; <u>Germany</u> : AlMg2Mn0.3; Wk.3.3525; <u>Italy</u> : 4511; <u>Spain</u> : L-3361; <u>Switzerland</u> : Al-2Mg; <u>UK</u> : 5251; BS N4, NS4; BS 3L80, 3L81, 5L44; <u>Others</u> : (CZ) CSN 42 4412							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
F19 (H12) [Wire]	145	-	190	4	-	50HB	Drawn (Elisental)
F20 (H14) [Rod]	160	-	200	4	-	50HB	Drawn (Elisental)
F23 (H16) [Wire]	200	-	230	1	-	65HB	Drawn (Elisental)
F24 (H18) [Rod]	205	-	235	2	-	65HB	Drawn (Elisental)
G22 (H26) [Wire]	200	-	230	1	-	60HB	Reannealed (Elisental)
W15 (O) [Wire]	60	-	150	9	-	40HB	Soft (Elisental)

3.3535 (AlMg3) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: USA: AA5754; *European (CEN)*: EN573 AW-5754; AW-AlMg3 (*ISO*): AlMg3; *France*: A-G3, A-G3M; 5754; *Germany*: AlMg3; 3.3535; *Italy*: 3575; P-AlMg3.5; *Spain*: L-3390; *Sweden*: 14,4125; *Switzerland*: AlMg3; *UK*: (BS N5); *Others*: (CZ) CSN 42 4413; AlMg3

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F23 (H12) [Wire]	170	-	230	3	-	65HB	Drawn	(Elisental)
F25 (H14) [Rod]	180	-	250	3	-	75HB	Drawn	(Elisental)
F27 (H16) [Wire]	230	-	270	1	-	80HB	Drawn	(Elisental)
G26 (H26) [Wire]	200	-	260	5	-	75HB	Reannealed	(Elisental)
W18 (O) [Rod]	80	-	130	14	-	45HB	Soft	(Elisental)
W18 (O) [Wire]	80	-	180	7	-	45HB	Soft	(Elisental)

3.3555 (AlMg5) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: USA: AA5056A; *European (CEN)*: EN573 AW-5056A; EN573 AW-5019 (*ISO*): AlMg5; *France*: A-G5M; *Germany*: AlMg5; DIN 3.3555; *Spain*: L-3320; *UK*: 5056A; BS N6; *Others*: (CZ) CSN 42 4415; European aerospace P-5056A

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F26 (H12) [Rod]	145	-	255	8	-	70HB	Drawn	(Elisental)
F28 (H14) [Rod]	200	-	280	5	-	80HB	Drawn	(Elisental)
F31 (H14) [Wire]	205	-	310	2	-	80HB	Drawn	(Elisental)
F35 (H18) [Wire]	250	-	350	1	-	95HB	Drawn	(Elisental)
G34 (H28) [Wire]	220	-	340	3	-	90HB	Reannealed	(Elisental)
W25 (O) [Rod]	110	-	250	12	-	60HB	Soft	(Elisental)
W27 (O) [Wire]	140	-	270	5	-	55HB	Soft	(Elisental)

3.4335 (AlZn4.5Mg1) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: USA: AA7020, SAE 214; *European (CEN)*: EN573 AW-7020; AW-AlZn4.5Mg1 (*ISO*): AlZn4.5Mg1; *France*: A-Z5G; 7020; AIR 9048-670; *Germany*: AlZn4.5Mg1; 3.4335; *Italy*: 9007/1; 7791; P-AlZn4.5Mg; *Japan*: A7020; *Spain*: L-3741; *Sweden*: 14,4425; *Switzerland*: AlZn4.5Mg1; *UK*: 7020; BS H17; *Others*: (CZ) CSN 42 4441; Eur. aerospace P-7020

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F35 (T6) [Rod]	290	-	-	8	-	100HB	Artificially aged	(Elisental)
F35 (T6) [Rod]	290	-	290	8	-	105HB	Artificially aged	(Elisental)
F35 (T6) [Rod]	290	-	270	7	-	100HB	Artificially aged	(Elisental)
F35 (T6) [Wire]	290	-	350	4	-	100HB	Artificially aged	(Elisental)

3.4365 (AlZnMgCu1.5) - Wk.

DIN (Germany)

Wrought

No composition: -

Identified Product forms: Rod, Wire

Similar/Equivalent alloys: USA: AA7075, UNS A97075, AMS 4045, 4078; *European (CEN)*: EN573 AW-7075; AW-AlZn5.5MgCu (*ISO*): AlZn5.5MgCu, AlZn6MgCu1.5 (*AECMA*): AL-P42; *Austria*: AlZnMgCu1.5; *Canada*: ZG62; *France*: A-Z5GU; 7075; AIR 9048-680, -690, -700, -710; *Germany*: AlZnMgCu1.5; Wk.3.4365; LW3.4364; *Italy*: 9007/2; 3735, 3736, FA60-7075; *Japan*: A7075P; *Spain*: L-3710; *Switzerland*: AlZn6MgCu1.5, AlZnMnCu; 10858; *UK*: 7075; BS 2L95, L96, L160, L161, L162, L170; DTD5074A, DTD5124, DTD5121, DTD5110; *Others*: (CZ) CSN 42 4222; Eur. aerospace P-7075

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F25 (H14) [Wire]	200	-	250	4	-	70HB	Drawn	(Elisental)
F50 (T6) [Rod]	440	-	500	5	-	140HB	Artificially aged	(Elisental)
F51 (T6) [Rod]	450	-	510	5	-	140HB	Artificially aged	(Elisental)
F51 (T6) [Rod]	440	-	510	6	-	140HB	Artificially aged	(Elisental)
F51 (T6) [Wire]	440	-	510	2	-	140HB	Artificially aged	(Elisental)
F52 (T6) [Rod]	460	-	520	6	-	140HB	Artificially aged	(Elisental)
F55 (T9) [Wire]	500	-	550	1	-	145HB	Artificially aged, drawn	(Elisental)

41/04

VAW (France)

Wrought

Proprietary composition: Si 0.5, Fe 0.6, Cu 0.2-0.5, Mg 0.1, Mn 0.9-1.3, Zn 0.1, Cr 0.3-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2730

Identified Product forms: Foil

Similar/Equivalent alloys: *Germany*: AlMn1Cr

Comments: Foil & thin strip for closures.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H16 [Foil (0.18-0.30mm)]	150	-	170	1	-		Min. values; uncoated	(VAW France)
H18 [Foil (0.18-0.26mm)]	170	-	190	1	-		Min. values; uncoated	(VAW France)
H24 / H44 [Foil (0.18-0.26mm)]	125	-	145	3	-		Min. values; laquered	(VAW France)
H24 / H44 [Foil (0.18-0.30mm)]	125	-	145	3	-		Min. values; uncoated	(VAW France)

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41/20	VAW (France)	Wrought						
Proprietary composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA3003, UNS A93003, SAE 29; <i>European (CEN):</i> EN573 AW-3003 (<i>ISO:</i> AlMn1Cu; <i>Canada:</i> MC10; <i>France:</i> A-M1; 3003; AlMn1Cu; <i>Germany:</i> AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; <i>Italy:</i> 7788; 9003/1; <i>Japan:</i> A3003; <i>Switzerland:</i> AlMn; <i>UK:</i> NS3; 3103; <i>Others:</i> (CZ) CSN 42 4432; <i>Proprietary:</i> VAW41/20 Comments: Foil & strip for semi-rigid containers (packaging); folded, single & compartment containers								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
(G21) [Foil (0.045-0.300mm)]	-	-	190	1	-	-	Min. values	(VAW France)
(W10) [Foil (0.045-0.300mm)]	-	-	100	-	-	-	Min. values; EI% varies with thickness	(VAW France)
(W10) [Foil (0.065-0.120mm)]	-	-	100	-	-	-	Min. values; EI% varies with thickness	(VAW France)
H48 (G15) [Foil (0.045-0.120mm)]	-	-	145	-	-	-	Min. values; EI% varies with thickness	(VAW France)
54	British Alcan (AHDE) (UK)	Wrought						
Proprietary composition: Cu 6, Mg 0.2, Mn 0.25, Aluminium rem. Identified Product forms: Tube, Extrusion Comments: Aerospace. Good properties at elevated temperatures.								
57	British Alcan (AHDE) (UK)	Wrought						
Proprietary composition: Si 0.15, Cu 6, Mn 0.25, Aluminium rem. Identified Product forms: Tube, Extrusion Comments: Aerospace. Good properties at elevated temperatures.								
61/03	VAW (France)	Wrought						
Proprietary composition: Si 0.3, Fe 0.7, Cu 0.25, Mg 0.8-1.3, Mn 1-1.5, Zn 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2715 Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA3004, UNS A93004; <i>European (CEN):</i> EN573 AW-3004; AW-AlMn1Mg (<i>ISO:</i> AlMn1Mg1; <i>France:</i> A-M1G; 3004; <i>Germany:</i> AlMn1Mg1; Wk. 3.0526; <i>Italy:</i> 6361; 9003/2; FA60-3004; <i>Japan:</i> A3004; <i>Proprietary:</i> VAW61/03 Comments: Foil & thin strip for closures. Can bodies.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H19 (F29) [Foil (0.25-0.40mm)]	270	-	290	2	-	-	Min. values; uncoated	(VAW France)
H24 [Foil (0.18-0.26mm)]	170	-	220	4	-	-	Min. values; uncoated	(VAW France)
61/10	VAW (France)	Wrought						
Proprietary composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.8, Mn 0.3-0.8, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710 Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA3105, UNS A93105; <i>European (CEN):</i> EN573 AW-3105 (<i>ISO:</i> AlMn0.5Mg0.5, AlMnMg; <i>France:</i> A-MG05; <i>Germany:</i> AlMn0.5Mg0.5; Wk.3.0505; <i>Italy:</i> 9003/5; 3103; <i>Japan:</i> A3105; <i>Spain:</i> L-3831; <i>UK:</i> 3105; BS N31, NS31; <i>Proprietary:</i> VAW61/10 Comments: Foil & thin strip for closures.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H16 [Foil (0.18-0.26mm)]	150	-	170	1	-	-	Min. values; uncoated	(VAW France)
61/15	VAW (France)	Wrought						
Proprietary composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.6, Mn 1-1.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA3005, UNS A93005; <i>European (CEN):</i> EN573 AW-3005 (<i>ISO:</i> AlMn1Mg0.5; <i>France:</i> A-MG0.5; 3005; <i>Germany:</i> AlMn1Mg0.5; <i>Italy:</i> 9003/4; <i>Japan:</i> A3005; <i>Proprietary:</i> VAW61/15 Comments: Foil & strip for semi-rigid containers (packaging); folded, single, compartment and smooth-walled containers								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
(G19) [Foil (0.045-0.120mm)]	-	-	185	5	-	-	Min. values	(VAW France)
(W13) [Foil (0.045-0.300mm)]	-	-	125	-	-	-	Min. values; EI% varies with thickness	(VAW France)
63/37	VAW (France)	Wrought						
No composition: - Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA5042; <i>European (CEN):</i> EN573 AW-5042; AlMg3.5Mn; <i>Proprietary:</i> VAW63/37 Comments: Tab for cans. Venetian blind strips. See: AA 5042								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H19 (F35) [Foil (0.20-0.33mm)]	320	-	350	4	-	-	Min. (EN541); uncoated	(VAW France)
H19 (F35) [Foil (0.34-0.50mm)]	310	-	340	4	-	-	Min. (EN541); uncoated	(VAW France)
H24 (G28) [Foil (0.25-0.50mm)]	230	-	280	6	-	-	Min. (EN541); uncoated	(VAW France)
H48 (G32) [Foil (0.25-0.50mm)]	280	-	330	5	-	-	Min. (EN541); uncoated/laquered	(VAW France)
63/45	VAW (France)	Wrought						
No composition: - Similar/Equivalent alloys: <i>USA:</i> AA5182; <i>European (CEN):</i> EN573 AW-5182; AW-AlMg4.5Mn0.4 (<i>ISO:</i> AlMg4.5Mn0.4); <i>France:</i> 5182; <i>Germany:</i> DIN 3.3549; <i>Proprietary:</i> VAW63/45 Comments: Ends for cans. See: EN 5182								
63/52	VAW (France)	Wrought						
No composition: - Similar/Equivalent alloys: <i>USA:</i> AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B; <i>European (CEN):</i> EN573 AW-5052; AW-AlMg2.5 (<i>ISO:</i> AlMg2.5 (AECMA); AL-P31; <i>Canada:</i> GR20; <i>France:</i> A-G2; A-G2.5C; 5052; <i>Germany:</i> AlMg2; AlMg2.5; DIN 3.3523; <i>Italy:</i> P-AlMg2.5; 3574; 9005/2; FA60-5052; <i>Japan:</i> A2X1; A5052P; <i>Sweden:</i> 14,4120; <i>Switzerland:</i> 10849; <i>UK:</i> 5052; BS N4; BS L80, L81, 2L55, 2L56; <i>Proprietary:</i> VAW63/52 Comments: Ends for cans. See: EN 5052								

Aluminium Alloys (wrought) 149

98/50 VAW (France) Wrought

Proprietary composition: Si 0.4-0.8, Fe 0.5-1, Cu 0.1, Mn 0.1, Zn 0.1, Ti 0.05, Others: Each 0.06 Total 0.25, Aluminium rem. **Density** (kg.m⁻³) 2710

Identified Product forms: Foil

Similar/Equivalent alloys: *USA:* AAX8011; *European (CEN):* EN573 AW-8011A; *Germany:* AlFeSi; *Proprietary:* VAW98/50

Comments: Foil & thin strip for closures. Single & smooth-walled containers (packaging)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H0 [Foil (0.15-0.26mm)]	-	-	80	20	-		Min. values; laquered	(VAW France)
H0 [Foil (0.15-0.30mm)]	-	-	80	20	-		Min. values; uncoated	(VAW France)
H0 (W8) [Foil (0.045-0.120mm)]	80	-	-	-	-		Min. values; EI% varies with thickness	(VAW France)
H0 (W8) [Foil (0.045-0.300mm)]	80	-	-	-	-		Min. values; EI% varies with thickness	(VAW France)
H14 [Foil (0.18-0.35mm)]	110	-	130	1.5	-		Min. values; uncoated	(VAW France)
H22 / H42 [Foil (0.18-0.26mm)]	80	-	110	3	-		Min. values; laquered	(VAW France)
H22 / H42 [Foil (0.18-0.35mm)]	80	-	110	3	-		Min. values; uncoated	(VAW France)

99/00 VAW (France) Wrought

No composition: -

Identified Product forms: Foil

Similar/Equivalent alloys: *USA:* AA1200, UNS A91200; *European (CEN):* EN573; AW-1200; AW-AI99.0 (*ISO:* AI99.0; *Austria:* AI99; *Canada:* 990; *France:* A4; 1200; *Germany:* AI99; Wk.3.0205; *Italy:* 9001/1; 3567-66; FA60-1200; P-ALP 99.0; *Japan:* A1200; A1X3; A1200P; *Russia (CIS):* GOST A/AO, A0; *Spain:* L-3001; *Sweden:* 14.4010; *Switzerland:* AI99; 10842; *UK:* 1200; BS 1C; BS 6L16, 6L17, 4L34; *Proprietary:* VAW99/00

Comments: Thin strip/foils for cable insulation; co-polymer coated one or both sides.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Strip/foil (0.100-0.300mm)]	-	-	70	20	-		Min. values	(VAW France)

99/01 VAW (France) Wrought

Proprietary composition: Si 0.05-0.1, Fe 0.7-0.9, Cu 0.05, Mg 0.005, Mn 0.05, Zn 0.07, Ti 0.03, Cr 0.02, Pb <20ppm, Cd <2ppm, Cr <20ppm, Aluminium rem.

Identified Product forms: Foil

Similar/Equivalent alloys: *USA:* AA8079; (1200); *European (CEN):* EN573 AW-8079 (*ISO:* AI 99.0; *Australia:* 1200; *Austria:* AI 99; *Canada:* 1200, 9900; *France:* A4, 1200; *Germany:* AI 99, 3.0205; AI99Fe0.8; *Italy:* 3567, 9001/1; *Japan:* A1X3, A1200; *Russia (CIS):* GOST A/AO, A0; *Spain:* L-3001; *Sweden:* 14.4010; *Switzerland:* AI99; *UK:* 1C, 1200; *Others:* (Norway) NS17005; (IND) IS19000; (B) NBN1200; *Proprietary:* VAW 99/01

Comments: Thin strip and foils for packaging (laminating, extrusion coating, lacquering, embossing); covering layers for insulation materials (heat reflectors); cables, etc.

Closure strip.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
(W6) [Foil (0.045-0.060mm)]	-	-	60	12	-		Min. values; EI% varies with thickness	(VAW France)
Hard [Foil (0.100-0.200mm)]	-	-	165	2	-		Min. values; Max. thickness range	(VAW France)
Soft [Foil (0.006-0.010mm)]	-	-	60	1.5	-		Min. values; Min. thickness range	(VAW France)
Soft [Foil (0.100-0.200mm)]	-	-	75	15	-		Min. values; Max. thickness range	(VAW France)

99/52 VAW (France) Wrought

Proprietary composition: Si 0.1-0.2, Fe 0.3-0.4, Cu 0.05, Mg 0.005, Mn 0.05, Zn 0.05, Ti 0.03, Cr 0.01, Pb <20ppm, Cd <2ppm, Cr <20ppm, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Sheet/strip, Foil

Similar/Equivalent alloys: *USA:* AA1050, UNS A91050; *European (CEN):* EN AW-1050A; AW-AI99.5 (*ISO:* AI99.5 (*AECMA:* AI99.5; *Australia:* 1050; *Austria:* AI 99.5; *Canada:* 1050; 9950; *France:* A5, 1050A; *Germany:* AI 99.5, 3.0225; *Italy:* 4507; 9001/2; FA60-1050A; *Japan:* A1X1; A1X18; A1050P; *Russia (CIS):* GOST A5/A0, A5; *Spain:* L-3051; *Sweden:* 14.4017; *Switzerland:* 10842; AI99.5; *UK:* BS 1B; 1050A; *Others:* (Norway) NS17010; (ZA) SBS1050; (IND) IS19500; (B) NBN1050; *Proprietary:* VAW99/52

Comments: Thin strip and foils for packaging (laminating, extrusion coating, lacquering, embossing); covering layers for insulation materials (heat reflectors); cables, etc.

Sheet & strip for closures. Folded containers.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
(F15) [Foil (0.045-0.120mm)]	-	-	150	1	-		Min. values	(VAW France)
H0 [Foil (0.15-0.20mm)]	-	-	65	15	-		Min. values; uncoated	(VAW France)
H19 [Foil (0.18-0.26mm)]	150	-	170	2	-		Min. values; uncoated	(VAW France)
H48 [Foil (0.18-0.26mm)]	140	-	150	3	-		Min. values; laquered	(VAW France)
Hard [Foil (0.100-0.200mm)]	-	-	150	1	-		Min. values; Max. thickness range	(VAW France)
Soft [Foil (0.006-0.010mm)]	-	-	45	1.5	-		Min. values; Min. thickness range	(VAW France)
Soft [Foil (0.100-0.200mm)]	-	-	65	15	-		Min. values; Max. thickness range	(VAW France)

111 Alusingen (Germany) Wrought

Proprietary composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.06, Ti 0.02, Others: Each 0.02 Total 0.2, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: *USA:* AA1080A; *European (CEN):* EN573 AW-1080A (*ISO:* AI99.8(A); *France:* A8; *Germany:* AI99.7, AI99.8; Wk.3.0275, 3.0285; *Italy:* 4509; 9001/4; P-ALP 99.8; *Japan:* A1080; *Spain:* L-3081; *Sweden:* 4004; *Switzerland:* AI99.8; *UK:* BS1470:1080A; BS 1A; *Others:* AI99.8; *Proprietary:* Alusingen Alloy No. 111; Alusuisse Pure Aluminium 99.8

119 Alusingen (Germany) Wrought

Proprietary composition: Si 0.06, Fe 0.05, Cu 0.01, Mg 0.01, Mn 0.01, Zn 0.04, Ti 0.025, Others: Each 0.01 Total 0.1, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: *USA:* AA1090; *European (CEN):* EN573 AW-1090; *France:* A9; *Germany:* Wk. 3.0305 (AI99.9); *Others:* AI99.9; *Proprietary:* Alusingen Alloy No. 119; Alusuisse Pure Aluminium 99.9

134 Alusingen (Germany) Wrought

Proprietary composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Others: Each 0.03 Total 0.5, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: *USA:* AA1050A; *European (CEN):* EN573 AW-1050A (*ISO:* AI99.5; *Canada:* 995; *France:* A5; *Germany:* Wk. 3.0255 (AI99.5); *Italy:* 9001/2; 4507; P-ALP 99.5; *Japan:* A1050; *Spain:* L-3051; *Sweden:* 4007; *Switzerland:* AI99.5; *UK:* BS1470:1050A; BS 1B; BS 5L36; G1B; *Others:* (CZ) CSN 42 4004, 42 4005; *Proprietary:* Alusingen Alloy No. 134; Alusuisse Pure Aluminium 99.5

150 Aluminium Alloys (wrought)

183	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.05, Fe 0.03, Mg 0.01, Zn 0.02, Ti 0.025, Others: Each 0.02 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Proprietary:</i> Alusingen Alloy No. 183; Alusuisse Relital</p>		
184	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.1, Fe 0.1, Cu 0.02, Mg 0.05, Mn 0.02, Zn 0.05, Ti 0.02, Others: Each 0.01 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA1085; <i>European (CEN):</i> EN573 AW-1085; <i>France:</i> A85; <i>Proprietary:</i> Alusingen Alloy No. 184; Alusuisse Pure Aluminium 99.85</p>		
205	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 0.35-0.6, Mn 0.15, Zn 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> AlMg0.5; <i>Proprietary:</i> Alusingen Alloy No. 205; Alusuisse Peraluman-050</p>		
214	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 0.7-1.1, Mn 0.15, Zn 0.2, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA5005A; <i>France:</i> A-G0.6; <i>Germany:</i> AlMg1; DIN 3.3315; <i>Italy:</i> 5764 P-AlMg0.2; <i>UK:</i> BS N41; <i>Others:</i> AlMg1; <i>Proprietary:</i> Alusingen Alloy No. 214; Alusuisse Peraluman-100</p>		
234	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 2.6-3.2, Mn 0.15-0.5, Zn 0.2, Ti 0.15, Cr 0.1, Others: Each 0.02 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA5754; <i>European (CEN):</i> EN573 AW-5754; AW-AlMg3 (<i>ISO:</i> AlMg3; <i>France:</i> A-G3, A-G3M; 5754; <i>Germany:</i> AlMg3; 3.3535; <i>Italy:</i> 3575; P-AlMg3.5; <i>Spain:</i> L-3390; <i>Sweden:</i> 14.4125; <i>Switzerland:</i> AlMg3; <i>UK:</i> BS N5; <i>Others:</i> (CZ) CSN 42 4413; AlMg3; <i>Proprietary:</i> Alusingen Alloy No. 234; Alusuisse Peraluman-300</p>		
276	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.3-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.01, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.5Cu; <i>Proprietary:</i> Alusingen Alloy No. 276; Alusuisse Peraluman-843</p>		
277	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.5-1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.8Cu; <i>Proprietary:</i> Alusingen Alloy No. 277; Alusuisse Peraluman-853</p>		
278	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.7-1.1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-AlMg0.9; <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alusingen Alloy No. 278; Alusuisse Peraluman-863</p>		
281	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.01, Mg 0.35-0.6, Zn 0.01, Fe+Ti 0.008, Others: Each 0.003 Total 0.02, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> AlRMg0.5; <i>Proprietary:</i> Alusingen Alloy No. 281; Alusuisse Reflectal-050</p>		
282	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.01, Mg 0.8-1.1, Zn 0.01, Fe+Ti 0.008, Others: Each 0.003 Total 0.02, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> AlRMg1; <i>Proprietary:</i> Alusingen Alloy No. 282; Alusuisse Reflectal-100</p>		
285	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.06, Fe 0.04, Mg 0.35-0.6, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.9Mg0.5; <i>Proprietary:</i> Alusingen Alloy No. 285; Alusuisse Remiral-050</p>		
286	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.06, Fe 0.04, Mg 0.8-1.1, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.9Mg1; <i>Proprietary:</i> Alusingen Alloy No. 286; Alusuisse Remiral-100</p>		
288	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 0.3-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.5; <i>Proprietary:</i> Alusingen Alloy No. 288; Alusuisse Peraluman-845</p>		
289	Alusingen (Germany)	Wrought
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 0.7-1.1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-AlMg0.9; <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alusingen Alloy No. 289; Alusuisse Peraluman-860</p>		

Aluminium Alloys (wrought) 151

294	Alusingen (Germany)	Wrought						
Proprietary composition: Si 0.2, Fe 0.2, Cu 0.03-0.1, Mg 0.5-1, Mn 0.03, Zn 0.05, Ti 0.03, Others: Each 0.02, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <u>USA:</u> AA5205; <u>Others:</u> Al99.7Mg0.8Cu; <u>Proprietary:</u> Alusingen Alloy No. 294; Alusuisse Peraluman-708								
297	Alusingen (Germany)	Wrought						
Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 2.2-2.8, Mn 0.05, Zn 0.05, Others: Each 0.03 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <u>USA:</u> AA5252, UNS A95252; <u>France:</u> AG-G3; <u>Others:</u> Al99.85Mg2.5; <u>Proprietary:</u> Alusingen Alloy No. 297; Alusuisse Peraluman-875								
390	Reynolds (USA)	Wrought						
No composition: - Comments: Engine alloy.								
420	Timminco (Canada)	Cast Wrought						
Approximate composition: Others: Total 0.01, Aluminium rem. Identified Product forms: Extrusion, Ingot Comments: High purity alloy for cathodic protection & anodes in water with low pH & high dissolved salt content.								
1000	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <u>USA:</u> AA1050, UNS A91050; <u>European (CEN):</u> EN AW-1050A; AW-AI99.5 (<u>ISO:</u> Al99.5 (<u>AECMA:</u> Al99.5; <u>Austria:</u> Al 99.5; <u>Canada:</u> 1050; 9950; <u>France:</u> A5, 1050A; <u>Germany:</u> Al 99.5, 3.0225; <u>Italy:</u> 4507; 9001/2; FA60-1050A; <u>Japan:</u> A1X1; A1X18; A1050P; <u>Russia (CIS):</u> GOST A5/AD0, A5; <u>Spain:</u> L-3051; <u>Sweden:</u> 14,4017; <u>Switzerland:</u> 10842; Al99.5; <u>UK:</u> BS 1B; 1050A; <u>Others:</u> (Norway) NS17010; (ZA) SBS1050; (IND) IS19500; (B) NBN1050 Comments: Hoogovens version of AA 1050.								
1001	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <u>USA:</u> AA1350, UNS A91350; <u>European (CEN):</u> EN573 AW-EAL99.5 (A), AW-1350 (<u>ISO:</u> E-Al99.5; <u>Austria:</u> E0A1; <u>France:</u> A 5L, A 5B; <u>Germany:</u> A199.5; E-AI, E-AI995; Wk.3.0255; <u>Italy:</u> 9001/5; <u>Spain:</u> Al99.5E; <u>Sweden:</u> 14,4022; <u>UK:</u> 1350; BS 1E; G1E Comments: Hoogovens version of AA 1350.								
1010	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <u>USA:</u> AA1200, UNS A91200; <u>European (CEN):</u> EN573; AW-1200; AW-AI99.0 (<u>ISO:</u> Al99.0; <u>Austria:</u> Al99; <u>Canada:</u> 990; <u>France:</u> A4; 1200; <u>Germany:</u> Al99; Wk.3.0205; <u>Italy:</u> 9001/1; 3567-66; FA60-1200; P-ALP 99.0; <u>Japan:</u> A1200; A1X3; A1200P; <u>Russia (CIS):</u> GOST A0; <u>Spain:</u> L-3001; <u>Sweden:</u> 14,4010; <u>Switzerland:</u> Al99; 10842; <u>UK:</u> 1200; BS 1C; BS 6L16, 6L17, 4L34 Comments: Hoogovens version of AA 1200.								
1030	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
1035	AA (USA)	Wrought						
Official composition: Si 0.35, Fe 0.6, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.35 min. Density (kg.m ⁻³) 2705 Comments: See AA documentation for method of expressing Al content.								
1040	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.5, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.4 min. Density (kg.m ⁻³) 2705 Comments: See AA documentation for method of expressing Al content.								
1045	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.45, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.45 min. Density (kg.m ⁻³) 2705 Comments: See AA documentation for method of expressing Al content.								
1050	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.5 min. Density (kg.m ⁻³) 2705 Identified Product forms: Sheet/strip, Foil, Tube, Wire Similar/Equivalent alloys: <u>USA:</u> AA1050, UNS A91050; <u>European (CEN):</u> EN AW-1050A; AW-AI99.5 (<u>ISO:</u> Al99.5 (<u>AECMA:</u> Al99.5; <u>Austria:</u> Al 99.5; <u>Canada:</u> 1050; 9950; <u>France:</u> A5; 1050A; <u>Germany:</u> Al99.5; E-AI99.5; 3.0255; <u>Italy:</u> 4507; 9001/2; FA60-1050A; <u>Japan:</u> A1X1; A1X18; A1050P; <u>Russia (CIS):</u> GOST A5/AD0, A5; <u>Spain:</u> L-3051; <u>Sweden:</u> 14,4017; <u>Switzerland:</u> 10842; Al99.5; <u>UK:</u> BS 1B; 1050A; <u>Others:</u> (Norway) NS17010; (ZA) SBS1050; (IND) IS19500; (B) NBN1050; <u>Proprietary:</u> Hoogovens 1000; VAW 99/52 Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers, litho plates (Welding wire and rod to BS 2901: pt 4). Pressure vessels, construction, electronic parts, road transport, aerospace, food industry. See AA documentation for method of expressing Al content.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
H24 [-]	100	-	110	25	69	30HB	RT typical properties	(Pechiney)
H48 (H287) [-]	120	-	140	2	-	-	EN1396 Min. values	(Pechiney-Rhenalu)
Hard [Foil (0.100-0.200mm)]	-	-	150	1	-	-	Min. values; Max. thickness range	(VAW France)
Not stated [-]	-	-	-	-	68	-	-	(Hoogovens)
Not stated [-]	-	20	74	20	-	-	Typical	(ALUMISR)
Soft [Foil (0.006-0.010mm)]	-	-	45	1.5	-	-	Min. values; Min. thickness range	(VAW France)
Soft [Foil (0.100-0.200mm)]	-	-	65	15	-	-	Min. values; Max. thickness range	(VAW France)

152 Aluminium Alloys (wrought)

1050A		AA (USA)						Wrought
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Others: Each 0.03, Aluminium 99.5 min. Density (kg.m ⁻³) 2710								
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Rod, Bar, Wire, Rivet stock								
Similar/Equivalent alloys: <i>USA:</i> AA1050A, DOA 1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Australia:</i> A1050; <i>Canada:</i> 995; <i>France:</i> A5; <i>Germany:</i> A199.5; <i>Wk.3.0255;</i> <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005; <i>Proprietary:</i> Alcan 1S, 1B; VAW 99/52								
Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers, litho plates (Welding wire and rod to BS 2901: pt 4). Tensile strength of drawn, seamless tube 75-146 MPa. See AA documentation for method of expressing Al content.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	27	-	80	40	69	21HB	Typical	(BAI Plate)
F11 [-]	90	-	110	6	-	-	Minimum	(Alcan Rolled Prod.)
F15 [-]	130	-	150	3	-	-	Minimum	(Alcan Rolled Prod.)
H14 [-]	85	-	125	3	-	-	El. min.	(Aalco (Glynwed))
H14 [-]	70	-	100	-	-	28HB	Typical	(P. Balloffet)
H8 (fully hard) [-]	130	-	145	-	-	-	Typical	(Raufoss)
1050A		CEN 573 (Europe)						Wrought
Nominal composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Others: Each 0.03, Aluminium 99.5 min. Density (kg.m ⁻³) 2710								
Identified Product forms: Plate, Sheet/strip, Wire								
Similar/Equivalent alloys: <i>USA:</i> AA1050A, DOA 1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Australia:</i> A1050; <i>France:</i> A5; <i>Germany:</i> A199.5; <i>Wk.3.0255;</i> <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005; <i>Proprietary:</i> Alcan 1S, 1B; VAW 99/52								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (<20mm)]	-	-	95	35	-	-	EN1301 / EN11715	(Pechiney)
O / H111 [Sheet/Plate >0.2 <50mm]	20	-	65	-	-	20HB	EN485 Min. values	(Pechiney)
O/H111/F [Plate 12.5 - 60mm]	20	-	65	-	-	-	Minimum	(AMAG)
O/H111/F [Plate 4 - 6mm]	20	-	65	29	-	-	Minimum	(AMAG)
O/H111/F [Plate 6 - 12.5mm]	20	-	65	35	-	-	Minimum	(AMAG)
F [Sheet/Plate >2.5 <150mm]	-	-	65	-	-	-	EN485 Min. values	(Pechiney)
H112 [Plate >12.5 <80mm]	25	-	70	20	-	22HB	EN485 Min. values	(Pechiney)
H112 [Plate >6 <12.5mm]	30	-	75	20	-	23HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate >0.2 <40mm]	65	-	85	-	-	28HB	EN485 Min. values	(Pechiney)
H14 [Drawn wire (<18mm)]	95	-	100	5	-	-	EN1301 / EN11715	(Pechiney)
H14 [Sheet/Plate >0.2 <25mm]	85	-	105	-	-	34HB	EN485 Min. values	(Pechiney)
H16 [Drawn wire (<15mm)]	115	-	120	3	-	-	EN1301 / EN11715	(Pechiney)
H16 [Sheet >0.2 <4mm]	100	-	120	-	-	39HB	EN485 Min. values	(Pechiney)
H18 [Drawn wire (<10mm)]	135	-	140	3	-	-	EN1301 / EN11715	(Pechiney)
H18 [Sheet >0.2 <3mm]	120	-	140	-	-	42HB	EN485 Min. values	(Pechiney)
H19 [Sheet >0.2 <3mm]	130	-	150	-	-	45HB	EN485 Min. values	(Pechiney)
H22 [Sheet/Plate >0.2 <12.5mm]	55	-	85	-	-	27HB	EN485 Min. values	(Pechiney)
H24 [Sheet >0.2 <4mm]	90	-	120	-	-	38HB	EN485 Min. values	(Pechiney)
H28 [Sheet >0.2 <3mm]	110	-	140	-	-	41HB	EN485 Min. values	(Pechiney)
1055		AA (USA)						Wrought
No composition: -								
Comments: Listed by AA as Inactive.								
1060		AA (USA)						Wrought
Official composition: Si 0.25, Fe 0.35, Cu 0.05, Mg 0.03, Mn 0.03, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.6 min. Density (kg.m ⁻³) 2705								
Identified Product forms: Plate, Sheet/strip, Foil, Tube, Rod								
Similar/Equivalent alloys: <i>USA:</i> AA1060, UNS A91060; <i>European (ISO):</i> A199.6, A199.8; <i>France:</i> A8; <i>Germany:</i> A199.8; <i>Italy:</i> 4509; <i>Russia (CIS):</i> GOST A6; <i>Sweden:</i> 14, 4020; <i>Proprietary:</i> LM Star 1602;								
Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers. Packaging: converter foil, thin strip & household. See AA documentation for method of expressing Al content.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	28	69	43	69	HB 19	Typical	(#1)
H12 [-]	-	76	83	16	69	HB 23	Typical	(#1)
H14 [-]	-	90	97	12	69	HB 26	Typical	(#1)
H16 [-]	-	103	110	8	69	HB 30	Typical	(#1)
H18 [-]	-	124	131	8	69	HB 35	Typical	(#1)
1065		AA (USA)						Wrought
Official composition: Si 0.25, Fe 0.3, Cu 0.05, Mg 0.03, Mn 0.03, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.65 min. Density (kg.m ⁻³) 2700								
Comments: See AA documentation for method of expressing Al content.								
1070		AA (USA)						Wrought
Official composition: Si 0.2, Fe 0.25, Cu 0.04, Mg 0.03, Mn 0.03, Zn 0.04, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.7 min. Density (kg.m ⁻³) 2700								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <i>USA:</i> AA1070; <i>European (CEN):</i> 1070 (<i>ISO:</i> A199.7; <i>France:</i> A7; (1070A); <i>Germany:</i> A199.7; 3.0275; <i>Italy:</i> 4508; FA60-1070A; <i>Sweden:</i> 4005; <i>Proprietary:</i> Hoogovens 1070								
Comments: Very good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers. Pressure vessels, food industry. See AA documentation for method of expressing Al content.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [-]	-	-	-	-	68	-	-	(Hoogovens)

Aluminium Alloys (wrought) 153

1070	Hoogovens (Netherlands)	Wrought																																																																								
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA1070; <i>European (CEN):</i> 1070 (<i>ISO:</i> A199.7; <i>France:</i> A7; (1070A); <i>Germany:</i> Al99.7; 3.0275; <i>Italy:</i> 4508; FA60-1070A; <i>Sweden:</i> 4005 Comments: Hoogovens version of AA 1070.</p>																																																																										
1070A	AA (USA)	Wrought																																																																								
<p>Official composition: Si 0.2, Fe 0.25, Cu 0.03, Mg 0.03, Mn 0.03, Zn 0.07, Ti 0.03, Others: Each 0.03, Aluminium 99.7 min. Identified Product forms: Sheet/strip, Tube Similar/Equivalent alloys: <i>USA:</i> AA1070A; <i>European (CEN):</i> EN573 AW-1070A (<i>ISO:</i> A199.7; <i>France:</i> 1070A; A7; <i>Germany:</i> DIN 3.0275; <i>Italy:</i> 4508, 9001/3; <i>Japan:</i> A1070; <i>UK:</i> BS: E1E; <i>Proprietary:</i> Otto Fuchs A2; Alunord 1370-70 Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers. See AA documentation for method of expressing Al content.</p>																																																																										
1070A	CEN 573 (Europe)	Wrought																																																																								
<p>Nominal composition: Si 0.2, Fe 0.25, Cu 0.03, Mg 0.03, Mn 0.03, Zn 0.07, Ti 0.03, Others: Each 0.03, Aluminium 99.7 min. Identified Product forms: Wire Similar/Equivalent alloys: <i>USA:</i> AA1070A; <i>European (CEN):</i> EN573 AW-1070A (<i>ISO:</i> A199.7; <i>France:</i> 1070A; A7; <i>Germany:</i> DIN 3.0275; <i>Italy:</i> 4508, 9001/3; <i>Japan:</i> A1070; <i>UK:</i> BS: E1E; <i>Proprietary:</i> Otto Fuchs A2 Comments: For comments see: AA series.</p>																																																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th style="text-align: right;">(Source)</th> </tr> </thead> <tbody> <tr> <td>O [Drawn wire (<20mm)]</td> <td>-</td> <td>-</td> <td>85</td> <td>35</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> <tr> <td>H14 [Drawn wire (<18mm)]</td> <td>90</td> <td>-</td> <td>95</td> <td>5</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> <tr> <td>H18 [Drawn wire (<10mm)]</td> <td>120</td> <td>-</td> <td>125</td> <td>3</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	O [Drawn wire (<20mm)]	-	-	85	35	-	-	EN1301 / EN11715	(Pechiney)	H14 [Drawn wire (<18mm)]	90	-	95	5	-	-	EN1301 / EN11715	(Pechiney)	H18 [Drawn wire (<10mm)]	120	-	125	3	-	-	EN1301 / EN11715	(Pechiney)																																				
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H18 [Drawn wire (<10mm)]	120	-	125	3	-	-	EN1301 / EN11715	(Pechiney)																																																																		
1075	AA (USA)	Wrought																																																																								
<p>No composition: - Comments: Listed by AA as Inactive.</p>																																																																										
1080	AA (USA)	Wrought																																																																								
<p>Official composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.03, Ga 0.03, V 0.05, Others: Each 0.02, Aluminium 99.8 min. Density (kg.m⁻³) 2700 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA1080; <i>European (ISO):</i> A199.8; <i>France:</i> A8 Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers. See AA documentation for method of expressing Al content.</p>																																																																										
1080A	AA (USA)	Wrought																																																																								
<p>Official composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.06, Ti 0.02, Ga 0.03, Others: Each 0.02, Aluminium 99.8 min. Identified Product forms: Plate, Sheet/strip, Tube, Wire Similar/Equivalent alloys: <i>USA:</i> AA1080A; <i>European (CEN):</i> EN573 AW-1080A (<i>ISO:</i> A199.8(A); <i>Australia:</i> B1080; <i>France:</i> A8; 1080A; <i>Germany:</i> Al99.7, Al99.8; Wk.3.0275, 3.0285; <i>Italy:</i> 4509; 9001/4; P-ALP 99.8; <i>Japan:</i> A1080; <i>Spain:</i> L-3081; <i>Sweden:</i> 4004; <i>Switzerland:</i> Al99.8; <i>UK:</i> BS1470:1080A; BS 1A; <i>Others:</i> Al99.8; <i>Proprietary:</i> Alcan 99.8%, Otto Fuchs A1 Comments: V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers. See AA documentation for method of expressing Al content.</p>																																																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th style="text-align: right;">(Source)</th> </tr> </thead> <tbody> <tr> <td>O [0.2 < t > 6mm]</td> <td>-</td> <td>-</td> <td>90</td> <td>29</td> <td>-</td> <td>-</td> <td></td> <td style="text-align: right;">(#2)</td> </tr> <tr> <td>O [Drawn wire (<20mm)]</td> <td>-</td> <td>-</td> <td>80</td> <td>35</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> <tr> <td>F [3 < t > 25mm.]</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td style="text-align: right;">(#2)</td> </tr> <tr> <td>H14 [0.2 < t > 12.5mm]</td> <td>-</td> <td>-</td> <td>120</td> <td>7</td> <td>-</td> <td>-</td> <td></td> <td style="text-align: right;">(#2)</td> </tr> <tr> <td>H14 [Drawn wire (<18mm)]</td> <td>85</td> <td>-</td> <td>90</td> <td>5</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> <tr> <td>H18 [0.2 < t > 3mm]</td> <td>-</td> <td>-</td> <td>125</td> <td>4</td> <td>-</td> <td>-</td> <td></td> <td style="text-align: right;">(#2)</td> </tr> <tr> <td>H18 [Drawn wire (<10mm)]</td> <td>115</td> <td>-</td> <td>120</td> <td>3</td> <td>-</td> <td>-</td> <td>EN1301 / EN11715</td> <td style="text-align: right;">(Pechiney)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	O [0.2 < t > 6mm]	-	-	90	29	-	-		(#2)	O [Drawn wire (<20mm)]	-	-	80	35	-	-	EN1301 / EN11715	(Pechiney)	F [3 < t > 25mm.]	-	-	-	-	-	-		(#2)	H14 [0.2 < t > 12.5mm]	-	-	120	7	-	-		(#2)	H14 [Drawn wire (<18mm)]	85	-	90	5	-	-	EN1301 / EN11715	(Pechiney)	H18 [0.2 < t > 3mm]	-	-	125	4	-	-		(#2)	H18 [Drawn wire (<10mm)]	115	-	120	3	-	-	EN1301 / EN11715	(Pechiney)
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)																																																																		
O [0.2 < t > 6mm]	-	-	90	29	-	-		(#2)																																																																		
O [Drawn wire (<20mm)]	-	-	80	35	-	-	EN1301 / EN11715	(Pechiney)																																																																		
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H14 [Drawn wire (<18mm)]	85	-	90	5	-	-	EN1301 / EN11715	(Pechiney)																																																																		
H18 [0.2 < t > 3mm]	-	-	125	4	-	-		(#2)																																																																		
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1080A	CEN 573 (Europe)	Wrought																																																																								
<p>Nominal composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.06, Ti 0.02, Ga 0.03, Others: Each 0.02, Aluminium 99.8 min. Similar/Equivalent alloys: <i>USA:</i> AA1080A; <i>European (CEN):</i> EN573 AW-1080A (<i>ISO:</i> A199.8(A); <i>Australia:</i> B1080; <i>France:</i> A8; 1080A; <i>Germany:</i> Al99.7, Al99.8; Wk.3.0275, 3.0285; <i>Italy:</i> 4509; 9001/4; P-ALP 99.8; <i>Japan:</i> A1080; <i>Spain:</i> L-3081; <i>Sweden:</i> 4004; <i>Switzerland:</i> Al99.8; <i>UK:</i> BS1470:1080A; BS 1A; <i>Others:</i> Al99.8; <i>Proprietary:</i> Alcan 99.8%, Otto Fuchs A1 Comments: For comments see: AA series.</p>																																																																										
1084	Lawson Mardon (LM) Star (UK)	Wrought																																																																								
<p>No composition: - Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA8011; <i>France:</i> A-FeS; <i>Spain:</i> L-3611; <i>UK:</i> 8011 Comments: Packaging. Container & container lidding foil. LM Star version of AA 8011.</p>																																																																										
1085	AA (USA)	Wrought																																																																								
<p>Official composition: Si 0.1, Fe 0.12, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.02, Ga 0.03, V 0.05, Others: Each 0.01, Aluminium 99.85 min. Density (kg.m⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA1085; <i>European (CEN):</i> EN573 AW-1085; <i>France:</i> A85 Comments: See AA documentation for method of expressing Al content.</p>																																																																										
1085	CEN 573 (Europe)	Wrought																																																																								
<p>Nominal composition: Si 0.1, Fe 0.12, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.02, Ga 0.03, V 0.05, Others: Each 0.01, Aluminium 99.85 min. Density (kg.m⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA1085; <i>European (CEN):</i> EN573 AW-1085; <i>France:</i> A85</p>																																																																										

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1085	Lawson Mardon (LM) Star (UK)	Wrought						
<p>No composition: - Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA8021A Comments: Packaging. Container & container lidding foil. LM Star version of AA 8021A.</p>								
1090	AA (USA)	Wrought						
<p>Official composition: Si 0.07, Fe 0.07, Cu 0.02, Mg 0.01, Mn 0.01, Zn 0.03, Ti 0.01, Ga 0.03, V 0.05, Others: Each 0.01, Aluminium 99.9 min. Density (kg.m⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA1090; <i>European (CEN):</i> EN 573 AW-1090; <i>France:</i> A9; <i>Germany:</i> Wk. 3.0305 (Al99.9); <i>Others:</i> Al99.9 Comments: See AA documentation for method of expressing Al content.</p>								
1090	CEN 573 (Europe)	Wrought						
<p>Nominal composition: Si 0.07, Fe 0.07, Cu 0.02, Mg 0.01, Mn 0.01, Zn 0.03, Ti 0.01, Ga 0.03, V 0.05, Others: Each 0.01, Aluminium 99.9 min. Density (kg.m⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA1090; <i>European (CEN):</i> EN573 AW-1090; <i>France:</i> A9; <i>Germany:</i> Wk. 3.0305 (Al99.9); <i>Others:</i> Al99.9</p>								
1095	AA (USA)	Wrought						
<p>No composition: - Identified Product forms: Wire Comments: Listed by AA as Inactive. V. good corrosion resistance for chemical and food plant. Collapsible tubes. Electrical condensers.</p>								
1098	AA (USA)	Wrought						
<p>Official composition: Si 0.01, Fe 0.006, Cu 0.003, Zn 0.015, Ti 0.003, Others: Each 0.003, Aluminium 99.98 min. Comments: See AA documentation for method of expressing Al content.</p>								
1099	AA (USA)	Wrought						
<p>No composition: - Comments: Listed by AA as Inactive.</p>								
1100	AA (USA)	Wrought						
<p>Official composition: Cu 0.05-0.2, Mn 0.05, Zn 0.1, Si+Fe 0.95 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium 99 min. Density (kg.m⁻³) 2710 Identified Product forms: Plate, Sheet/strip, Foil, Fin stock, Tube, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock Similar/Equivalent alloys: <i>USA:</i> AA1100, UNS A91100, SAE 25; <i>European (CEN):</i> EN573 AW-1100 (<i>ISO</i>): Al99.0Cu; <i>Canada:</i> 990C; <i>France:</i> A45; 1100; <i>Germany:</i> Al99.0; <i>Japan:</i> A1100; <i>Others:</i> (CZ) CSN 42 4446; <i>Proprietary:</i> Alcan D2S Comments: General purpose grade for low-strength applications. Hollow ware and formed components, i.e. by spinning, deep drawing. Improved pitting resistance. See AA documentation for method of expressing Al content.</p>								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	34	89	35	69	HB 23	Typical	(#1)
H12 [-]	-	103	110	12	69	HB 28	Typical	(#1)
H14 [-]	-	117	124	9	69	HB 32	Typical	(#1)
H16 [-]	-	138	145	6	69	HB 38	Typical	(#1)
H18 [-]	-	152	165	5	69	HB 44	Typical	(#1)
1100	CEN 573 (Europe)	Wrought						
<p>Nominal composition: Cu 0.05-0.2, Mn 0.05, Zn 0.1, Si+Fe 0.95, Others: Each 0.05 Total 0.15, Aluminium 99 min. Density (kg.m⁻³) 2710 Similar/Equivalent alloys: <i>USA:</i> AA1100, UNS A91100, SAE 25; <i>European (CEN):</i> EN573 AW-1100 (<i>ISO</i>): Al99.0Cu; <i>Canada:</i> 990C; <i>France:</i> A45; 1100; <i>Germany:</i> Al99.0; <i>Japan:</i> A1100; <i>Others:</i> (CZ) CSN 42 4446; <i>Proprietary:</i> Alcan D2S Comments: For comments see: AA series.</p>								
1110	AA (USA)	Wrought						
<p>Official composition: Si 0.3, Fe 0.8, Cu 0.04, Mg 0.25, Mn 0.01, Cr 0.01, B 0.02, V+Ti 0.03, Others: Each 0.03, Aluminium 99.1 min. Comments: See AA documentation for method of expressing Al content.</p>								
1120	AA (USA)	Wrought						
<p>Official composition: Si 0.1, Fe 0.4, Cu 0.05-0.35, Mg 0.2, Mn 0.01, Zn 0.05, Cr 0.01, Ga 0.03, B 0.05, V+Ti 0.02, Others: Each 0.03 Total 0.1, Aluminium 99.2 min. Comments: See AA documentation for method of expressing Al content.</p>								
1130	AA (USA)	Wrought						
<p>No composition: - Comments: Listed by AA as Inactive.</p>								
1135	AA (USA)	Wrought						
<p>Official composition: Cu 0.05-0.2, Mg 0.05, Mn 0.04, Zn 0.1, Ti 0.03, V 0.05, Si+Fe 0.60, Others: Each 0.03, Aluminium 99.35 min. Density (kg.m⁻³) 2705 Comments: See AA documentation for method of expressing Al content.</p>								
1145	AA (USA)	Wrought						
<p>Official composition: Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.03, V 0.05, Si+Fe 0.55, Others: Each 0.03, Aluminium 99.45 min. Density (kg.m⁻³) 2700 Identified Product forms: Foil, Fin stock Similar/Equivalent alloys: <i>USA:</i> AA1145, UNS A91145 Comments: See AA documentation for method of expressing Al content.</p>								
1150	AA (USA)	Wrought						
<p>Official composition: Cu 0.05-0.2, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.03, Si+Fe 0.45, Others: Each 0.03, Aluminium 99.5 min. Comments: See AA documentation for method of expressing Al content.</p>								

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1160	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1165	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1170	AA (USA)	Wrought
Official composition: Cu 0.03, Mg 0.02, Mn 0.03, Zn 0.04, Ti 0.03, Cr 0.03, V 0.05, Si+Fe 0.30, Others: Each 0.03, Aluminium 99.7 min. Density (kg.m ⁻³) 2700		
Comments: See AA documentation for method of expressing Al content.		
1175	AA (USA)	Wrought
Official composition: Cu 0.1, Mg 0.02, Mn 0.02, Zn 0.04, Ti 0.02, Ga 0.03, V 0.05, Si+Fe 0.15, Others: Each 0.02, Aluminium 99.75 min. Density (kg.m ⁻³) 2700		
Similar/Equivalent alloys: <i>USA:</i> AA1175, UNS A91175; <i>France:</i> A8; <i>Germany:</i> Al99.7, Al99.8; Wk.3.0275, 3.0285		
Comments: See AA documentation for method of expressing Al content.		
1180	AA (USA)	Wrought
Official composition: Si 0.09, Fe 0.09, Cu 0.01, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.02, Ga 0.03, V 0.05, Others: Each 0.02, Aluminium 99.8 min. Density (kg.m ⁻³) 2700		
Comments: See AA documentation for method of expressing Al content.		
1185	AA (USA)	Wrought
Official composition: Cu 0.01, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.02, Ga 0.03, V 0.05, Si+Fe 0.15, Others: Each 0.01, Aluminium 99.85 min. Density (kg.m ⁻³) 2700		
Comments: See AA documentation for method of expressing Al content.		
1187	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1188	AA (USA)	Wrought
Official composition: Si 0.06, Fe 0.06, Cu 0.005, Mg 0.01, Mn 0.01, Zn 0.03, Ti 0.01, Ga 0.03, V 0.05, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.01, Aluminium 99.88 min. Density (kg.m ⁻³) 2700		
Comments: See AA documentation for method of expressing Al content.		
1190	AA (USA)	Wrought
Official composition: Si 0.05, Fe 0.07, Cu 0.01, Mg 0.01, Mn 0.01, Zn 0.02, Cr 0.01, Ga 0.02, B 0.01, V+Ti 0.01, Others: Each 0.01, Aluminium 99.9 min.		
Comments: See AA documentation for method of expressing Al content.		
1193	AA (USA)	Wrought
Official composition: Si 0.04, Fe 0.04, Cu 0.006, Mg 0.01, Mn 0.01, Zn 0.03, Ti 0.01, Ga 0.03, V 0.05, Others: Each 0.01, Aluminium 99.93 min.		
Comments: See AA documentation for method of expressing Al content.		
1197	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1198	AA (USA)	Wrought
Official composition: Si 0.01, Fe 0.006, Cu 0.006, Mn 0.006, Zn 0.01, Ti 0.006, Ga 0.006, Others: Each 0.003, Aluminium 99.98 min.		
Similar/Equivalent alloys: <i>USA:</i> AA1198; <i>European (CEN):</i> EN573 AW-1198		
Comments: See AA documentation for method of expressing Al content.		
1198	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.01, Fe 0.006, Cu 0.006, Mn 0.006, Zn 0.01, Ti 0.006, Ga 0.006, Others: Each 0.003, Aluminium 99.98 min.		
Similar/Equivalent alloys: <i>USA:</i> AA1198; <i>European (CEN):</i> EN573 AW-1198		
1199	AA (USA)	Wrought
Official composition: Si 0.006, Fe 0.006, Cu 0.006, Mg 0.006, Mn 0.002, Zn 0.006, Ti 0.002, Ga 0.005, V 0.005, Others: Each 0.002, Aluminium 99.99 min.		
Density (kg.m ⁻³) 2700		
Similar/Equivalent alloys: <i>USA:</i> AA1199; <i>European (CEN):</i> EN573 AW-1199; <i>France:</i> A9; <i>UK:</i> 1199; BS 1		
Comments: See AA documentation for method of expressing Al content.		
1199	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.006, Fe 0.006, Cu 0.006, Mg 0.006, Mn 0.002, Zn 0.006, Ti 0.002, Ga 0.005, V 0.005, Others: Each 0.002, Aluminium 99.99 min.		
Density (kg.m ⁻³) 2700		
Similar/Equivalent alloys: <i>USA:</i> AA1199; <i>European (CEN):</i> EN573 AW-1199; <i>France:</i> A9; <i>UK:</i> 1199; BS 1		

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1200	AA (USA)	Wrought						
Official composition: Cu 0.05, Mn 0.05, Zn 0.1, Ti 0.05, Si+Fe 1.00, Others: Each 0.05 Total 0.15, Aluminium 99 min. Density (kg.m ⁻³) 2700 Identified Product forms: Plate, Sheet/strip, Foil, Tube, Extrusion, Bar, Wire Similar/Equivalent alloys: <i>USA:</i> AA1200, UNS A91200; <i>European (CEN):</i> EN573; AW-1200; AW-A199.0 (<i>ISO</i>): A199.0; <i>Australia:</i> B1200; <i>Austria:</i> A199; <i>Canada:</i> 990; <i>France:</i> A4; 1200; <i>Germany:</i> A199; Wk.3.0205; <i>Italy:</i> 9001/1; 3567-66; FA60-1200; P-ALP 99.0; <i>Japan:</i> A1200; A1X3; A1200P; <i>Russia (CIS):</i> GOST A0; <i>Spain:</i> L-3001; <i>Sweden:</i> 14,4010; <i>Switzerland:</i> A199; 10842; <i>UK:</i> 1200; BS 1C; BS 6L16, 6L17, 4L34; <i>Proprietary:</i> Alcan 2S, 1C; LM Star 1201; Hoogovens 1010; VAW 99/01; ; VAW 99/00 Comments: General purpose grade for low-strength applications. Pressure vessels, construction, electronic parts, road transport, food industry. Hollow ware and formed components, i.e. by spinning, deep drawing. Packaging: bottle capping. Lidding. Heat-shields. See AA documentation for method of expressing Al content. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion) Machinability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	34	-	87	35	69	23HB	Typical	(BAI Plate)
O (Soft) [Foil (12 microns)]	-	-	85	2	-	-	UTS max. El min values	(LM Star 1201)
O (Soft) [Foil (38-50 microns)]	-	-	-	8	-	-	El min value	(LM Star 1201)
Soft [Foil (>41 microns)]	-	-	100	8	-	-	UTS max. El min values	(LM Star 1201)
Soft [Foil (0.006-0.010mm)]	-	-	60	1.5	-	-	Min. values; Min. thickness range	(VAW France)
Soft [Foil (0.100-0.200mm)]	-	-	75	15	-	-	Min. values; Max. thickness range	(VAW France)
H8 [-]	145	-	160	-	-	-	Typical	(Raufoss)
Hard [Foil (0.100-0.200mm)]	-	-	165	2	-	-	Min. values; Max. thickness range	(VAW France)
Not stated [-]	-	-	-	-	68	-	-	(Hoogovens)
1200	CEN 573 (Europe)	Wrought						
Nominal composition: Cu 0.05, Mn 0.05, Zn 0.1, Ti 0.05, Si+Fe 1.00, Others: Each 0.05 Total 0.15, Aluminium 99 min. Density (kg.m ⁻³) 2700 Identified Product forms: Plate, Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA1200, UNS A91200; <i>European (CEN):</i> EN573; AW-1200; AW-A199.0 (<i>ISO</i>): A199.0; <i>Australia:</i> B1200; <i>Austria:</i> A199; <i>Canada:</i> 990; <i>France:</i> A4; 1200; <i>Germany:</i> A199; Wk.3.0205; <i>Italy:</i> 9001/1; 3567-66; FA60-1200; P-ALP 99.0; <i>Japan:</i> A1200; A1X3; A1200P; <i>Russia (CIS):</i> GOST A0; <i>Spain:</i> L-3001; <i>Sweden:</i> 14,4010; <i>Switzerland:</i> A199; 10842; <i>UK:</i> 1200; BS 1C; BS 6L16, 6L17, 4L34; <i>Proprietary:</i> Alcan 2S, 1C; LM Star 1201; Hoogovens 1010; VAW 99/00 Comments: For comments see: AA series. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion) Machinability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate 0.2-50mm]	25	-	75	-	-	23HB	EN485 Min. values	(Pechiney)
F [Sheet (>2.5 <150mm)]	-	-	75	-	-	-	EN485 Min. values	(Pechiney)
H112 [Plate (>12.5 <80mm)]	30	-	80	16	-	24HB	EN485 Min. values	(Pechiney)
H112 [Plate (>6 <12.5mm)]	35	-	85	16	-	26HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (0.2 <40mm)]	75	-	95	-	-	31HB	EN485 Min. values	(Pechiney)
H14 [Plate (6 <25mm)]	90	-	115	6	-	37HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (0.2 <6mm)]	95	-	115	-	-	37HB	EN485 Min. values	(Pechiney)
H16 [Sheet/Plate (0.2 <4mm)]	115	-	130	-	-	42HB	EN485 Min. values	(Pechiney)
H18 [Sheet (0.2 <3mm)]	130	-	150	-	-	45HB	EN485 Min. values	(Pechiney)
H19 [Sheet (0.2 <3mm)]	140	-	160	1	-	48HB	EN485 Min. values	(Pechiney)
H22 [Sheet/Plate (0.2 <12.5mm)]	65	-	95	-	-	30HB	EN485 Min. values	(Pechiney)
H24 [Plate (6 <12.5mm)]	85	-	115	9	-	36HB	EN485 Min. values	(Pechiney)
H24 [Sheet/Plate (0.2 <6mm)]	90	-	115	-	-	37HB	EN485 Min. values	(Pechiney)
H26 [Sheet/Plate (0.2 <4mm)]	105	-	130	-	-	41HB	EN485 Min. values	(Pechiney)
1200A	AA (USA)	Wrought						
Official composition: Cu 0.1, Mg 0.3, Mn 0.3, Zn 0.1, Cr 0.1, Si+Fe 1.00, Others: Each 0.05 Total 0.15, Aluminium 99 min. Comments: See AA documentation for method of expressing Al content.								
1201	Lawson Mardon (LM) Star (UK)	Wrought						
No composition: - Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA1200, UNS A91200; <i>European (CEN):</i> EN573; AW-1200; AW-A199.0 (<i>ISO</i>): A199.0; <i>Austria:</i> A199; <i>Canada:</i> 990; <i>France:</i> A4; 1200; <i>Germany:</i> A199; Wk.3.0205; <i>Italy:</i> 9001/1; 3567-66; FA60-1200; P-ALP 99.0; <i>Japan:</i> A1200; A1X3; A1200P; <i>Russia (CIS):</i> GOST A0; <i>Spain:</i> L-3001; <i>Sweden:</i> 14,4010; <i>Switzerland:</i> A199; 10842; <i>UK:</i> 1200; BS 1C; BS 6L16, 6L17, 4L34 Comments: Packaging. Container & container lidding foil. LM Star version of AA 1200.								
1230	AA (USA)	Wrought						
Official composition: Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.03, V 0.05, Si+Fe 0.70, Others: Each 0.03, Aluminium 99.3 min. Density (kg.m ⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA1230, UNS A91230, SAE 28 Comments: See AA documentation for method of expressing Al content.								
1235	AA (USA)	Wrought						
Official composition: Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.06, V 0.05, Si+Fe 0.65, Others: Each 0.03, Aluminium 99.35 min. Density (kg.m ⁻³) 2705 Identified Product forms: Foil, Tube Similar/Equivalent alloys: <i>USA:</i> AA1235, UNS A91235 Comments: See AA documentation for method of expressing Al content.								
1245	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
1250	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								

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1260	AA (USA)	Wrought
Official composition: Cu 0.04, Mg 0.03, Mn 0.01, Zn 0.05, Ti 0.03, V 0.05, Si+Fe 0.40 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.03, Aluminium 99.6 min.		
Comments: See AA documentation for method of expressing Al content.		
1270	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1275	AA (USA)	Wrought
Official composition: Si 0.08, Fe 0.12, Cu 0.05-0.1, Mg 0.02, Mn 0.02, Zn 0.03, Ti 0.02, Ga 0.03, V 0.03, Others: Each 0.01, Aluminium 99.75 min.		
Comments: See AA documentation for method of expressing Al content.		
1285	AA (USA)	Wrought
Official composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 0.01, Mn 0.01, Zn 0.03, Ti 0.02, Ga 0.03, V 0.05, (Si+Fe 0.14), Others: Each 0.01, Aluminium 99.85 min. Density (kg.m ⁻³) 2700		
Comments: See AA documentation for method of expressing Al content.		
1330	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1335	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1345	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.45 min. Density (kg.m ⁻³) 2705		
Identified Product forms: Wire		
Similar/Equivalent alloys: <u>USA:</u> AA1345, UNS A91345		
Comments: See AA documentation for method of expressing Al content.		
1350	AA (USA)	Wrought
Official composition: Si 0.1, Fe 0.4, Cu 0.05, Mn 0.01, Zn 0.05, Cr 0.01, Ga 0.03, B 0.05, V+Ti 0.02, Others: Each 0.03 Total 0.1, Aluminium 99.5 min. Density (kg.m ⁻³) 2705		
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Structural profile, Extrusion, Rod, Bar, Wire		
Similar/Equivalent alloys: <u>USA:</u> AA1350, UNS A91350 (was EC); <u>European (CEN):</u> EN573 AW-EAL99.5 (A), AW-1350 (<u>ISO:</u> E-AI99.5; <u>Austria:</u> E0Al; <u>France:</u> A 5L, A 5B; <u>Germany:</u> Al99.5; E-Al, E-AI995; Wk.3.0255; <u>Italy:</u> 9001/5; <u>Spain:</u> A199.5E; <u>Sweden:</u> 14.4022; <u>UK:</u> 1350; BS 1E; G1E; <u>Proprietary:</u> Alcan C1S; Hoogovens 1001		
Comments: Formerly designated EC. Electrical purity, winding strip with controlled low resistance. Extensive use as overhead conductor wiring. Chemical, food, petroleum and electrical industries. See AA documentation for method of expressing Al content. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion)		
Machinability: Fair		
Condition [Form]	PS (MPa)	YS (MPa)
O [-]	-	28
H12 [-]	-	83
H14 [-]	-	97
H16 [-]	-	110
H19 [-]	-	124
	-	165
		186
		23
		69
		69
		69
		69
		1.5
		69
		(Source)
		(#1)
		(#1)
		(#1)
		(#1)
		(#1)
1350	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.1, Fe 0.4, Cu 0.05, Mn 0.01, Zn 0.05, Cr 0.01, Ga 0.03, B 0.05, V+Ti 0.02, Others: Each 0.03, Aluminium 99.5 min. Density (kg.m ⁻³) 2705		
Similar/Equivalent alloys: <u>USA:</u> AA1350, UNS A91350; <u>European (CEN):</u> EN573 AW-EAL99.5 (A), AW-1350 (<u>ISO:</u> E-AI99.5; <u>Austria:</u> E0Al; <u>France:</u> A 5L, A 5B; <u>Germany:</u> A199.5; E-Al, E-AI995; Wk.3.0255; <u>Italy:</u> 9001/5; <u>Spain:</u> A199.5E; <u>Sweden:</u> 14.4022; <u>UK:</u> 1350; BS 1E; G1E; <u>Proprietary:</u> Alcan C1S; Hoogovens 1001		
Comments: For comments see: AA series. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion) Machinability: Fair		
1350A	AA (USA)	Wrought
Official composition: Si 0.25, Fe 0.4, Cu 0.02, Mg 0.05, Zn 0.05, Cr+Mn+Ti+V 0.03, Others: Each 0.03, Aluminium 99.5 min.		
Similar/Equivalent alloys: <u>USA:</u> AA1350A; <u>European (ISO):</u> E-AI99-5; <u>France:</u> A5/L; <u>Germany:</u> E-Al; 3.0257; <u>Italy:</u> 9001/5; <u>Spain:</u> L3052; <u>UK:</u> (BS 1E)		
Comments: See AA documentation for method of expressing Al content.		
1360	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
1370	AA (USA)	Wrought
Official composition: Si 0.1, Fe 0.25, Cu 0.02, Mg 0.02, Mn 0.01, Zn 0.04, Cr 0.01, Ga 0.03, B 0.02, V+Ti 0.02, Others: Each 0.02 Total 0.1, Aluminium 99.7 min.		
Similar/Equivalent alloys: <u>USA:</u> AA1370; <u>European (CEN):</u> EN573 AW-1370 (<u>ISO:</u> E-AI99.7)		
Comments: See AA documentation for method of expressing Al content.		
1370	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.1, Fe 0.25, Cu 0.02, Mg 0.02, Mn 0.01, Zn 0.04, Cr 0.01, Ga 0.03, B 0.02, V+Ti 0.02, Others: Each 0.02 Total 0.1, Aluminium 99.7 min.		
Similar/Equivalent alloys: <u>USA:</u> AA1370; <u>European (CEN):</u> EN573 AW-1370 (<u>ISO:</u> E-AI99.7)		

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1370-70	Alunord (France)	Wrought						
Proprietary composition: Si 0.05-0.08, Fe 0.17-0.23, Cu 0.05, Mg 0.01, Mn 0.05, Zn 0.02, Ti 0.03, Cr 0.003, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA1070A; <u>European (CEN):</u> EN573 AW-1070A (<u>ISO:</u> A199.7; <u>France:</u> 1070A; A7; <u>Germany:</u> DIN 3.0275; <u>Italy:</u> 4508, 9001/3; <u>Japan:</u> A1070; <u>UK:</u> BS: E1E; <u>Proprietary:</u> Otto Fuchs A2; Alunord 1370-70								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [-]	20	-	65	20	-		Typical	(Alunord)
1385	AA (USA)	Wrought						
Official composition: Si 0.05, Fe 0.12, Cu 0.02, Mg 0.02, Mn 0.01, Zn 0.03, Cr 0.01, Ga 0.03, B 0.02, V+Ti 0.03, Others: Each 0.01, Aluminium 99.85 min.								
Comments: See AA documentation for method of expressing Al content.								
1435	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.3-0.5, Cu 0.02, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.03, V 0.05, Others: Each 0.03, Aluminium 99.35 min. Density (kg.m ⁻³) 2710								
Comments: See AA documentation for method of expressing Al content.								
1445	AA (USA)	Wrought						
Official composition: Cu 0.04, Si+Fe+Cu 0.50, Others: Total 0.05, Aluminium 99.45 min.								
Comments: See AA documentation for method of expressing Al content.								
1450	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.1-0.2, Others: Each 0.03, Aluminium 99.5 min.								
Similar/Equivalent alloys: <u>USA:</u> AA1450								
Comments: See AA documentation for method of expressing Al content.								
1602	Lawson Mardon (LM) Star (UK)	Wrought						
No composition: -								
Identified Product forms: Foil								
Similar/Equivalent alloys: <u>USA:</u> AA1060, UNS A91060; <u>European (ISO):</u> A199.6, A199.8; <u>France:</u> A8; <u>Germany:</u> A199.8; <u>Italy:</u> 4509; <u>Russia (CIS):</u> GOST A6; <u>Sweden:</u> 14,4020								
Comments: Packaging. Converter foil, thin strip & household. LM Star version of AA 1060.								
2001	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.2, Cu 5.2-6, Mg 0.2-0.45, Mn 0.15-0.5, Zn 0.1, Ni 0.05, Ti 0.2, Cr 0.1, Pb 0.003, Zr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
2002	AA (USA)	Wrought						
Official composition: Si 0.35-0.8, Fe 0.3, Cu 1.5-2.5, Mg 0.5-1, Mn 0.2, Zn 0.2, Ti 0.2, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
2003	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.3, Cu 4-5, Mg 0.02, Mn 0.3-0.8, Zn 0.1, Ti 0.15, V 0.05-0.2, Zr 0.1-0.25, Cd 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
2004	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.2, Cu 5.5-6.5, Mg 0.5, Mn 0.1, Zn 0.1, Ti 0.05, Zr 0.3-0.5, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA2004; <u>Proprietary:</u> Supral 100 (Supral 150 clad with A199.7)								
Comments: Components produced by superplastic forming.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Superplastic forming]	130	-	220	9	-		Typical	(Superform Metals)
O [Superplastic forming]	120	-	240	-	-		Typical	(Superform Metals)
T6 [Superplastic forming]	300	-	420	9	-		Typical	(Superform Metals)
T6 [Superplastic forming]	315	-	410	-	-		Typical	(Superform Metals)
2005	AA (USA)	Wrought						
Official composition: Si 0.8, Fe 0.7, Cu 3.5-5, Mg 0.2-1, Mn 1, Zn 0.5, Ni 0.2, Ti 0.2, Cr 0.1, Bi 0.2, Pb 1-2, Others: Each 0.05 Total 0.15, Aluminium rem.								
2006	AA (USA)	Wrought						
Official composition: Si 0.8-1.3, Fe 0.7, Cu 1-2, Mg 0.5-1.4, Mn 0.6-1, Zn 0.2, Ni 0.2, Ti 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
2007	AA (USA)	Wrought						
Official composition: Si 0.8, Fe 0.8, Cu 3.3-4.6, Mg 0.4-1.8, Mn 0.5-1, Zn 0.8, Ni 0.2, Ti 0.2, Cr 0.1, Bi 0.2, Pb 0.8-1.5, Sn 0.2, Others: Each 0.1 Total 0.3, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA2007; <u>Germany:</u> AlCuMgPb; DIN 3.1645; <u>Others:</u> (CZ) CSN 42 4254; <u>Proprietary:</u> Otto Fuchs AB27								
2008	AA (USA)	Wrought						
Official composition: Si 0.5-0.8, Fe 0.4, Cu 0.7-1.1, Mg 0.25-0.5, Mn 0.3, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
2009	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.05, Cu 3.2-4.4, Mg 1-1.6, Zn 0.1, V 0.05, O ₂ 0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2750								
2010	AA (USA)	Wrought						
Official composition: Si 0.5, Fe 0.5, Cu 0.7-1.3, Mg 0.4-1, Mn 0.1-0.4, Zn 0.3, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA2010; <u>Proprietary:</u> Reynolds 2010								
Comments: Vehicle body sheet.								

Aluminium Alloys (wrought) 159

2011 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.7, Cu 5-6, Zn 0.3, Bi 0.2-0.6, Pb 0.2-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2830

Identified Product forms: Tube, Extrusion, Rod, Bar, Wire

Similar/Equivalent alloys: *USA:* AA2011, UNS A92011; *European (CEN):* EN573 AW-2011 (*ISO:* AlCu6BiPb; *Australia:* A2011; *Canada:* CB60; *France:* A-U5PbBi; *Germany:* AlCuBiPb; Wk.3.1655; *Italy:* 9002/5; 6362; *Japan:* A2011; *Spain:* L-3192; *Sweden:* 4355; *UK:* 2011; BS FC1; *Proprietary:* Alcan 28S

Comments: Free-cutting machining alloy - BS4300/S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T3 [-]	-	296	379	15	70	HB 95	Typical	(#1)
T3/T6 [Extrusion]	235	-	300	8	-	-	Typical	(Aalco (Glywed))
T8 [-]	-	310	407	12	70	HB 100	Typical	(#1)

2011 CEN 573 (Europe) Wrought

Nominal composition: Si 0.4, Fe 0.7, Cu 5-6, Zn 0.3, Bi 0.2-0.6, Pb 0.6, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2830

Identified Product forms: Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA2011, UNS A92011; *European (CEN):* EN573 AW-2011 (*ISO:* AlCu6BiPb; *Australia:* A2011; *Canada:* CB60; *France:* A-U5PbBi; *Germany:* AlCuBiPb; Wk.3.1655; *Italy:* 9002/5; 6362; *Japan:* A2011; *Spain:* L-3192; *Sweden:* 4355; *UK:* 2011; BS FC1; *Proprietary:* Alcan 28S

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T3 [Drawn bar (<40mm)]	270	-	320	10	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn tube (>5 <20mm)]	240	-	290	8	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn wire (d<18mm)]	295	-	310	6	-	-	EN1301 / EN11715	(Pechiney)
T4 [Extru. Bar]	125	-	275	14	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Bar (<60; <70mm)]	125	-	275	14	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Bar (<70; <200mm)]	195	-	295	6	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Tube (<25mm)]	230	-	310	6	-	-	EN755 Min. values	(Pechiney)
T8 [Drawn bar (<80mm)]	270	-	370	8	-	-	EN754 Min. values	(Pechiney)
T8 [Drawn tube (<20mm)]	275	-	370	8	-	-	EN754 Min. values	(Pechiney)
T8 [Drawn wire (d<18mm)]	310	-	370	4	-	-	EN1301 / EN11715	(Pechiney)

2011A AA (USA) Wrought

Official composition: Si 0.4, Fe 0.5, Cu 4.5-6, Zn 0.3, Bi 0.2-0.6, Pb 0.2-0.6, Others: Each 0.05 Total 0.15, Aluminium rem.

Similar/Equivalent alloys: *USA:* AA2011A; *European (CEN):* EN573 AW-2011A

2011A CEN 573 (Europe) Wrought

Nominal composition: Si 0.4, Fe 0.5, Cu 4.5-6, Zn 0.3, Bi 0.2, Pb 0.8-1, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA2011A; *European (CEN):* EN573 AW-2011A

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T3 [Drawn bar (<40mm)]	270	-	320	10	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn tube (>5 <20mm)]	240	-	290	8	-	-	EN754 Min. values	(Pechiney)
T4 [Extru. Bar (<60; <200mm)]	125	-	275	14	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Bar (<75; <200mm)]	195	-	295	6	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Tube (<25mm)]	230	-	310	6	-	-	EN755 Min. values	(Pechiney)
T8 [Drawn bar (<80mm)]	270	-	370	8	-	-	EN754 Min. values	(Pechiney)
T8 [Drawn tube (<20mm)]	275	-	370	8	-	-	EN754 Min. values	(Pechiney)

2012 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.7, Cu 4-5.5, Zn 0.3, Bi 0.2-0.7, Sn 0.2-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2820

Similar/Equivalent alloys: *USA:* AA2012

2014 AA (USA) Wrought

Official composition: Si 0.5-1.2, Fe 0.7, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, By agreement Zr+Ti limit may be 0.2 for extrusion & forging, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2800

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA2014, UNS A92014, AMS 4028, 4029, MIL -A-22771, QQ -A-225/4, -A-200/2, -A-367; *European (CEN):* EN573 AW-2014 (2014A); AW-AlCu4SiMg(A) (*ISO:* AlCu4SiMg (*AECMA:* AL-P12; *Canada:* CS41N; *France:* A-U4SG; 2014; *Germany:* AlCuSiMn; Wk.3.1255; LW3.1254; *Italy:* 3581; 9002/3; FA60-2014; *Japan:* A3X1; A2014; A2014P; *Russia (GOST):* 1380, 1185; *Spain:* L-3130; *Sweden:* 14.4338; *UK:* 2014A; BS H15 (HS 15); L102, L103, L105, L156-L159, L163-L168, 2L77, 2L87, 2L93, 3L63, 7L37; *DTD:* 5010A, DTD 5030A, DTD 5040A; *Others:* (CZ) CSN 42 4207; *Proprietary:* Alcan 66; Otto Fuchs AK34; Hoogovens 2140

Comments: Aerospace: strong general engineering alloy, rivets. Road transport, rail transport, mechanical engineering. **Corrosion resistance:** Fair (atmospheric)

Weldability: Unsuitable (fusion) **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	97	186	18	73	HB 45	Typical	(#1)
T4, T451 [-]	-	290	427	20	73	HB 105	Typical	(#1)
T6 [-]	420	-	470	-	-	-	Typical	(Raufoss)
T6, T651 [-]	-	414	483	13	73	HB 135	Typical	(#1)

160 Aluminium Alloys (wrought)

2014

CEN 573 (Europe)

Wrought

Nominal composition: Si 0.5-1.2, Fe 0.7, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2800

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Wire

Similar/Equivalent alloys: *USA:* AA2014, UNS A92014, AMS 4028, 4029, MIL -A-22771, QQ -A-225/4, -A-200/2, -A-367; *European (CEN):* EN573 AW-2014 (2014A); *AlCu4SiMg(A) (ISO):* AlCu4SiMg (*AECMA*): AL-P12; *Canada:* CS41N; *France:* A-U4SG; 2014; *Germany:* AlCuSiMn; Wk.3.1255; LW3.1254; *Italy:* 3581; 9002/3; FA60-2014; *Japan:* A3X1; A2014; A2014P; *Russia (CIS):* 1380, 1185; *Spain:* L-3130; *Sweden:* 14,4338; *UK:* 2014A; BS H15 (HS 15); L102, L103, L105, L156-L159, L163-L168, 2L77, 2L87, 2L93, 3L63, 7L37; DTD 5010A, DTD 5030A, DTD 5040A; *Others:* (CZ) CSN 42 4207; *Proprietary:* Alcan 66; Otto Fuchs AK34; Hoogovens 2140

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate 0.4-12.5mm]	140	-	220	-	-	55HB	EN485 Max. values	(Pechiney)
H13 [Drawn wire (d<18mm)]	190	-	210	5	-	-	EN1301 / EN11715	(Pechiney)
T3 [Drawn bar (<80mm)]	240	-	380	8	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn Tube (<20mm)]	240	-	380	8	-	-	EN754 Min. values	(Pechiney)
T3 [Sheet (>0.4 <1.5mm)]	245	-	395	14	-	111HB	EN485 Min. values	(Pechiney)
T3 [Sheet/Plate 1.5-6mm]	245	-	400	14	-	112HB	EN485 Min. values	(Pechiney)
T4 [Drawn Tube (<20mm)]	240	-	380	12	-	-	EN754 Min. values	(Pechiney)
T4 [Drawn wire (d<18mm)]	255	-	380	18	-	-	EN1301 / EN11715	(Pechiney)
T4 [Extru. Bar (<25mm)]	230	-	370	13	-	-	EN755 Min. values	(Pechiney)
T4 [Extru. Tube (<20mm)]	230	-	370	11	-	-	EN755 Min. values	(Pechiney)
T4 [Extrusion (<25mm)]	230	-	370	11	-	-	EN755 Min. values	(Pechiney)
T4 [Sheet (>0.4 <1.5mm)]	240	-	395	14	-	110HB	EN485 Min. values	(Pechiney)
T42 [Plate (>6 <25mm)]	235	-	400	-	-	111HB	EN485 Min. values	(Pechiney)
T42 [Sheet (>0.4 <6mm)]	230	-	395	14	-	110HB	EN485 Min. values	(Pechiney)
T451 [Plate (>12.5 <40mm)]	250	-	400	10	-	112HB	EN485 Min. values	(Pechiney)
T451 [Plate (>40 <100mm)]	250	-	395	7	-	111HB	EN485 Min. values	(Pechiney)
T451 [Plate (>6 <12.5mm)]	240	-	400	14	-	112HB	EN485 Min. values	(Pechiney)
T451 [Sheet/Plate 1.5-6mm]	240	-	395	14	-	110HB	EN485 Min. values	(Pechiney)
T6 [Drawn Tube (<20mm)]	380	-	450	8	-	-	EN754 Min. values	(Pechiney)
T6 [Drawn wire (d<18mm)]	415	-	440	9	-	-	EN1301 / EN11715	(Pechiney)
T6 [Sheet (>0.4 <1.5mm)]	390	-	440	6	-	133HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	390	-	440	6	-	133HB	Minimum	(AMAG)
T62 [Plate (>12.5 <25mm)]	395	-	450	6	-	135HB	EN485 Min. values	(Pechiney)
T62 [Sheet/Plate 0.4-12.5mm]	390	-	440	7	-	133HB	EN485 Min. values	(Pechiney)
T651 [Plate (>100 <120mm)]	350	-	410	4	-	123HB	EN485 Min. values	(Pechiney)
T651 [Plate (>12.5 <40mm)]	400	-	460	6	-	138HB	EN485 Min. values	(Pechiney)
T651 [Plate (>40 <60mm)]	390	-	450	5	-	135HB	EN485 Min. values	(Pechiney)
T651 [Plate (>6 <12.5mm)]	395	-	450	7	-	135HB	EN485 Min. values	(Pechiney)
T651 [Plate (>60 <80mm)]	380	-	435	4	-	131HB	EN485 Min. values	(Pechiney)
T651 [Plate (>80 <100mm)]	360	-	420	4	-	126HB	EN485 Min. values	(Pechiney)
T651 [Sheet/Plate 1.5-6mm]	390	-	440	7	-	133HB	EN485 Min. values	(Pechiney)

2014 Alclad

AA (USA)

Wrought

No composition: (2014 + Al)

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: *USA:* AA2014 Alclad, QQ -A-250/3; *Canada:* CS41N ALCLAD; *Italy:* P-AlCu4.4SiMnMgplacc.

Comments: Clad sheet. See AA2014

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	70	172	21	72	-	Typical	(#1)
T3 [-]	-	276	434	20	72	-	Typical	(#1)
T4, T451 [-]	-	255	421	22	72	-	Typical	(#1)
T6, T651 [-]	-	414	469	10	72	-	Typical	(#1)

2014A

AA (USA)

Wrought

Official composition: Si 0.5-0.9, Fe 0.5, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ni 0.1, Ti 0.15, Cr 0.1, Zr+Ti 0.20, Others: Each 0.05 Total 0.15, Aluminium rem.

Density (kg.m⁻³) 2800

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA2014A; *European (CEN):* EN573 AW-2014A (*ISO*): AlCu4SiMg(A); *Australia:* B2014; *France:* A-U4SG; *Germany:* AlCuSiMn; Wk.3.1255; *Italy:* 9002/3; 3581; *Japan:* A2014; *Spain:* L-3130; *Sweden:* 14,4338; *Switzerland:* AlCu4SiMn; *UK:* 2014A; BS H15; L93, L94, L102, L103, L105, L156-L159, L163-L168, 2L77, 2L87, 2L93, 3L63, 7L37; DTD 5010A, DTD 5030A, DTD 5040A; HR15; *Others:* European aerospace P-2014A; *Proprietary:* Alcan 26S, 66, Dural S; HDA 66

Comments: Aerospace: strong general engineering alloy, rivets. Tensile strength of drawn, seamless tube 410-470 MPa. **Corrosion resistance:** Fair (atmospheric)

Weldability: Unsuitable (fusion) **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T651 [Hot rolled plate, 50mm]	430	-	480	7	74	135HB	Transverse properties (Typ.)	(BAI Plate)

2017

AA (USA)

Wrought

Official composition: Si 0.2-0.8, Fe 0.7, Cu 3.5-4.5, Mg 0.4-0.8, Mn 0.4-1, Zn 0.25, Ti 0.15, Cr 0.1, By agreement Zr+Ti limit may be 0.2 for extrusion & forging, Others:

Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2790

Identified Product forms: Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA2017, UNS A92017, QQ -A-225/5; *European (ISO):* AlCu4MgSi; *Austria:* AlCuMg1; *Canada:* CM41; *France:* A-U4G; 2017A; *Germany:* AlCuMg1; LW. 3.1324; *Italy:* P-AlCu4MgMn; 3579; FA60-2017A; *Switzerland:* Al3.5Cu0.5Mg; *UK:* H14; L87, 5L37; DTD150A; *Others:* (CZ) CSN 42 4201; *Proprietary:* Alcan 17S; Otto Fuchs AK13; Hoogovens 2170

Comments: Aerospace and armaments. Medium strength with good forgeability and machining, rivets. Road transport, rail transport, aerospace, mechanical engineering.

Corrosion resistance: Fair (atmospheric) **Weldability:** Unsuitable (fusion) **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	69	179	22	72	HB 45	Typical	(#1)
T4, T451 [-]	-	276	427	22	72	HB 105	Typical	(#1)

Aluminium Alloys (wrought) 161

2017A AA (USA) Wrought

Official composition: Si 0.2-0.8, Fe 0.7, Cu 3.5-4.5, Mg 0.4-1, Mn 0.4-1, Zn 0.25, Cr 0.1, Zr+Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Tube, Extrusion, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA2017A; *European (CEN):* EN573 AW-2017A; AW-AlCu4MgSi(A) (*ISO:* AlCu4MgSi(A); *France:* A-U4G; 2017A; *Germany:* AlCuMg1; Wk.3.1325; *Italy:* 3579; 9002/2; *Japan:* A2017P; *Spain:* W3120; *UK:* 2017A; BS L93, L 94; *Others:* European aerospace P-2017A; *Proprietary:* Alcan 17S, 01, Dural SM; Otto Fuchs AK13

Comments: Aerospace and general engineering. **Corrosion resistance:** Fair (atmospheric) **Weldability:** Unsuitable (fusion) **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [-]	260	-	390	-	-	110HB	Typical	(P. Balloffet)
T451 [Plate, 50mm]	300	-	440	16	72	105HB	Typical	(BAI Plate)

2017A CEN 573 (Europe) Wrought

Nominal composition: Si 0.2-0.8, Fe 0.7, Cu 3.5-4.5, Mg 0.4-1, Mn 0.4-1, Zn 0.25, Cr 0.1, Zr+Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA2017A; *European (CEN):* EN573 AW-2017A; AW-AlCu4MgSi(A) (*ISO:* AlCu4MgSi(A); *France:* A-U4G; 2017A; *Germany:* AlCuMg1; Wk.3.1325; *Italy:* 3579; 9002/2; *Japan:* A2017P; *Spain:* W3120; *UK:* 2017A; BS L93, L 94; *Others:* European aerospace P-2017A; *Proprietary:* Alcan 17S, 01, Dural SM; Otto Fuchs AK13

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate 0.4-25mm]	145	-	225	-	-	55HB	EN485 Max. values	(Pechiney)
T3 [Drawn bar (<80mm)]	250	-	400	10	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn Tube (<20mm)]	250	-	400	10	-	-	EN754 Min. values	(Pechiney)
T4 [Extru. Bar (<25mm)]	260	-	380	12	-	-	EN755 Min. values	(Pechiney)
T4 [Extru. Tube (<10mm)]	260	-	380	12	-	-	EN755 Min. values	(Pechiney)
T4 [Extrusion]	260	-	380	10	-	-	EN755 Min. values	(Pechiney)
T4 [Sheet (0.4 <1.5mm)]	245	-	390	14	-	110HB	EN485 Min. values	(Pechiney)
T4 [Strip/sheet]	245	-	390	14	-	110HB	Minimum	(AMAG)
T42 [Sheet/Plate 0.4-25mm]	235	-	390	-	-	109HB	EN485 Min. values	(Pechiney)
T451 [Plate (>100 <120mm)]	240	-	370	8	-	108HB	EN485 Min. values	(Pechiney)
T451 [Plate (>12.5 <40mm)]	250	-	390	12	-	110HB	EN485 Min. values	(Pechiney)
T451 [Plate (>120 <150mm)]	240	-	350	4	-	108HB	EN485 Min. values	(Pechiney)
T451 [Plate (>40 <100mm)]	240	-	385	10	-	108HB	EN485 Min. values	(Pechiney)
T451 [Plate (>6 <12.5mm)]	260	-	390	13	-	111HB	EN485 Min. values	(Pechiney)
T451 [Sheet/Plate 0.4-6mm]	245	-	390	15	-	110HB	EN485 Min. values	(Pechiney)

2018 AA (USA) Wrought

Official composition: Si 0.9, Fe 1, Cu 3.5-4.5, Mg 0.45-0.9, Mn 0.2, Zn 0.25, Ni 1.7-2.3, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2820

Identified Product forms: Forging stock/Billet

Similar/Equivalent alloys: *USA:* AA2018; *Canada:* CN42

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T61 [-]	-	317	421	12	74	HB 120	Typical	(#1)

2020 AA (USA) Wrought

No composition: -

Comments: Listed by AA as Inactive.

2021 AA (USA) Wrought

Official composition: Si 0.2, Fe 0.3, Cu 5.8-6.8, Mg 0.02, Mn 0.2-0.4, Zn 0.1, Ti 0.02-0.1, V 0.05-0.15, Sn 0.03-0.08, Zr 0.1-0.25, Cd 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.

2024 AA (USA) Wrought

Official composition: Si 0.5, Fe 0.5, Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, By agreement Zr+Ti limit may be 0.2 for extrusion & forging, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2780

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA2024, UNS A92024, AMS 4037, QQ-A-250/4, -A225/6, -A-200/3; *European (CEN):* EN573 AW-2024; AW-AlCu4Mg1 (*ISO:* AlCu4Mg1.5 (*AECMA:* AL-P13; *Australia:* A2024; *Austria:* AlCuMg2; *Canada:* CG42; *France:* A-U4G1; 2024; AIR 9048-630; *Germany:* AlCuMg2; Wk.3.1355; LW3.1354; *Italy:* P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; *Japan:* A2024P; *Russia (GOST):* 1160; *Spain:* L-3140; *Switzerland:* AlCu4Mg1.5; *UK:* 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; *Others:* USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024; *Proprietary:* Otto Fuchs AK24; Hoogovens 2240

Comments: Road transport, aerospace, mechanical engineering. Aircraft structures. **Corrosion resistance:** Fair (atmospheric) **Weldability:** Unsuitable (fusion)

Machinability: Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	76	186	20	73	47HB	Typical	(#1)
T3 [-]	-	345	483	18	73	120HB	Typical	(#1)
T351 [Hot rolled plate, 50mm]	320	-	460	14	73	120HB	Transverse properties (Typ.)	(BAI Plate)
T361 (T36) [-]	-	393	496	13	73	130HB	Typical	(#1)
T4 [-]	300	-	420	-	-	-	Typical	(Raufoss)
T4, T351 [-]	-	324	469	20	73	120HB	Typical	(#1)
T6 [-]	380	-	455	-	-	130HB	Typical	(P. Balloffet)
T851 [Hot rolled plate, 50mm]	420	-	480	7	-	-	Transverse properties (Typ.)	(BAI Plate)

162 Aluminium Alloys (wrought)

2024 CEN 573 (Europe) Wrought

Nominal composition: Si 0.5, Fe 0.5, Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2780

Similar/Equivalent alloys: **USA:** AA2024, UNS A92024, AMS 4037, QQ -A-250/4, -A225/6, -A-200/3; **European (CEN):** EN573 AW-2024; AW-AlCu4Mg1 (**ISO**): AlCu4Mg1.5 (**AECMA**): AL-P13; **Australia:** A2024; **Austria:** AlCuMg2; **Canada:** CG42; **France:** A-U4G1; 2024; AIR 9048-630; **Germany:** AlCuMg2; Wk.3.1355; LW3.1354; **Italy:** P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; **Japan:** A2024P; **Russia (CIS):** 1160; **Spain:** L-3140; **Switzerland:** AlCu4Mg1.5; **UK:** 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; **Others:** USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024; **Proprietary:** Otto Fuchs AK24; Hoogovens 2240

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate 0.4-12.5mm]	140	-	220	-	-	55HB	EN485 Max. values	(Pechiney)
T3 [Drawn bar (>10 <80mm)]	290	-	425	9	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn Tube (>5 <20mm)]	270	-	420	10	-	-	EN754 Min. values	(Pechiney)
T3 [Extru. Bar (<50mm)]	310	-	450	8	-	-	EN755 Min. values	(Pechiney)
T3 [Extru. Tube (<30mm)]	290	-	420	8	-	-	EN755 Min. values	(Pechiney)
T3 [Extrusion]	290	-	395	8	-	-	EN755 Min. values	(Pechiney)
T3 [Sheet (0.4 <1.5mm)]	290	-	435	12	-	123HB	EN485 Min. values	(Pechiney)
T351 [Plate (>100 <120mm)]	270	-	380	5	-	110HB	EN485 Min. values	(Pechiney)
T351 [Plate (>12.5 <40mm)]	290	-	430	11	-	122HB	EN485 Min. values	(Pechiney)
T351 [Plate (>120 <150mm)]	250	-	360	5	-	104HB	EN485 Min. values	(Pechiney)
T351 [Plate (>40 <80mm)]	290	-	420	8	-	120HB	EN485 Min. values	(Pechiney)
T351 [Plate (>80 <100mm)]	285	-	400	7	-	115HB	EN485 Min. values	(Pechiney)
T351 [Sheet/Plate (1.5 <3mm)]	290	-	435	14	-	123HB	EN485 Min. values	(Pechiney)
T351 [Sheet/Plate (3 <12.5mm)]	290	-	440	-	-	124HB	EN485 Min. values	(Pechiney)
T4 [Drawn wire (<18mm)]	315	-	420	-	-	-	EN1301 / EN11715	(Pechiney)
T4 [Sheet/Plate (>0.4 <6mm)]	275	-	425	-	-	120HB	EN485 Min. values	(Pechiney)
T42 [Plate (>12.5 <25mm)]	260	-	420	8	-	118HB	EN485 Min. values	(Pechiney)
T42 [Sheet/Plate 0.4-12.5mm]	260	-	425	-	-	119HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	345	-	440	5	-	129HB	Minimum	(AMAG)
T62 [Plate (>12.5 <25mm)]	345	-	435	4	-	128HB	EN485 Min. values	(Pechiney)
T62 [Sheet/Plate 0.4-12.5mm]	345	-	440	5	-	129HB	EN485 Min. values	(Pechiney)
T8 [Sheet (>0.4 <1.5mm)]	400	-	460	5	-	138HB	EN485 Min. values	(Pechiney)
T851 [Plate (>12.5 <25mm)]	400	-	455	4	-	137HB	EN485 Min. values	(Pechiney)
T851 [Plate (>25 <40mm)]	395	-	455	4	-	136HB	EN485 Min. values	(Pechiney)
T851 [Sheet/Plate 1.5-12.5mm]	400	-	460	-	-	138HB	EN485 Min. values	(Pechiney)

2024 Alclad AA (USA) Wrought

No composition: (2024 + Al)

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: **USA:** AA2024 Alclad, QQ -A-250/5; **Canada:** CG 42 ALCLAD; **Italy:** P-AlCu4.5MgMnplacc.; **UK:** DTD5100

Comments: Clad sheet. See AA2024

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	76	179	20	73	-	Typical	(#1)
T3 [-]	-	310	448	18	73	-	Typical	(#1)
T361 (T36) [-]	-	434	462	11	73	-	Typical	(#1)
T4, T351 [-]	-	290	441	19	73	-	Typical	(#1)
T81, T851 [-]	-	414	448	6	73	-	Typical	(#1)
T861 (T86) [-]	-	455	483	6	73	-	Typical	(#1)

2024A AA (USA) Wrought

Official composition: Si 0.15, Fe 0.2, Cu 3.7-4.5, Mg 1.2-1.5, Mn 0.15-0.8, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.

Comments: Designation added to AA (USA) register since previous issue (06/94)

2025 AA (USA) Wrought

Official composition: Si 0.5-1.2, Fe 1, Cu 3.9-5, Mg 0.05, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2810

Identified Product forms: Forging stock/Billet

Similar/Equivalent alloys: **USA:** AA2025, AMS 4130; **Canada:** CS41P; **UK:** 2025

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [-]	-	255	400	19	72	HB 110	Typical	(#1)

2030 AA (USA) Wrought

Official composition: Si 0.8, Fe 0.7, Cu 3.3-4.5, Mg 0.5-1.3, Mn 0.2-1, Zn 0.5, Ti 0.2, Cr 0.1, Bi 0.2, Pb 0.8-1.5, Others: Each 0.1 Total 0.3, Aluminium rem.

Similar/Equivalent alloys: **USA:** AA2030; **European (CEN):** EN573 AW-2030 (**ISO**): AlCu4PbMg; **France:** A-U4Pb; 2030; **Germany:** AlCuMgPb; 3.1645

2030 CEN 573 (Europe) Wrought

Nominal composition: Si 0.8, Fe 0.7, Cu 3.3-4.5, Mg 0.5-1.3, Mn 0.2-1, Zn 0.5, Ti 0.2, Cr 0.1, Bi 0.2, Pb 0.8-1.5, Others: Each 0.1 Total 0.3, Aluminium rem.

Identified Product forms: Tube, Extrusion

Similar/Equivalent alloys: **USA:** AA2030; **European (CEN):** EN573 AW-2030 (**ISO**): AlCu4PbMg; **France:** A-U4Pb; 2030; **Germany:** AlCuMgPb; 3.1645

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T3 [Drawn bar (<30mm)]	250	-	370	7	-	-	EN754 Min. values	(Pechiney)
T3 [Drawn tube (<20mm)]	250	-	370	7	-	-	EN754 Min. values	(Pechiney)
T4 [Extru. Bar (<80mm)]	250	-	370	8	-	-	EN755 Min. values	(Pechiney)
T4 [Extru. Tube (<25mm)]	250	-	370	8	-	-	EN755 Min. values	(Pechiney)
T4 [Extrusion (<30mm)]	250	-	370	8	-	-	EN755 Min. values	(Pechiney)

Aluminium Alloys (wrought) 163

2031	AA (USA)	Wrought																		
Official composition: Si 0.5-1.3, Fe 0.6-1.2, Cu 1.8-2.8, Mg 0.6-1.2, Mn 0.5, Zn 0.2, Ni 0.6-1.4, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Plate, Tube, Extrusion, Forging stock/Billet Similar/Equivalent alloys: <i>USA:</i> AA2031; <i>European (ISO):</i> AlCu2Ni1MgFeSi; <i>France:</i> A-U2N; <i>Spain:</i> L-3160; <i>UK:</i> 2031; H12; <i>Proprietary:</i> Alcan 15S, 56 Comments: Aerospace. Forging stock, medium to high strength. Engine and airframe components. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good																				
2034	AA (USA)	Wrought																		
Official composition: Si 0.1, Fe 0.12, Cu 4.2-4.8, Mg 1.3-1.9, Mn 0.8-1.3, Zn 0.2, Ti 0.15, Cr 0.05, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810																				
2036	AA (USA)	Wrought																		
Official composition: Si 0.5, Fe 0.5, Cu 2.2-3, Mg 0.3-0.6, Mn 0.1-0.4, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2750 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA2036; <i>Proprietary:</i> Reynolds: 2036 Comments: Vehicle body sheet. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>El (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th style="text-align: right;">(Source)</th> </tr> </thead> <tbody> <tr> <td>T4 [-]</td> <td style="text-align: center;">-</td> <td style="text-align: center;">193</td> <td style="text-align: center;">338</td> <td style="text-align: center;">24</td> <td style="text-align: center;">71</td> <td></td> <td style="text-align: center;">Typical</td> <td style="text-align: right;">(#1)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)	T4 [-]	-	193	338	24	71		Typical	(#1)
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)												
T4 [-]	-	193	338	24	71		Typical	(#1)												
2037	AA (USA)	Wrought																		
Official composition: Si 0.5, Fe 0.5, Cu 1.4-2.2, Mg 0.3-0.8, Mn 0.1-0.4, Zn 0.25, Ti 0.15, Cr 0.1, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740																				
2038	AA (USA)	Wrought																		
Official composition: Si 0.5-1.3, Fe 0.6, Cu 0.8-1.8, Mg 0.4-1, Mn 0.1-0.4, Zn 0.5, Ti 0.15, Cr 0.2, Ga 0.05, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730 Similar/Equivalent alloys: <i>USA:</i> AA2038; <i>Germany:</i> AlCu2SiMn; <i>Others:</i> (CZ) CSN 42 4206																				
2048	AA (USA)	Wrought																		
Official composition: Si 0.15, Fe 0.2, Cu 2.8-3.8, Mg 1.2-1.8, Mn 0.2-0.6, Zn 0.25, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2750 Similar/Equivalent alloys: <i>USA:</i> AA2048, UNS A92048																				
2053	AA (USA)	Wrought																		
No composition: - Comments: Listed by AA as Inactive.																				
2080	AA (USA)	Wrought																		
Official composition: Si 0.1, Fe 0.2, Cu 3.3-4.1, Mg 1.5-2.2, Mn 0.25, Zn 0.1, Zr 0.08-0.25, Be 0.005, O ₂ 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2750 Comments: Was AA X2080. Composition limits revised and 'X' removed from designation since previous issue of AA (USA) register (06/94)																				
2090	AA (USA)	Wrought																		
Official composition: Si 0.1, Fe 0.12, Cu 2.4-3, Mg 0.8, Mn 0.05, Zn 0.1, Ti 0.15, Cr 0.05, Li 1.9-2.6, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2590 Similar/Equivalent alloys: <i>USA:</i> AA2090, AMS 4251; <i>Proprietary:</i> Alcoa ALITHALITE 2090; Kaiser KALITE 2090																				
2091	AA (USA)	Wrought																		
Official composition: Si 0.2, Fe 0.3, Cu 1.8-2.5, Mg 1.1-1.9, Mn 0.1, Zn 0.25, Ti 0.1, Cr 0.1, Li 1.7-2.3, Zr 0.04-0.16, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2580 Similar/Equivalent alloys: <i>USA:</i> AA2091; <i>Proprietary:</i> Pechiney CP274 (discontinued); Alcoa ALITHALITE 2091; Otto Fuchs AL21																				
2094	AA (USA)	Wrought																		
Official composition: Si 0.12, Fe 0.15, Cu 4.4-5.2, Mg 0.25-0.8, Mn 0.25, Zn 0.25, Ti 0.1, Li 0.7-1.4, Zr 0.04-0.18, Ag 0.25-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720																				
2095	AA (USA)	Wrought																		
Official composition: Si 0.12, Fe 0.15, Cu 3.9-4.6, Mg 0.25-0.8, Mn 0.25, Zn 0.25, Ti 0.1, Li 0.7-1.5, Zr 0.04-0.18, Ag 0.25-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA2095; <i>Proprietary:</i> Reynolds WELDALITE 049																				
2097	AA (USA)	Wrought																		
Official composition: Si 0.12, Fe 0.15, Cu 2.5-3.1, Mg 0.35, Mn 0.1-0.6, Zn 0.35, Ti 0.15, Li 1.2-1.8, Zr 0.08-0.16, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2640																				
2111	AA (USA)	Wrought																		
Official composition: Si 0.4, Fe 0.7, Cu 5-6, Zn 0.3, Bi 0.2-0.8, Sn 0.1-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830																				

164 Aluminium Alloys (wrought)

2117	AA (USA)	Wrought						
Official composition: Si 0.8, Fe 0.7, Cu 2.2-3, Mg 0.2-0.5, Mn 0.2, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2750								
Identified Product forms: Rod, Wire, Rivet stock								
Similar/Equivalent alloys: <u>USA:</u> AA2117; <u>European (ISO):</u> AlCu2.5Mg, AlCu2Mg (<u>AECMA:</u> AL-P14; <u>Austria:</u> AlCuMg0.5; <u>Canada:</u> CG30; <u>France:</u> A-U2G; <u>Germany:</u> AlCu2.5Mg0.5; Wk.3.1305; <u>Italy:</u> P-AlCu2.5MgSi; 9002/1; 3577; <u>Japan:</u> A2117; <u>Spain:</u> L-3180; <u>UK:</u> BS L86								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T4 [-]	-	165	296	27	71	HB 70	Typical	(#1)
2124	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, By agreement Zr+Ti limit may be 0.2 for extrusion & forging, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780								
Identified Product forms: Plate								
Similar/Equivalent alloys: <u>USA:</u> AA2124, UNS A92124, AMS 4101, QQ -A-250/29; <u>European (CEN):</u> EN573 AW-2124								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T351 [Hot rolled plate, 50mm]	320	-	460	16	-	-	Transverse properties (Typ.)	(BAI Plate)
T851 [-]	-	441	483	8	73	-	Typical	(#1)
T851 [Hot rolled plate, 50mm]	420	-	470	8	-	-	Transverse properties (Typ.)	(BAI Plate)
2124	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.2, Fe 0.3, Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780								
Similar/Equivalent alloys: <u>USA:</u> AA2124, UNS A92124, AMS 4101, QQ -A-250/29; <u>European (CEN):</u> EN573 AW-2124								
2140	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA2014, UNS A92014, AMS 4028, 4029; <u>European (CEN):</u> EN573 AW-2014 (2014A); AW-AlCu4SiMg(A) (<u>ISO:</u> AlCu4SiMg (<u>AECMA:</u> AL-P12; <u>Canada:</u> CS41N; <u>France:</u> A-U4SG; 2014; <u>Germany:</u> AlCuSiMn; Wk.3.1255; LW3.1254; <u>Italy:</u> 3581; 9002/3; FA60-2014; <u>Japan:</u> A3X1; A2014; A2014P; <u>Russia (CIS):</u> 1380, 1185; <u>Spain:</u> L-3130; <u>Sweden:</u> 14.4338; <u>UK:</u> 2014A; BS H15 (HS 15); L102, L103, L105, L156-L159, L163-L168, 2L77, 2L87, 2L93, 3L63, 7L37; DTD 5010A, DTD 5030A, DTD 5040A; <u>Others:</u> (CZ) CSN 42 4207								
Comments: Hoogovens version of AA 2014.								
2170	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA2017, UNS A92017; <u>European (ISO):</u> AlCu4MgSi; <u>Austria:</u> AlCuMg1; <u>Canada:</u> CM41; <u>France:</u> A-U4G; 2017A; <u>Germany:</u> AlCuMg1; LW. 3.1324; <u>Italy:</u> P-AlCu4MgMn; 3579; FA60-2017A; <u>Switzerland:</u> Al3.5Cu0.5Mg; <u>UK:</u> H14; L87, 5L37; DTD150A; <u>Others:</u> (CZ) CSN 42 4201								
Comments: Hoogovens version of AA 2017.								
2195	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 3.7-4.3, Mg 0.25-0.8, Mn 0.25, Zn 0.25, Ti 0.1, Li 0.8-1.2, Zr 0.08-0.16, Ag 0.25-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
2197	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.1, Cu 2.5-3.1, Mg 0.25, Mn 0.1-0.5, Zn 0.05, Ti 0.12, Li 1.3-1.7, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2640								
2214	AA (USA)	Wrought						
Official composition: Si 0.5-1.2, Fe 0.3, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, By agreement Zr+Ti limit may be 0.2 for extrusion & forging, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2800								
Identified Product forms: Plate, Tube, Extrusion, Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA2214; <u>European (CEN):</u> EN573 AW-2214 (<u>ISO:</u> AlCu4SiMg; <u>France:</u> AIR 9048-610, -620; 2214; <u>Germany:</u> AlCuSiMn; <u>Others:</u> European aerospace P-2214; <u>Proprietary:</u> Alcan B26S, 66, Dural SF; HDA 66								
Comments: Aerospace: general engineering, forging stock. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T451 [Hot rolled plate, 50mm]	290	-	420	10	-	-	Transverse properties (Typ.)	(BAI Plate)
T651 [Hot rolled plate, 50mm]	430	-	480	7	-	-	Transverse properties (Typ.)	(BAI Plate)
2214	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.5-1.2, Fe 0.3, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2800								
Similar/Equivalent alloys: <u>USA:</u> AA2214; <u>European (CEN):</u> EN573 AW-2214 (<u>ISO:</u> AlCu4SiMg; <u>France:</u> AIR 9048-610, -620; 2214; <u>Germany:</u> AlCuSiMn; <u>Others:</u> European aerospace P-2214; <u>Proprietary:</u> Alcan B26S, 66, Dural SF; HDA 66								
Comments: For comments see: AA series.								
2218	AA (USA)	Wrought						
Official composition: Si 0.9, Fe 1, Cu 3.5-4.5, Mg 1.2-1.8, Mn 0.2, Zn 0.25, Ni 1.7-2.3, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810								
Identified Product forms: Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA2218; <u>France:</u> A-U4N; <u>Spain:</u> L-315; <u>Switzerland:</u> AlCuNi, 10853; <u>UK:</u> BS 6L25								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T72 [-]	-	255	331	11	74	HB 95	Typical	(#1)

Aluminium Alloys (wrought) 165

2219	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Cu 5.8-6.8, Mg 0.02, Mn 0.2-0.4, Zn 0.1, Ti 0.02-0.1, V 0.05-0.15, Zr 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <u>USA:</u> AA2219, UNS A92219, AMS 4144, 4162, QQ -A-250/30; <u>European (CEN):</u> EN573 AW-2219 (<u>ISO:</u> AlCu6Mn; <u>France:</u> A-U6MT; <u>UK:</u> DTD 5004A; <u>Proprietary:</u> Otto Fuchs AK60								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	76	172	18	73		Typical	(#1)
T31, T351 [-]	-	248	359	17	73		Typical	(#1)
T37 [-]	-	317	393	11	73		Typical	(#1)
T42 [-]	-	186	359	20	73		Typical	(#1)
T62 [-]	-	290	414	10	73		Typical	(#1)
T81, T851 [-]	-	352	455	10	73		Typical	(#1)
T851 [Hot rolled plate, 50mm]	340	-	450	8	-		Transverse properties (Typ.)	(BAI Plate)
T87 [-]	-	393	476	10	73		Typical	(#1)
T87 [Hot rolled plate, 50mm]	380	-	470	7	-		Transverse properties (Typ.)	(BAI Plate)
2219	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.2, Fe 0.3, Cu 5.8-6.8, Mg 0.02, Mn 0.2-0.4, Zn 0.1, Ti 0.02-0.1, V 0.05-0.15, Zr 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
Similar/Equivalent alloys: <u>USA:</u> AA2219, UNS A92219, AMS 4144, 4162, QQ -A-250/30; <u>European (CEN):</u> EN573 AW-2219 (<u>ISO:</u> AlCu6Mn; <u>France:</u> A-U6MT; <u>UK:</u> DTD 5004A; <u>Proprietary:</u> Otto Fuchs AK60								
2224	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 3.8-4.4, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
2225	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
2240	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <u>USA:</u> AA2024, UNS A92024, AMS 4037; <u>European (CEN):</u> EN573 AW-2024; AW-AlCu4Mg1 (<u>ISO:</u> AlCu4Mg1.5 (<u>AECMA:</u> AL-P13; <u>Austria:</u> AlCuMg2; <u>Canada:</u> CG42; <u>France:</u> A-U4G1; 2024; AIR 9048-630; <u>Germany:</u> AlCuMg2; Wk.3.1355; LW3.1354; <u>Italy:</u> P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; <u>Japan:</u> A2024P; <u>Russia (CIS):</u> 1160; <u>Spain:</u> L-3140; <u>Switzerland:</u> AlCu4Mg1.5; <u>UK:</u> 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; <u>Others:</u> USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024 Comments: Hoogovens version of AA 2024.								
2319	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Cu 5.8-6.8, Mg 0.02, Mn 0.2-0.4, Zn 0.1, Ti 0.1-0.2, V 0.05-0.15, Zr 0.1-0.25, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
2324	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.12, Cu 3.8-4.4, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
2419	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.18, Cu 5.8-6.8, Mg 0.02, Mn 0.2-0.4, Zn 0.1, Ti 0.02-0.1, V 0.05-0.15, Zr 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T851 [Hot rolled plate, 50mm]	340	-	450	9	-		Transverse properties (Typ.)	(BAI Plate)
T87 [Hot rolled plate, 50mm]	380	-	470	8	-		Transverse properties (Typ.)	(BAI Plate)
2424	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.12, Cu 3.8-4.4, Mg 1.2-1.6, Mn 0.3-0.6, Zn 0.2, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
2519	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.3, Cu 5.3-6.4, Mg 0.05-0.4, Mn 0.1-0.5, Zn 0.1, Ti 0.02-0.1, V 0.05-0.15, Zr 0.1-0.25, (Si+Fe 0.4), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2820 Similar/Equivalent alloys: <u>USA:</u> AA2519, MIL -A-46192								
2524	AA (USA)	Wrought						
Official composition: Si 0.06, Fe 0.12, Cu 4-4.5, Mg 1.2-1.6, Mn 0.45-0.7, Zn 0.15, Ti 0.1, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)								
2618	AA (USA)	Wrought						
Official composition: Si 0.1-0.25, Fe 0.9-1.3, Cu 1.9-2.7, Mg 1.3-1.8, Zn 0.1, Ni 0.9-1.2, Ti 0.04-0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2760								
Identified Product forms: Plate, Forging stock/Billet, Bar								
Similar/Equivalent alloys: <u>USA:</u> AA2618, UNS A92618, MIL -A-22771, QQ -A-367; <u>European (ISO):</u> AlCu2Mg1.5Fe1Ni1; <u>France:</u> A-U2GN; <u>Germany:</u> AlCu2Mg2Ni; LW3.1924; <u>Japan:</u> A4X1; <u>Russia (CIS):</u> 1141; <u>UK:</u> H16; DTD717A, 724, 731A, 731B; 745A, 5084A, 5014A; <u>Others:</u> (CZ) CSN 42 4218; <u>Proprietary:</u> Otto Fuchs AN40 Comments: Aircraft and automotive engine components. Pistons, compressor blades. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T61 [-]	-	372	441	10	74	HB 115	Typical	(#1)

166 Aluminium Alloys (wrought)

2618A	AA (USA)						Wrought
Official composition: Si 0.15-0.25, Fe 0.9-1.4, Cu 1.8-2.7, Mg 1.2-1.8, Mn 0.25, Zn 0.15, Ni 0.8-1.4, Ti 0.2, Zr+Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.							
Similar/Equivalent alloys: <i>USA:</i> AA2618A; <i>European (CEN):</i> EN573 AW-2618A; <i>France:</i> A-U2GN; AIR 9048-640; 2618A; <i>Germany:</i> LW3.1924; <i>Italy:</i> 9002/6; 3578; 7250; <i>Spain:</i> L-3171; <i>UK:</i> 2618A; H16; DTD717A, 731B, 745A, 5084A, 5014A; <i>Others:</i> European aerospace P-2618A; <i>Proprietary:</i> Hid RR58; Otto Fuchs AN40							
Comments: Aircraft and automotive engine components. Pistons, compressor blades. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion)							
Machinability: Good							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)
T851 [Hot rolled plate, 50mm]	410	-	460	7	-	-	Transverse properties (Typ.) (BAI Plate)
2618A	CEN 573 (Europe)						Wrought
Nominal composition: Si 0.15-0.25, Fe 0.9-1.4, Cu 1.8-2.7, Mg 1.2-1.8, Mn 0.25, Zn 0.15, Ni 0.8-1.4, Ti 0.2, Zr+Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.							
Similar/Equivalent alloys: <i>USA:</i> AA2618A; <i>European (CEN):</i> EN573 AW-2618A; <i>France:</i> A-U2GN; AIR 9048-640; 2618A; <i>Germany:</i> LW3.1924; <i>Italy:</i> 9002/6; 3578; 7250; <i>Spain:</i> L-3171; <i>UK:</i> 2618A; H16; DTD717A, 731B, 745A, 5084A, 5014A; <i>Others:</i> European aerospace P-2618A; <i>Proprietary:</i> Hid RR58; Otto Fuchs AN40							
3000	Hoogovens (Netherlands)						Wrought
No composition: -							
Similar/Equivalent alloys: <i>USA:</i> AA3103, UNS A93103; <i>European (CEN):</i> EN573 AW-3103 (<i>ISO:</i> AIMn1; <i>Canada:</i> M1; <i>France:</i> A-M1; <i>Germany:</i> AIMn; AIMn1; Wk.3.0515; <i>Italy:</i> 9003/3; 3568; FA60-3103; P-AIMn1.2; <i>Russia (CIS):</i> 1400; <i>Spain:</i> L-3811; <i>Sweden:</i> 4054; <i>Switzerland:</i> AIMn; 10848; <i>UK:</i> 3103; BS N3, (NS 3); <i>Others:</i> (CZ) CSN 42 4432							
Comments: Hoogovens version of AA 3103.							
3000 Clad	Hoogovens (Netherlands)						Wrought
No composition: (Clad)							
Comments: Hoogovens clad version of AA 3103. Pressure vessels, road transport.							
3002	AA (USA)						Wrought
Official composition: Si 0.08, Fe 0.1, Cu 0.15, Mg 0.05-0.2, Mn 0.05-0.25, Zn 0.05, Ti 0.03, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700							
3003	AA (USA)						Wrought
Official composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730							
Identified Product forms: Plate, Sheet/strip, Foil, Fin stock, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock							
Similar/Equivalent alloys: <i>USA:</i> AA3003, UNS A93003, SAE 29; <i>European (CEN):</i> EN573 AW-3003 (<i>ISO:</i> AIMn1Cu; <i>Canada:</i> MC10; <i>France:</i> A-M1; 3003; AIMn1Cu; <i>Germany:</i> AIMnCu; AIMn1Cu; AIMn; Wk.3.0515; DIN 3.0517; <i>Italy:</i> 7788; 9003/1; <i>Japan:</i> A3003; <i>Switzerland:</i> AIMn; <i>UK:</i> NS3; 3103; <i>Others:</i> (CZ) CSN 42 4432; <i>Proprietary:</i> Alcan D3S, 11; Otto Fuchs AG18; LM Star 3103; Hoogovens 3530; Reynolds Tread-Brite; VAW 41/20							
Comments: Hollow ware, building, cladding, general sheet metal work, vehicle body-work (caravan, trailer), general engineering. Improved pitting resistance. Pressure vessels, construction, road transport, food industry. Vehicle tubing, heat exchangers. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion)							
Machinability: Good							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)
O [-]	-	41	110	40	69	HB 28	Typical (#1)
Soft [Foil (>90 microns)]	-	-	130	20	-	-	UTS max., El min values. (LM Star 3103)
Soft [Foil (41-90 microns)]	-	-	130	15	-	-	UTS max., El min values. (LM Star 3103)
H12 [-]	-	124	131	20	69	HB 35	Typical (#1)
H14 [-]	-	145	152	16	69	HB 40	Typical (#1)
H14 [-]	110	-	130	-	-	35HB	Typical (P. Balloffet)
H14 [Plate (3.2<e<8mm)]	120	-	140	5	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H14 [Plate (8<e<12mm)]	120	-	140	4	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H14 [Sheet (0.35<e<3.2mm)]	120	-	140	5	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H16 [-]	-	172	179	14	69	HB 47	Typical (#1)
H16 [Sheet (0.35<e<3.2mm)]	150	-	170	3	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H18 [-]	-	186	200	10	69	HB 55	Typical (#1)
H18 [Foil (>41 microns)]	-	-	230	2	-	-	UTS max., El min values. (LM Star 3103)
H19 [Foil (>41 microns)]	-	-	320	2	-	-	UTS max., El min values. (LM Star 3103)
H22 [-]	80	-	140	7	-	-	El. min. (Aalco (Glynwed))
H22 [Foil (>90 microns)]	-	-	145	16	-	-	UTS max., El min values. (LM Star 3103)
H22 [Foil (41-90 microns)]	-	-	145	14	-	-	UTS max., El min values. (LM Star 3103)
H24 [Foil (>90 microns)]	-	-	170	12	-	-	UTS max., El min values. (LM Star 3103)
H24 [Foil (41-90 microns)]	-	-	170	10	-	-	UTS max., El min values. (LM Star 3103)
H24 [Plate (3.2<e<8mm)]	115	-	140	8	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H24 [Plate (8<e<12mm)]	110	-	140	8	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H24 [Sheet (0.35<e<3.2mm)]	115	-	140	8	-	-	NF A 50-451/NF A 50-411 Min. values. (Pechiney)
H26 [Foil (>90 microns)]	-	-	180	10	-	-	UTS max., El min values. (LM Star 3103)
H26 [Foil (41-90 microns)]	-	-	180	8	-	-	UTS max., El min values. (LM Star 3103)
H4 [-]	145	-	150	-	-	-	Typical (Raufoss)
H44 (H247) [Not stated]	110	-	140	4	-	-	EN1396 Min. values (Pechiney-Rhenalu)
H45 (H257) [Not stated]	130	-	155	3	-	-	EN1396 Min. values (Pechiney-Rhenalu)

Aluminium Alloys (wrought) 167

3003 CEN 573 (Europe) Wrought

Nominal composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: USA: AA3003, UNS A93003, SAE 29; European (CEN): EN573 AW-3003 (ISO: AlMn1Cu; Canada: MC10; France: A-M1; 3003; AlMn1Cu; Germany: AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; Italy: 7788; 9003/1; Japan: A3003; Switzerland: AlMn; UK: NS3; 3103; Others: (CZ) CSN 42 4432; Proprietary: Alcan D3S, 11; Otto Fuchs AG18; LM Star 3103; Hoogovens 3530; VAW 41/20

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <50mm)]	35	-	95	-	-	28HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	95	-	-	-	EN485 Min. values	(Pechiney)
H112 [Plate (>12.5 <80mm)]	40	-	100	18	-	29HB	EN485 Min. values	(Pechiney)
H112 [Plate (>6 <12.5mm)]	70	-	115	10	-	35HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	90	-	120	-	-	38HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	125	-	145	-	-	46HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <4mm)]	150	-	170	-	-	54HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	170	-	190	-	-	60HB	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <3mm)]	180	-	210	-	-	65HB	EN485 Min. values	(Pechiney)
H22 [Sheet/Plate 0.2-12.5mm]	80	-	120	-	-	37HB	EN485 Min. values	(Pechiney)
H24 [Sheet/Plate (>0.2 <6mm)]	115	-	145	-	-	45HB	EN485 Min. values	(Pechiney)
H26 [Sheet (>0.2 <4mm)]	140	-	170	-	-	53HB	EN485 Min. values	(Pechiney)
H28 [Sheet (>0.2 <3mm)]	160	-	190	-	-	59HB	EN485 Min. values	(Pechiney)

3003 NF EN573-3 (France) Wrought

Nominal composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.1, Others: Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Plate, Sheet/strip, Foil, Fin stock, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: USA: AA3003, UNS A93003, SAE 29; European (CEN): EN573 AW-3003 (ISO: AlMn1Cu; Canada: MC10; France: A-M1; 3003; AlMn1Cu; Germany: AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; Italy: 7788; 9003/1; Japan: A3003; Switzerland: AlMn; UK: NS3; 3103; Others: (CZ) CSN 42 4432; Proprietary: Alcan D3S, 11; Otto Fuchs AG18; LM Star 3103; Hoogovens 3530

Comments: Hollow ware, building, cladding, general sheet metal work, vehicle body-work (caravan, trailer), general engineering. Improved pitting resistance. Pressure vessels, construction, road transport, food industry.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H45 (H257) [Sheet (0.6mm)]	130	-	155	3	-	-	EN 1396 Min. values	(Pechiney-Rhenalu)

3003 Alclad AA (USA) Wrought

Nominal composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: USA: AA3003 Alclad; Germany: AlMnCu Clad; Proprietary: Hoogovens 3530 Clad

Comments: Composition given for 3003 base material. Pressure vessels, road transport.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	-	-	69	-	-	(Hoogovens)

3004 AA (USA) Wrought

Nominal composition: Si 0.3, Fe 0.7, Cu 0.25, Mg 0.8-1.3, Mn 1-1.5, Zn 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Plate, Sheet/strip, Tube

Similar/Equivalent alloys: USA: AA3004, UNS A93004; European (CEN): EN573 AW-3004; AW-AlMn1Mg (ISO: AlMn1Mg1; France: A-M1G; 3004; Germany: AlMn1Mg1; Wk. 3.0526; Italy: 6361; 9003/2; FA60-3004; Japan: A3004; Proprietary: Alcan D4S; Hoogovens 3540, 3541; VAW 61/03

Comments: Similar to 3103 with improved pitting resistance. Hollow ware, building, higher strength than 3103 and 3003. General engineering. Pressure vessels, construction, road transport, food industry.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	69	179	25	69	HB 45	Typical	(#1)
H32 [-]	-	172	214	17	69	HB 52	Typical	(#1)
H34 [-]	-	200	241	12	69	HB 63	Typical	(#1)
H36 [-]	-	228	262	9	69	HB 70	Typical	(#1)
H38 [-]	-	248	283	6	69	HB 77	Typical	(#1)
H46 (H267) [Not stated]	200	-	230	3	-	-	EN1396 Min. values	(Pechiney-Rhenalu)
H48 (H287) [Not stated]	220	-	260	3	-	-	EN1396 Min. values	(Pechiney-Rhenalu)

3004 CEN 573 (Europe) Wrought

Nominal composition: Si 0.3, Fe 0.7, Cu 0.25, Mg 0.8-1.3, Mn 1-1.5, Zn 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Plate, Sheet/strip, Foil

Similar/Equivalent alloys: USA: AA3004, UNS A93004; European (CEN): EN573 AW-3004; AW-AlMn1Mg (ISO: AlMn1Mg1; France: A-M1G; 3004; Germany: AlMn1Mg1; Wk. 3.0526; Italy: 6361; 9003/2; FA60-3004; Japan: A3004; Proprietary: Alcan D4S; Hoogovens 3540, 3541; VAW 61/03

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <50mm)]	60	-	155	-	-	45HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	155	-	-	-	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <6mm)]	155	-	190	-	-	59HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <6mm)]	180	-	220	-	-	67HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <4mm)]	200	-	240	-	-	73HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	230	-	260	-	-	80HB	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <1.5mm)]	240	-	270	-	-	83HB	EN485 Min. values	(Pechiney)
H19 (F29) [Foil (0.25-0.41mm)]	270	-	290	2	-	-	Min. (EN541); uncoated	(VAW France)
H22 / H32 [Sheet/Plate (>0.2 <6mm)]	145	-	190	-	-	58HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet (>0.2 <3mm)]	170	-	220	-	-	66HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet (>0.2 <3mm)]	190	-	240	3	-	72HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <1.5mm)]	220	-	260	-	-	79HB	EN485 Min. values	(Pechiney)

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3004 Alclad	AA (USA)	Wrought						
Nominal composition: Si 0.3, Fe 0.7, Cu 0.25, Mg 0.8-1.3, Mn 1-1.5, Zn 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Plate, Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3004 Alclad; <i>Germany:</i> AlMn1Mg1 Clad; <i>Proprietary:</i> Hoogovens 3540 Clad Comments: Composition given for 3004 base material. Construction, road transport, shipbuilding.								
3004A	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.25, Mg 0.8-1.5, Mn 0.8-1.5, Zn 0.25, Ti 0.05, Cr 0.1, Pb 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
3005	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.6, Mn 1-1.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3005, UNS A93005; <i>European (CEN):</i> EN573 AW-3005 (<i>ISO:</i> AlMn1Mg0.5; <i>France:</i> A-MG0.5; 3005; <i>Germany:</i> AlMn1Mg0.5; <i>Italy:</i> 9003/4; <i>Japan:</i> A3005; <i>Proprietary:</i> VAW 61/15 Comments: Similar to 3103 with improved pitting resistance. Hollow ware, building, higher strength than 3103 and 3003. General engineering. Shutters & gutters.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H43 (H237) [Not stated]	125	-	155	4	-		Typical (not in EN1396)	(Pechiney-Rhenalu)
H44 (H247) [Not stated]	135	-	165	3	-		EN1396 Min. values	(Pechiney-Rhenalu)
H46 (H267) [Not stated]	160	-	185	2	-		EN1396 Min. values	(Pechiney-Rhenalu)
3005	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.6, Mn 1-1.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730 Identified Product forms: Plate, Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3005, UNS A93005; <i>European (CEN):</i> EN573 AW-3005 (<i>ISO:</i> AlMn1Mg0.5; <i>France:</i> A-MG0.5; 3005; <i>Germany:</i> AlMn1Mg0.5; <i>Italy:</i> 9003/4; <i>Japan:</i> A3005; <i>Proprietary:</i> VAW 61/15 Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <6mm)]	45	-	115	-	-	33HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	115	-	-		EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <6mm)]	125	-	145	-	-	46HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <6mm)]	150	-	170	-	-	54HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <4mm)]	175	-	195	-	-	61HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	200	-	220	-	-	69HB	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <1.5mm)]	210	-	235	-	-	73HB	EN485 Min. values	(Pechiney)
H22 [Sheet/Plate (>0.2 <6mm)]	110	-	145	-	-	45HB	EN485 Min. values	(Pechiney)
H24 [Sheet (>0.2 <3mm)]	130	-	170	4	-	52HB	EN485 Min. values	(Pechiney)
H26 [Sheet (>0.2 <3mm)]	160	-	195	3	-	60HB	EN485 Min. values	(Pechiney)
H28 [Sheet (>0.2 <3mm)]	190	-	220	-	-	68HB	EN485 Min. values	(Pechiney)
3005 Alclad	AA (USA)	Wrought						
Nominal composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.6, Mn 1-1.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730 Identified Product forms: Plate, Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3005 Alclad; <i>France:</i> A-MG0.5 Plaque; 3005 Plaque; <i>Germany:</i> AlMn1Mg0.5 Clad; <i>Wk.</i> 3.0525; <i>Proprietary:</i> Hoogovens 3560 Clad Comments: Composition given for 3005 base material. Pressure vessels, road transport.								
3006	AA (USA)	Wrought						
Official composition: Si 0.5, Fe 0.7, Cu 0.1-0.3, Mg 0.3-0.6, Mn 0.5-0.8, Zn 0.15-0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
3007	AA (USA)	Wrought						
Official composition: Si 0.5, Fe 0.7, Cu 0.05-0.3, Mg 0.6, Mn 0.3-0.8, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
3008	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
3009	AA (USA)	Wrought						
Official composition: Si 1-1.8, Fe 0.7, Cu 0.1, Mg 0.1, Mn 1.2-1.8, Zn 0.05, Ni 0.05, Ti 0.1, Cr 0.05, Zr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730								
3010	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.2, Cu 0.03, Mn 0.2-0.9, Zn 0.05, Ti 0.05, Cr 0.05-0.4, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2720								
3010	Hoogovens (Netherlands)	Wrought						
Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 1.6-2.5, Mn 0.5-1.1, Zn 0.2, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>Germany:</i> AlMg2Mn0.8; <i>Wk.</i> 3.3527 Comments: Hoogovens version of DIN Wk. 3.3527. Pressure vessels, construction, road transport, rail transport, shipbuilding, aerospace, mechanical engineering, food industry.								
3011	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.05-0.2, Mn 0.8-1.2, Zn 0.1, Ti 0.1, Cr 0.1-0.4, Zr 0.1-0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730								
3012	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.1, Mg 0.1, Mn 0.5-1.1, Zn 0.1, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								

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3013	AA (USA)	Wrought
Official composition: Si 0.6, Fe 1, Cu 0.5, Mg 0.2-0.6, Mn 0.9-1.4, Zn 0.5-1, Others: Each 0.05 Total 0.15, Aluminium rem.		
3014	AA (USA)	Wrought
Official composition: Si 0.6, Fe 1, Cu 0.5, Mg 0.1, Mn 1-1.5, Zn 0.5-1, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
3015	AA (USA)	Wrought
Official composition: Si 0.6, Fe 0.8, Cu 0.3, Mg 0.2-0.7, Mn 0.5-0.9, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720		
3016	AA (USA)	Wrought
Official composition: Si 0.6, Fe 0.8, Cu 0.3, Mg 0.5-0.8, Mn 0.5-0.9, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710		
3017	AA (USA)	Wrought
Official composition: Si 0.25, Fe 0.25-0.45, Cu 0.25-0.4, Mg 0.1, Mn 0.8-1.2, Zn 0.1, Ti 0.05, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem.		
3018	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.15-0.25, Cu 0.1-0.3, Mg 0.8-1.4, Mn 1.1-1.4, Zn 0.25, Ti 0.1, Cr 0.1, Pb 0.01, Others: Each 0.05 Total 0.15, Aluminium rem.		
3102	AA (USA)	Wrought
Official composition: Si 0.4, Fe 0.07, Cu 0.1, Mn 0.05-0.4, Zn 0.3, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710		
3103	AA (USA)	Wrought
Official composition: Si 0.5, Fe 0.7, Cu 0.1, Mg 0.3, Mn 0.9-1.5, Zn 0.2, Cr 0.1, Zr+Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Plate, Sheet/strip, Tube, Wire		
Similar/Equivalent alloys: <i>USA:</i> AA3103, UNS A93103; <i>European (CEN):</i> EN573 AW-3103 (<i>ISO:</i> AlMn1; <i>Canada:</i> M1; <i>France:</i> A-M1; <i>Germany:</i> AlMn; AlMn1; Wk.3.0515; <i>Italy:</i> 9003/3; 3568; FA60-3103; P-AlMn1.2; <i>Russia (CIS):</i> 1400; <i>Spain:</i> L-3811; <i>Sweden:</i> 4054; <i>Switzerland:</i> AlMn; 10848; <i>UK:</i> 3103; BS N3, (NS 3); <i>Others:</i> (CZ) CSN 42 4432; <i>Proprietary:</i> Alcan 3S, Mangal; Otto Fuchs AG15; Hoogovens 3000		
Comments: Building sheet, general sheet metal work, packaging. Pressure vessels, construction, electronic parts, road transport, food industry. Vehicle heat exchangers.		
Condition [Form]	PS (MPa)	YS (MPa)
H8 [-]	185	195
Not stated [-]	-	69
		<i>(Source)</i> <i>(Raufoss)</i> <i>(Hoogovens)</i>
3103	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.5, Fe 0.7, Cu 0.1, Mg 0.3, Mn 0.9-1.5, Zn 0.2, Cr 0.1, Zr+Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Similar/Equivalent alloys: <i>USA:</i> AA3103, UNS A93103; <i>European (CEN):</i> EN573 AW-3103 (<i>ISO:</i> AlMn1; <i>Canada:</i> M1; <i>France:</i> A-M1; <i>Germany:</i> AlMn; AlMn1; Wk.3.0515; <i>Italy:</i> 9003/3; 3568; FA60-3103; P-AlMn1.2; <i>Russia (CIS):</i> 1400; <i>Spain:</i> L-3811; <i>Sweden:</i> 4054; <i>Switzerland:</i> AlMn; 10848; <i>UK:</i> 3103; BS N3, (NS 3); <i>Others:</i> (CZ) CSN 42 4432; <i>Proprietary:</i> Alcan 3S, Mangal; Otto Fuchs AG15; Hoogovens 3000		
Comments: For comments see: AA series.		
Condition [Form]	PS (MPa)	YS (MPa)
O / H111 [Sheet/Plate (>0.2 <50mm)]	35	90
F [Sheet/Plate (>2.5 <80mm)]	-	-
H112 [Plate (>12.5 <80mm)]	40	95
H112 [Plate (>6 <12.5mm)]	70	110
H12 [Sheet/Plate (>0.2 <40mm)]	85	115
H14 [Sheet/Plate (>0.2 <25mm)]	120	140
H16 [Sheet (>0.2 <4mm)]	145	160
H18 [Sheet (>0.2 <3mm)]	165	185
H19 [Sheet (>0.2 <3mm)]	175	200
H22 [Sheet/Plate (>0.2 <12.5mm)]	75	115
H24 [Sheet/Plate (>0.2 <12.5mm)]	110	140
H26 [Sheet (>0.2 <4mm)]	135	160
H28 [Sheet (>0.2 <3mm)]	155	185
		<i>(Source)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i> <i>(Pechiney)</i>
3103	Lawson Mardon (LM) Star (UK)	Wrought
No composition: -		
Identified Product forms: Foil		
Similar/Equivalent alloys: <i>USA:</i> AA3003, UNS A93003, SAE 29; <i>European (CEN):</i> EN573 AW-3003 (<i>ISO:</i> AlMn1Cu; <i>Canada:</i> MC10; <i>France:</i> A-M1; 3003; AlMn1Cu; <i>Germany:</i> AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; <i>Italy:</i> 7788; 9003/1; <i>Japan:</i> A3003; <i>Switzerland:</i> AlMn; <i>UK:</i> NS3; 3103; <i>Others:</i> (CZ) CSN 42 4432		
Comments: Packaging. Container & container lidding foil. LM Star version of AA 3003.		
3103A	AA (USA)	Wrought
Official composition: Si 0.5, Fe 0.7, Cu 0.1, Mg 0.3, Mn 0.7-1.4, Zn 0.2, Ti 0.1, Cr 0.1, Zr+Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
3104	AA (USA)	Wrought
Official composition: Si 0.6, Fe 0.8, Cu 0.05-0.25, Mg 0.8-1.3, Mn 0.8-1.4, Zn 0.25, Ti 0.1, Ga 0.05, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720		
Similar/Equivalent alloys: <i>USA:</i> AA3104; <i>European (CEN):</i> EN573 AW-3104		
3104	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.6, Fe 0.8, Cu 0.05-0.25, Mg 0.8-1.3, Mn 0.8-1.4, Zn 0.25, Ti 0.1, Ga 0.05, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720		
Similar/Equivalent alloys: <i>USA:</i> AA3104; <i>European (CEN):</i> EN573 AW-3104		

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3105	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.8, Mn 0.3-0.8, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3105, UNS A93105; <i>European (CEN):</i> EN573 AW-3105 (<i>ISO:</i> AlMn0.5Mg0.5, AlMnMg; <i>France:</i> A-MG05; <i>Germany:</i> AlMn0.5Mg0.5; <i>Wk.</i> 3.0505; <i>Italy:</i> 9003/5; 3103; <i>Japan:</i> A3105; <i>Spain:</i> L-3831; <i>UK:</i> 3105; BS N31, NS31; <i>Proprietary:</i> ALCAN E4S; VAW 61/10 Comments: Painted caravan sheet, building sheet, domestic appliances.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	55	117	24	69		Typical	(#1)
H12 [-]	-	131	152	7	69		Typical	(#1)
H14 [-]	-	152	172	5	69		Typical	(#1)
H16 [-]	-	172	193	4	69		Typical	(#1)
H18 [-]	-	193	214	3	69		Typical	(#1)
H25 [-]	-	159	179	8	69		Typical	(#1)
3105	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.8, Mn 0.3-0.8, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA3105, UNS A93105; <i>European (CEN):</i> EN573 AW-3105 (<i>ISO:</i> AlMn0.5Mg0.5, AlMnMg; <i>France:</i> A-MG05; <i>Germany:</i> AlMn0.5Mg0.5; <i>Wk.</i> 3.0505; <i>Italy:</i> 9003/5; 3103; <i>Japan:</i> A3105; <i>Spain:</i> L-3831; <i>UK:</i> 3105; BS N31, NS31; <i>Proprietary:</i> ALCAN E4S; VAW 61/10 Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet (>0.2 <3.0mm)]	40	-	100	-	-	29HB	EN 485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	100	-	-		EN 485 Min. values	(Pechiney)
H12 [Sheet (>0.2 <3.0mm)]	105	-	130	-	-	41HB	EN 485 Min. values	(Pechiney)
H14 [Sheet (>0.2 <3.0mm)]	130	-	150	-	-	48HB	EN 485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <3.0mm)]	160	-	175	-	-	56HB	EN 485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3.0mm)]	180	-	195	-	-	62HB	EN 485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <1.5mm)]	190	-	215	1	-	67HB	EN 485 Min. values	(Pechiney)
H22 [Sheet (>0.2 <3.0mm)]	105	-	130	-	-	41HB	EN 485 Min. values	(Pechiney)
H24 [Sheet (>0.2 <3.0mm)]	120	-	150	-	-	47HB	EN 485 Min. values	(Pechiney)
H26 [Sheet (>0.2 <3.0mm)]	150	-	175	3	-	55HB	EN 485 Min. values	(Pechiney)
H28 [Sheet (>0.2 <1.5mm)]	170	-	195	2	-	61HB	EN 485 Min. values	(Pechiney)
3105A	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.3, Mg 0.2-0.8, Mn 0.3-0.8, Zn 0.25, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
3107	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.05-0.15, Mn 0.4-0.9, Zn 0.2, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
3203	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.05, Mn 1-1.5, Zn 0.1, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.								
3204	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.7, Cu 0.1-0.25, Mg 0.8-1.5, Mn 0.8-1.5, Zn 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
3205	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
3207	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.45, Cu 0.1, Mg 0.1, Mn 0.4-0.8, Zn 0.1, Others: Each 0.05 Total 0.1, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA3207; <i>European (CEN):</i> 3207								
3207A	AA (USA)	Wrought						
Official composition: Si 0.35, Fe 0.6, Cu 0.25, Mg 0.4, Mn 0.3-0.8, Zn 0.25, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
3303	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.05-0.2, Mn 1-1.5, Zn 0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730								
3307	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.8, Cu 0.3, Mg 0.3, Mn 0.5-0.9, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
3530	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3003, UNS A93003, SAE 29; <i>European (CEN):</i> EN573 AW-3003 (<i>ISO:</i> AlMn1Cu; <i>Canada:</i> MC10; <i>France:</i> A-M1; 3003; AlMn1Cu; <i>Germany:</i> AlMnCu; AlMn1Cu; AlMn; <i>Wk.</i> 3.0515; <i>DIN</i> 3.0517; <i>Italy:</i> 7788; 9003/1; <i>Japan:</i> A3003; <i>Switzerland:</i> AlMn; <i>UK:</i> NS3; 3103; <i>Others:</i> (CZ) CSN 42 4432 Comments: Hoogovens version of AA 3003.								
3530 Clad	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3003 Alclad; <i>Germany:</i> AlMnCu Clad Comments: Hoogovens version of AA 3003 Alclad.								

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3540	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3004, UNS A93004; <i>European (CEN):</i> EN573 AW-3004; AW-AlMn1Mg (<i>ISO:</i> AlMn1Mg1; <i>France:</i> A-M1G; 3004; <i>Germany:</i> AlMn1Mg1; Wk. 3.0526; <i>Italy:</i> 6361; 9003/2; FA60-3004; <i>Japan:</i> A3004 Comments: Hoogovens version of AA 3004.</p>		
3540 Clad	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3004 Alclad; <i>Germany:</i> AlMn1Mg1 Clad Comments: Hoogovens version of AA 3004 Alclad.</p>		
3541	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3004, UNS A93004; <i>European (CEN):</i> EN573 AW-3004; AW-AlMn1Mg (<i>ISO:</i> AlMn1Mg1; <i>France:</i> A-M1G; 3004; <i>Germany:</i> AlMn1Mg1; Wk. 3.0526; <i>Italy:</i> 6361; 9003/2; FA60-3004; <i>Japan:</i> A3004 Comments: Hoogovens version of AA 3004 - strip for canning. Food industry.</p>		
3560 Clad	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA3005 Alclad; <i>France:</i> A-MG0.5 Plaque; 3005 Plaque; <i>Germany:</i> AlMn1Mg0.5 Clad; Wk. 3.0525 Comments: Hoogovens version of AA 3005 Alclad.</p>		
4001	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
4002	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
4004	AA (USA)	Wrought
<p>Official composition: Si 9-10.5, Fe 0.8, Cu 0.25, Mg 1-2, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2650 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA4004; <i>European (CEN):</i> EN573 AW-4004 Comments: Brazing sheet, cladding alloy.</p>		
4004	CEN 573 (Europe)	Wrought
<p>Nominal composition: Si 9-10.5, Fe 0.8, Cu 0.25, Mg 1-2, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2650 Similar/Equivalent alloys: <i>USA:</i> AA4004; <i>European (CEN):</i> EN573 AW-4004 Comments: Brazing sheet, cladding alloy.</p>		
4006	AA (USA)	Wrought
<p>Official composition: Si 0.8-1.2, Fe 0.5-0.8, Cu 0.1, Mg 0.01, Mn 0.05, Zn 0.05, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA4006; <i>European (CEN):</i> EN573 AW-4006</p>		
4006	CEN 573 (Europe)	Wrought
<p>Nominal composition: Si 0.8-1.2, Fe 0.5-0.8, Cu 0.1, Mg 0.01, Mn 0.05, Zn 0.05, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA4006; <i>European (CEN):</i> EN573 AW-4006</p>		
4007	AA (USA)	Wrought
<p>Official composition: Si 1-1.7, Fe 0.4-1, Cu 0.2, Mg 0.2, Mn 0.8-1.5, Zn 0.1, Ni 0.15-0.7, Ti 0.1, Cr 0.05-0.25, Co 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA4007; <i>European (CEN):</i> EN573 AW-4007</p>		
4007	CEN 573 (Europe)	Wrought
<p>Nominal composition: Si 1-1.7, Fe 0.4-1, Cu 0.2, Mg 0.2, Mn 0.8-1.5, Zn 0.1, Ni 0.15-0.7, Ti 0.1, Cr 0.05-0.25, Co 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA4007; <i>European (CEN):</i> EN573 AW-4007</p>		
4008	AA (USA)	Wrought
<p>Official composition: Si 6.5-7.5, Fe 0.09, Cu 0.05, Mg 0.3-0.45, Mn 0.05, Zn 0.05, Ti 0.04-0.15, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2670</p>		
4009	AA (USA)	Wrought
<p>Official composition: Si 4.5-5.5, Fe 0.2, Cu 1-1.5, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ti 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2700</p>		
4010	AA (USA)	Wrought
<p>Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.3-0.45, Mn 0.1, Zn 0.1, Ti 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2670</p>		
4011	AA (USA)	Wrought
<p>Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.45-0.7, Mn 0.1, Zn 0.1, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2670</p>		

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4012	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
4013	AA (USA)	Wrought
Official composition: Si 3.5-4.5, Fe 0.35, Cu 0.05-0.2, Mg 0.05-0.2, Mn 0.03, Zn 0.05, Ti 0.02, Bi 0.6-1.5, Cd 0.05, Be 0.04-0.07, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710		
4014	AA (USA)	Wrought
Official composition: Si 1.4-2.2, Fe 0.7, Cu 0.2, Mg 0.3-0.8, Mn 0.35, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
4015	AA (USA)	Wrought
Official composition: Si 1.4-2.2, Fe 0.7, Cu 0.2, Mg 0.1-0.5, Mn 0.6-1.2, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
H12 [-]	110 - 155 5 -	El. min. (Aalco (Glynwed))
4016	AA (USA)	Wrought
Official composition: Si 1.4-2.2, Fe 0.7, Cu 0.2, Mg 0.1, Mn 0.6-1.2, Zn 0.5-1.3, Others: Each 0.05 Total 0.15, Aluminium rem.		
4017	AA (USA)	Wrought
Official composition: Si 0.6-1.6, Fe 0.7, Cu 0.1-0.5, Mg 0.1-0.5, Mn 0.6-1.2, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)		
4018	AA (USA)	Wrought
Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.05, Mg 0.5-0.8, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)		
4032	AA (USA)	Wrought
Official composition: Si 11-13.5, Fe 1, Cu 0.5-1.3, Mg 0.8-1.3, Zn 0.25, Ni 0.5-1.3, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680 Identified Product forms: Tube, Extrusion, Forging stock/Billet Similar/Equivalent alloys: USA: AA4032 (Old AA - AA 32S), UNS A94032; European (AECMA): AL-P22; Canada: SG121; France: A-S12UN; 4032; Italy: 3572; 9004/1; Spain: L-3541; UK: 4032; DTD324A, DTD324B; Proprietary: Alcan GB38S, 08; Otto Fuchs AS60 Comments: Bearing alloy for general engineering.		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
T6 [-]	- 317 379 9 79 HB 120 Typical	(#1)
4043	AA (USA)	Wrought
Official composition: Si 4.5-6, Fe 0.8, Cu 0.3, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690 Identified Product forms: Wire Similar/Equivalent alloys: USA: AA4043; European (ISO): AISi5; Australia: B4043; Canada: S5; France: A-S5; Germany: AISi5; Wk.3.2245; Japan: A4043; UK: 4043; N21 Comments: Welding wire - BS 2901: pt 4.		
4043A	AA (USA)	Wrought
Official composition: Si 4.5-6, Fe 0.6, Cu 0.3, Mg 0.2, Mn 0.15, Zn 0.1, Ti 0.15, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Wire Similar/Equivalent alloys: USA: AA4043A; European (CEN): EN573 AW-4043A (ISO): AISi5(A) Comments: Welding wire - BS 2901: pt 4.		
4043A	CEN 573 (Europe)	Wrought
Nominal composition: Si 4.5-6, Fe 0.6, Cu 0.3, Mg 0.2, Mn 0.15, Zn 0.1, Ti 0.15, (Be 0.008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: USA: AA4043A; European (CEN): EN573 AW-4043A (ISO): AISi5(A) Comments: Welding wire and cladding/brazing sheet.		
4044	AA (USA)	Wrought
Official composition: Si 7.8-9.2, Fe 0.8, Cu 0.25, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2670		
4045	AA (USA)	Wrought
Official composition: Si 9-11, Fe 0.8, Cu 0.3, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2670 Identified Product forms: Sheet/strip Similar/Equivalent alloys: USA: AA4045; European (CEN): EN573 AW-4045; Proprietary: Alcan B35S Comments: Brazing sheet, cladding alloy.		
4045	CEN 573 (Europe)	Wrought
Nominal composition: Si 9-11, Fe 0.8, Cu 0.3, Mg 0.05, Mn 0.05, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2670 Similar/Equivalent alloys: USA: AA4045; European (CEN): EN573 AW-4045; Proprietary: Alcan B35S Comments: For comments see: AA series.		
4046	AA (USA)	Wrought
Official composition: Si 9-11, Fe 0.5, Cu 0.03, Mg 0.2-0.5, Mn 0.4, Zn 0.1, Ti 0.15, Others: Each 0.05 Total 0.15, Aluminium rem.		

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4047	AA (USA)	Wrought
Official composition: Si 11-13, Fe 0.8, Cu 0.3, Mg 0.1, Mn 0.15, Zn 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.		
Density (kg.m ⁻³) 2660		
Similar/Equivalent alloys: <u>USA:</u> AA4047; <u>European (ISO):</u> AISi12; <u>Australia:</u> B4047; <u>Canada:</u> S12; <u>France:</u> A-S12; <u>Germany:</u> AISi12; <u>UK:</u> 4047; N2		
4047A	AA (USA)	Wrought
Official composition: Si 11-13, Fe 0.6, Cu 0.3, Mg 0.1, Mn 0.15, Zn 0.2, Ti 0.15, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Wire		
Similar/Equivalent alloys: <u>USA:</u> AA4047A; <u>European (CEN):</u> EN573 AW-4047A (<u>ISO:</u> AISi12(A)); <u>UK:</u> BS N21		
Comments: Welding wire - BS 2901 pt 4, brazing wire - BS 1845		
4047A	CEN 573 (Europe)	Wrought
Nominal composition: Si 11-13, Fe 0.6, Cu 0.3, Mg 0.1, Mn 0.15, Zn 0.2, Ti 0.15, Others: Each 0.05 Total 0.15, Aluminium rem.		
Similar/Equivalent alloys: <u>USA:</u> AA4047A; <u>European (CEN):</u> EN573 AW-4047A (<u>ISO:</u> AISi12(A)); <u>UK:</u> BS N21		
Comments: For comments see: AA series.		
4048	AA (USA)	Wrought
Official composition: Si 9.3-10.7, Fe 0.8, Cu 3.3-4.7, Mg 0.07, Mn 0.07, Zn 9.3-10.7, Cr 0.07, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2930		
Comments: Formerly inactive USA alloy AA4245, reactivated as 4048		
4101	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		
4104	AA (USA)	Wrought
Official composition: Si 9-10.5, Fe 0.8, Cu 0.25, Mg 1-2, Mn 0.1, Zn 0.2, Bi 0.02-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2650		
Similar/Equivalent alloys: <u>USA:</u> AA4104; <u>European (CEN):</u> EN573 AW-4104		
4104	CEN 573 (Europe)	Wrought
Nominal composition: Si 9-10.5, Fe 0.8, Cu 0.25, Mg 1-2, Mn 0.1, Zn 0.2, Bi 0.02-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2650		
Similar/Equivalent alloys: <u>USA:</u> AA4104; <u>European (CEN):</u> EN573 AW-4104		
4145	AA (USA)	Wrought
Official composition: Si 9.3-10.7, Fe 0.8, Cu 3.3-4.7, Mg 0.15, Mn 0.15, Zn 0.2, Cr 0.15, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740		
4145A	AA (USA)	Wrought
Official composition: Si 9-11, Fe 0.6, Cu 3-5, Mg 0.1, Mn 0.15, Zn 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.		
4147	AA (USA)	Wrought
Official composition: Si 11-13, Fe 0.8, Cu 0.25, Mg 0.1-0.5, Mn 0.1, Zn 0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660		
4245	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive. Now AA4048		
4343	AA (USA)	Wrought
Official composition: Si 6.8-8.2, Fe 0.8, Cu 0.25, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680		
Identified Product forms: Sheet/strip, Wire		
Similar/Equivalent alloys: <u>USA:</u> AA4343; <u>European (CEN):</u> EN573 AW-4343; <u>Proprietary:</u> Alcan TF41		
Comments: Brazing sheet, cladding alloy - wire BS 1845.		
4343	CEN 573 (Europe)	Wrought
Nominal composition: Si 6.8-8.2, Fe 0.8, Cu 0.25, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680		
Similar/Equivalent alloys: <u>USA:</u> AA4343; <u>European (CEN):</u> EN573 AW-4343; <u>Proprietary:</u> Alcan TF41		
Comments: For comments see: AA series.		
4543	AA (USA)	Wrought
Official composition: Si 5-7, Fe 0.5, Cu 0.1, Mg 0.1-0.4, Mn 0.05, Zn 0.1, Ti 0.1, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680		
Similar/Equivalent alloys: <u>USA:</u> AA4543; <u>European (ISO):</u> AISi5; <u>Canada:</u> S5; <u>Germany:</u> AISi5		
4643	AA (USA)	Wrought
Official composition: Si 3.6-4.6, Fe 0.8, Cu 0.1, Mg 0.1-0.3, Mn 0.05, Zn 0.1, Ti 0.15, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690		
5004	AA (USA)	Wrought
No composition: -		
Comments: Listed by AA as Inactive.		

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5005	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.7, Cu 0.2, Mg 0.5-1.1, Mn 0.2, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Plate, Sheet/strip, Tube, Rod, Wire, Rivet stock Similar/Equivalent alloys: <i>USA:</i> AA5005, UNS A95005; <i>European (CEN):</i> EN573 AW-5005 (<i>ISO:</i> AlMg1, AlMg1(B)); <i>Australia:</i> A5005; <i>France:</i> A-G0.6; 5005; <i>Germany:</i> AlMg1; Wk.3.3315; <i>Italy:</i> 9005/1; 5764-66, 4510; FA60-5005; P-AlMg0.8; P-AlMg0.9; <i>Japan:</i> A5005, A2X8; <i>Russia (CIS):</i> 1510; <i>Spain:</i> L-3350; <i>Sweden:</i> 4106; <i>Switzerland:</i> Al-1Mg, 10849; <i>UK:</i> 5005; BS N41; <i>Proprietary:</i> Alcan B57S; Hoogovens 5010 Comments: Architectural anodised cladding. Matt anodised panels. Colour anodising. Road transport.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	41	124	25	69	HB 28	Typical	(#1)
G15 [-]	110	-	145	8	-	-	Minimum	(Alcan Rolled Prod.)
H12 [-]	-	131	138	10	69	-	Typical	(#1)
H14 [-]	-	152	159	6	69	-	Typical	(#1)
H16 [-]	-	172	179	5	69	-	Typical	(#1)
H18 [-]	-	193	200	4	69	-	Typical	(#1)
H32 [-]	-	117	138	11	69	HB 36	Typical	(#1)
H34 [-]	-	138	159	8	69	HB 41	Typical	(#1)
H36 [-]	-	165	179	6	69	HB 46	Typical	(#1)
H38 [-]	-	186	200	5	69	HB 51	Typical	(#1)
5005	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.3, Fe 0.7, Cu 0.2, Mg 0.5-1.1, Mn 0.2, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA5005, UNS A95005; <i>European (CEN):</i> EN573 AW-5005 (<i>ISO:</i> AlMg1, AlMg1(B)); <i>Australia:</i> A5005; <i>France:</i> A-G0.6; 5005; <i>Germany:</i> AlMg1; Wk.3.3315; <i>Italy:</i> 9005/1; 5764-66, 4510; FA60-5005; P-AlMg0.8; P-AlMg0.9; <i>Japan:</i> A5005, A2X8; <i>Russia (CIS):</i> 1510; <i>Spain:</i> L-3350; <i>Sweden:</i> 4106; <i>Switzerland:</i> Al-1Mg, 10849; <i>UK:</i> 5005; BS N41; <i>Proprietary:</i> Alcan B57S; Hoogovens 5010 Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <50mm)]	35	-	100	-	-	29HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	100	-	-	-	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <12.5mm)]	95	-	125	-	-	39HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <12.5mm)]	120	-	145	-	-	48HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <4mm)]	145	-	165	-	-	52HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	165	-	185	-	-	58HB	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <3mm)]	185	-	205	-	-	64HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <12.5mm)]	80	-	125	-	-	38HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <12.5mm)]	110	-	145	-	-	47HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet (>0.2 <4mm)]	135	-	165	3	-	52HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	160	-	185	-	-	58HB	EN485 Min. values	(Pechiney)
5005A	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 0.7-1.1, Mn 0.15, Zn 0.2, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA5005A; <i>France:</i> A-G0.6; <i>Germany:</i> AlMg1; DIN 3.3315; <i>Italy:</i> 5764 P-AlMg0.2; <i>UK:</i> BS N41; <i>Others:</i> AlMg1; <i>Proprietary:</i> Otto Fuchs AM10 Comments: Sheet for general vehicle applications.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H8 [-]	170	-	195	-	-	-	Typical	(Raufoss)
5006	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.8, Cu 0.1, Mg 0.8-1.3, Mn 0.4-0.8, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
5007	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5008	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5009	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5010	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.25, Mg 0.2-0.6, Mn 0.1-0.3, Zn 0.3, Ti 0.1, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710 Similar/Equivalent alloys: <i>USA:</i> AA5010; <i>European (CEN):</i> EN573 AW-5010								
5010	Hoogovens (Netherlands)	Wrought						
No composition: - Similar/Equivalent alloys: <i>USA:</i> AA5005, UNS A95005; <i>European (CEN):</i> EN573 AW-5005 (<i>ISO:</i> AlMg1, AlMg1(B)); <i>France:</i> A-G0.6; 5005; <i>Germany:</i> AlMg1; Wk.3.3315; <i>Italy:</i> 9005/1; 5764-66, 4510; FA60-5005; P-AlMg0.8; P-AlMg0.9; <i>Japan:</i> A5005, A2X8; <i>Russia (CIS):</i> 1510; <i>Spain:</i> L-3350; <i>Sweden:</i> 4106; <i>Switzerland:</i> Al-1Mg, 10849; <i>UK:</i> 5005; BS N41 Comments: Hoogovens version of AA 5005.								

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5011	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
5013	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
5014	AA (USA)	Wrought
<p>Official composition: Si 0.4, Fe 0.4, Cu 0.2, Mg 4-5.5, Mn 0.2-0.9, Zn 0.7-1.5, Ti 0.2, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.</p>		
5016	AA (USA)	Wrought
<p>Official composition: Si 0.25, Fe 0.6, Cu 0.2, Mg 1.4-1.9, Mn 0.4-0.7, Zn 0.15, Ti 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2700</p>		
5017	AA (USA)	Wrought
<p>Official composition: Si 0.4, Fe 0.7, Cu 0.18-0.28, Mg 1.9-2.2, Mn 0.6-0.8, Ti 0.09, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2690</p>		
5018	AA (USA)	Wrought
<p>Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 2.6-3.6, Mn 0.2-0.6, Zn 0.2, Ti 0.15, Cr 0.3, Mn+Cr 0.2-0.6 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.</p>		
5019	AA (USA)	Wrought
<p>Official composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 4.5-5.6, Mn 0.1-0.6, Zn 0.2, Ti 0.2, Cr 0.2, Mn+Cr 0.1-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Plate, Sheet/strip, Tube, Extrusion Similar/Equivalent alloys: <i>USA:</i> AA5019 (Old AA - Renumbered, was 5056A); <i>European (CEN):</i> EN573 AW-5019 (<i>ISO:</i> AlMg5; <i>Australia:</i> A5056; <i>France:</i> A-G5M; <i>Germany:</i> AlMg5; Wk.3.3555; <i>Spain:</i> L-3320; <i>UK:</i> 5056A; N6; BS 3L58; <i>Proprietary:</i> Alcan 56S, 06 Comments: Renumbered, was AA 5056A. High strength applications.</p>		
5019	CEN 573 (Europe)	Wrought
<p>Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 4.5-5.6, Mn 0.1-0.6, Zn 0.2, Ti 0.2, Cr 0.2, Mn+Cr 0.1-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA5019 (Old AA - Renumbered, was 5056A); <i>European (CEN):</i> EN573 AW-5019 (<i>ISO:</i> AlMg5; <i>Australia:</i> A5056; <i>France:</i> A-G5M; <i>Germany:</i> AlMg5; Wk.3.3555; <i>Spain:</i> L-3320; <i>UK:</i> 5056A; N6; BS 3L58; <i>Proprietary:</i> Alcan 56S, 06 Comments: For comments see: AA series.</p>		
5020	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>Germany:</i> AlMg1.8; Wk. 3.3326 Comments: Hoogovens version of DIN Wk. 3.3326. Electronic parts, road transport, shipbuilding.</p>		
5021	AA (USA)	Wrought
<p>Official composition: Si 0.4, Fe 0.5, Cu 0.15, Mg 2.2-2.8, Mn 0.1-0.5, Zn 0.15, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem.</p>		
5022	AA (USA)	Wrought
<p>Official composition: Si 0.25, Fe 0.4, Cu 0.2-0.5, Mg 3.5-4.9, Mn 0.2, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)</p>		
5023	AA (USA)	Wrought
<p>Official composition: Si 0.25, Fe 0.4, Cu 0.2-0.5, Mg 5-6.2, Mn 0.2, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)</p>		
5030	Hoogovens (Netherlands)	Wrought
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> AA5754; <i>European (CEN):</i> EN573 AW-5754; AW-AlMg3 (<i>ISO:</i> AlMg3; <i>France:</i> A-G3, A-G3M; 5754; <i>Germany:</i> AlMg3; 3.3535; <i>Italy:</i> 3575; P-AlMg3.5; <i>Spain:</i> L-3390; <i>Sweden:</i> 14,4125; <i>Switzerland:</i> AlMg3; <i>UK:</i> BS N5; <i>Others:</i> (CZ) CSN 42 4413; AlMg3 Comments: Hoogovens version of AA 5754.</p>		
5034	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
5039	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
5040	AA (USA)	Wrought
<p>Official composition: Si 0.3, Fe 0.7, Cu 0.25, Mg 1-1.5, Mn 0.9-1.4, Zn 0.25, Cr 0.1-0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2720</p>		

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5042	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.35, Cu 0.15, Mg 3-4, Mn 0.2-0.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2670								
Identified Product forms: Foil								
Similar/Equivalent alloys: <u>USA:</u> AA5042; <u>European (CEN):</u> EN573 AW-5042; <u>AlMg3.5Mn:</u> <u>Proprietary:</u> VAW 63/37								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
H19 (F35) [Foil (0.20-0.33mm)]	320	-	350	4	-		Min. (EN541); uncoated	(VAW France)
H19 (F35) [Foil (0.34-0.50mm)]	310	-	340	4	-		Min. (EN541); uncoated	(VAW France)
H24 (G28) [Foil (0.25-0.50mm)]	230	-	280	6	-		Min. (EN541); uncoated	(VAW France)
H48 (G32) [Foil (0.25-0.50mm)]	280	-	330	5	-		Min. (EN541); uncoated/laquered	(VAW France)
5043	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.05-0.35, Mg 0.7-1.3, Mn 0.7-1.2, Zn 0.25, Ti 0.1, Cr 0.05, Ga 0.05, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
5049	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 1.6-2.5, Mn 0.5-1.1, Zn 0.2, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5049; <u>European (CEN):</u> EN573 AW-5049; <u>France:</u> 5049; <u>Germany:</u> DIN 3.3527; <u>AlMg2Mn0.8:</u> <u>Proprietary:</u> Otto Fuchs AM21								
5049	CEN 573 (Europe)	Wrought						
Nominal Composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 1.6-2.5, Mn 0.5-1.1, Zn 0.2, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product Forms: Plate, Sheet/strip.								
Similar/Equivalent alloys: <u>USA:</u> AA5049; <u>European (CEN):</u> EN573 AW-5049; <u>France:</u> 5049; <u>Germany:</u> DIN 3.3527; <u>AlMg2Mn0.8:</u> <u>Proprietary:</u> Otto Fuchs AM21.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <100mm)]	80	-	190	-	-	52HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <100mm)]	-	-	190	-	-		EN485 Min. values	(Pechiney)
H112 [Sheet/Plate (>6 <12.5mm)]	140	-	210	12	-	62HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	170	-	220	-	-	66HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	190	-	240	-	-	72HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <6mm)]	220	-	265	-	-	80HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	250	-	290	-	-	88HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	130	-	220	-	-	63HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	160	-	240	-	-	70HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <6mm)]	190	-	265	3	-	78HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	230	-	290	-	-	87HB	EN485 Min. values	(Pechiney)
5050	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.2, Mg 1.1-1.8, Mn 0.1, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Plate, Sheet/strip, Tube, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>USA:</u> AA5050, UNS A95050; <u>European (CEN):</u> EN573 AW-5050 (<u>ISO:</u> AlMg1.5, AlMg1.5(C)); <u>France:</u> A-G1; A-G1.5; <u>Italy:</u> 3573; P-AlMg1.5; <u>Switzerland:</u> Al1.5Mg; <u>UK:</u> 5050; BS 3L44								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	55	145	24	69	HB 36	Typical	(#1)
H32 [-]	-	145	172	9	69	HB 46	Typical	(#1)
H34 [-]	-	165	193	8	69	HB 53	Typical	(#1)
H36 [-]	-	179	207	7	69	HB 58	Typical	(#1)
H38 [-]	-	200	221	6	69	HB 63	Typical	(#1)
5050	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.4, Fe 0.7, Cu 0.2, Mg 1.1-1.8, Mn 0.1, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Similar/Equivalent alloys: <u>USA:</u> AA5050, UNS A95050; <u>European (CEN):</u> EN573 AW-5050 (<u>ISO:</u> AlMg1.5, AlMg1.5(C)); <u>France:</u> A-G1; A-G1.5; <u>Italy:</u> 3573; P-AlMg1.5; <u>Switzerland:</u> Al1.5Mg; <u>UK:</u> 5050; BS 3L44								
5050A	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.2, Mg 1.1-1.8, Mn 0.3, Zn 0.25, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
5050B	AA (USA)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA5050B; <u>Germany:</u> DIN 3.3316; <u>Proprietary:</u> Otto Fuchs AM15								
Comments: Listed by AA as Inactive.								
5051	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.25, Mg 1.7-2.2, Mn 0.2, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
5051A	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 1.4-2.1, Mn 0.25, Zn 0.2, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5051A; <u>European (CEN):</u> EN573 AW-5051A; <u>Germany:</u> AlMg1.8, DIN 3.3326; <u>Proprietary:</u> Otto Fuchs AM18								
5051A	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 1.4-2.1, Mn 0.25, Zn 0.2, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5051A; <u>European (CEN):</u> EN573 AW-5051A; <u>Germany:</u> AlMg1.8, DIN 3.3326; <u>Proprietary:</u> Otto Fuchs AM18								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (d<20mm)]	85	-	190	15	-		EN1301 / EN11715	(Pechiney)
H12 [Drawn wire (d<18mm)]	155	-	170	6	-		EN1301 / EN11715	(Pechiney)
H14 [Drawn wire (d<18mm)]	200	-	195	4	-		EN1301 / EN11715	(Pechiney)
H18 [Drawn wire (d<10mm)]	200	-	245	3	-		EN1301 / EN11715	(Pechiney)

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5052		AA (USA)					Wrought	
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.1, Cr 0.15-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680								
Identified Product forms: Plate, Sheet/strip, Foil, Tube, Rod, Bar, Wire, Rivet stock								
Similar/Equivalent alloys: <i>USA:</i> AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B, QQ -A-250/8; <i>European (CEN):</i> EN573 AW-5052; <i>AW-AlMg2.5 (ISO):</i> AlMg2.5 (<i>AECMA</i>): AL-P31; <i>Canada:</i> GR20; <i>France:</i> A-G2; A-G2.5C; 5052; <i>Germany:</i> AlMg2; AlMg2.5; DIN 3.3523; <i>Italy:</i> P-AlMg2.5; 3574; 9005/2; FA60-5052; <i>Japan:</i> A2X1; A5052P; <i>Sweden:</i> 14.4120; <i>Switzerland:</i> 10849; <i>UK:</i> 5052; BS N4; BS L80, L81, 2L55, 2L56; <i>Proprietary:</i> Alcan 57S, 06; Otto Fuchs AM25, AM36; Hoogovens 5520; VAW 63/52								
Comments: Good marine corrosion resistance, panelling and cladding, rivets, domestic appliances. Pressure vessels, construction, road transport, rail transport, shipbuilding, aerospace, mechanical engineering.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	90	193	30	70	47HB	Typical	(#1)
O [-]	70	-	195	22	70	49HB	Typical	(BAI Plate)
F [-]	125	-	225	16	70	60HB	Typical	(BAI Plate)
H32 [-]	-	193	228	18	70	HB 60	Typical	(#1)
H34 [-]	-	214	262	14	70	HB 68	Typical	(#1)
H36 [-]	-	241	276	10	70	73HB	Typical	(#1)
H38 [-]	-	255	290	8	70	77HB	Typical	(#1)

5052		CEN 573 (Europe)					Wrought	
Nominal composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.1, Cr 0.15-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680								
Identified Product forms: Plate, Sheet/strip, Foil, Wire								
Similar/Equivalent alloys: <i>USA:</i> AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B, QQ -A-250/8; <i>European (CEN):</i> EN573 AW-5052; <i>AW-AlMg2.5 (ISO):</i> AlMg2.5 (<i>AECMA</i>): AL-P31; <i>Canada:</i> GR20; <i>France:</i> A-G2; A-G2.5C; 5052; <i>Germany:</i> AlMg2; AlMg2.5; DIN 3.3523; <i>Italy:</i> P-AlMg2.5; 3574; 9005/2; FA60-5052; <i>Japan:</i> A2X1; A5052P; <i>Sweden:</i> 14.4120; <i>Switzerland:</i> 10849; <i>UK:</i> 5052; BS N4; BS L80, L81, 2L55, 2L56; <i>Proprietary:</i> Alcan 57S, 06; Otto Fuchs AM25, AM36; Hoogovens 5520; VAW 63/52								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (d<20mm)]	100	-	225	15	-	-	EN1301 / EN11715	(Pechiney)
O / H111 [Sheet/Plate (>0.2 <6mm)]	65	-	170	-	-	47HB	EN485 Min. values	(Pechiney)
O / H111 [Sheet/Plate (>6 <80mm)]	65	-	165	-	-	46HB	EN485 Min. values	(Pechiney)
O/H111 [Plate 12.5 - 60mm]	65	-	165	-	-	-	Minimum	(AMAG)
O/H111 [Plate 4 - 6mm]	65	-	170	18	-	-	Minimum	(AMAG)
O/H111 [Plate 6 - 12.5mm]	65	-	165	19	-	-	Minimum	(AMAG)
F [Sheet/Plate (>2.5 <80mm)]	-	-	170	-	-	-	EN485 Min. values	(Pechiney)
H111 [Treadplate 1.5 - 3mm]	65	-	170	10	-	-	Minimum	(AMAG)
H111 [Treadplate 3 - 6mm]	65	-	170	12	-	-	Minimum	(AMAG)
H111 [Treadplate 6 - 10mm]	65	-	165	14	-	-	Minimum	(AMAG)
H112 [Sheet/Plate (>6 <12.5mm)]	110	-	190	7	-	55HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	160	-	210	-	-	63HB	EN485 Min. values	(Pechiney)
H14 [Drawn wire (d<18mm)]	225	-	225	4	-	-	EN1301 / EN11715	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	180	-	230	-	-	69HB	EN485 Min. values	(Pechiney)
H14 [Treadplate 1.5 - 3mm]	150	-	230	3	-	-	Minimum	(AMAG)
H14 [Treadplate 3 - 6mm]	150	-	230	4	-	-	Minimum	(AMAG)
H14 [Treadplate 6 - 10mm]	150	-	230	6	-	-	Minimum	(AMAG)
H16 [Sheet/Plate (>0.2 <6mm)]	210	-	250	-	-	76HB	EN485 Min. values	(Pechiney)
H18 [Drawn wire (d<10mm)]	275	-	275	3	-	-	EN1301 / EN11715	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	240	-	270	-	-	83HB	EN485 Min. values	(Pechiney)
H19 (F32) [Foil (0.20-0.30mm)]	280	-	300	2	-	-	Min. (EN541); uncoated	(VAW France)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	130	-	210	-	-	61HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	150	-	230	-	-	67HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <6mm)]	180	-	250	-	-	74HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	210	-	270	-	-	81HB	EN485 Min. values	(Pechiney)
H32 [Drawn wire (d<18mm)]	146	-	190	11	-	-	EN1301 / EN11715	(Pechiney)
H32 [Treadplate 1.5 - 3mm]	130	-	210	6	-	-	Minimum	(AMAG)
H32 [Treadplate 3 - 6mm]	130	-	210	8	-	-	Minimum	(AMAG)
H32 [Treadplate 6 - 8mm]	130	-	210	9	-	-	Minimum	(AMAG)
H34 [Drawn wire (d<15mm)]	195	-	265	8	-	-	EN1301 / EN11715	(Pechiney)
H38 [Drawn wire (d<10mm)]	245	-	260	5	-	-	EN1301 / EN11715	(Pechiney)
H47 (G28) [Foil (0.20-0.30mm)]	240	-	270	6	-	-	Min. (EN541); laquered	(VAW France)
H48 (G29) [Foil (0.20-0.30mm)]	260	-	280	5	-	-	Min. (EN541); laquered	(VAW France)

5053		AA (USA)					Wrought	
No composition: -								
Comments: Listed by AA as Inactive.								

5056		AA (USA)					Wrought	
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 4.5-5.6, Mn 0.05-0.2, Zn 0.1, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2640								
Identified Product forms: Foil, Rod, Bar, Wire, Rivet stock								
Similar/Equivalent alloys: <i>USA:</i> AA5056, UNS A95056; <i>European (ISO):</i> AlMg5Cr, AlMg5 (<i>AECMA</i>): AL-P32; <i>Austria:</i> AlMg5; <i>Canada:</i> GM50R, GM50N; <i>France:</i> A-G5, A-G5M; <i>Germany:</i> AlMg5; Wk.3.3555; <i>Italy:</i> 3576; <i>Japan:</i> A2X2; <i>Russia (CIS):</i> 1550; <i>Sweden:</i> 14.4146; <i>Switzerland:</i> 10849; <i>UK:</i> N6; BS 2L58, 3L58								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	152	290	35	71	HB 65	Typical	(#1)
H18 [-]	-	407	434	10	71	HB 105	Typical	(#1)
H38 [-]	-	345	414	15	71	HB 100	Typical	(#1)

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5056A AA (USA) Wrought

No composition: -

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Wire, Rivet stock

Similar/Equivalent alloys: USA: AA5056A; European (CEN): EN573 AW-5056A; EN573 AW-5019 (ISO): AlMg5; France: A-G5M; Germany: AlMg5; DIN 3.3555; Spain: L-3320; UK: 5056A; BS N6; Others: (CZ) CSN 42 4415; European aerospace P-5056A; Proprietary: Alcan 56S, 06; Otto Fuchs AM58

Comments: Number changed in AA (USA) register. Now AA 5019. High strength applications. General engineering, cladding and ducting. Corrosion resistance: Excellent (atmospheric) Weldability: Good (fusion) Machinability: Good.

5058 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 4.5-5.6, Mn 0.2, Zn 0.2, Ti 0.2, Cr 0.1, Pb 1.2-1.8, Others: Each 0.05 Total 0.15, Aluminium rem.

5082 AA (USA) Wrought

Official composition: Si 0.2, Fe 0.35, Cu 0.15, Mg 4-5, Mn 0.15, Zn 0.25, Ti 0.1, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2650

5083 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4-4.9, Mn 0.4-1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2660

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Bar

Similar/Equivalent alloys: USA: AA5083, UNS A95083, QQ -A-250/6, -A-200/4; European (CEN): EN573 AW-5083; AW-AlMg4.5Mn0.7 (ISO): AlMg4.5Mn0.7, AlMg4.5Mn; Australia: A5083; Canada: GM41, GM50R; France: A-G4.5MC, A-GM4MC; 5083; Germany: AlMg4.5Mn; Wk.3.3547; Italy: 9005/5; 5452-64; FA60-5083; UNI 7790; P-AlMg4.4; Japan: A5083P; Spain: L-3321; Sweden: 14.4140; Switzerland: AlMg4.5Mn; UK: 5083; N8 (NS 8); Proprietary: Alcan D54S, 05; Otto Fuchs AM40; Hoogovens 5510; Superform 5083SPF

Comments: High strength after welding. Welded structures. Road vehicles, rail wagons, pressure vessels, shipbuilding, off-shore. Cryogenics. Superplastic forming. Armour plate. Construction, mechanical engineering, food industry. Tensile strength of drawn, seamless tube 312-375 MPa. Also superplastic forming grades. Corrosion resistance: Excellent (atmospheric) Weldability: Very good (fusion) Machinability: Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	145	290	22	71		Typical	(#1)
O [-]	170	-	310	20	71	75HB	Typical	(BAI Plate)
O [-]	125	-	313	12	-		El. min.	(Aalco (Glynwed))
O [Sheet (1.6<e<3.2mm)]	125	-	275	17	-		NF A 50-451 Min. values	(Pechiney)
O [Superplastic forming]	135	-	290	-	-		Typical	(Superform Metals)
O [Superplastic forming]	150	-	300	20	-		Typical	(Superform Metals)
O / H111 [-]	170	-	305	22	71	70HB	RT typical properties	(Pechiney)
F [-]	190	-	320	18	71	80HB	Typical	(BAI Plate)
H111 [Plate (3.2<e<12mm)]	125	-	275	17	-		NF A 50-451 Min. values	(Pechiney)
H111 [Plate (6<e<150mm)]	115	-	275	16	-		NF A 50-451 Min. values	(Pechiney)
H115 [-]	290	-	360	12	-		Typical	(BAI Plate)
H116 [-]	250	-	340	15	71	80HB	RT typical properties	(Pechiney)
H116 [Plate (12<e<40mm)]	215	-	305	10	-		NF A 50-451 Min. values	(Pechiney)
H116 [Plate (3.2<e<12mm)]	215	-	305	11	-		NF A 50-451 Min. values	(Pechiney)
H116 [Plate (40<e<80mm)]	200	-	285	10	-		NF A 50-451 Min. values	(Pechiney)
H116 [Sheet (0.8<e<3.2mm)]	215	-	305	11	-		NF A 50-451 Min. values	(Pechiney)
H22 [Plate (3.2<e<40mm)]	210	-	300	11	-		NF A 50-451 Min. values	(Pechiney)
H22 [Sheet (1.6<e<3.2mm)]	210	-	300	12	-		NF A 50-451 Min. values	(Pechiney)
H321 [-]	225	-	330	15	71	85HB	Typical	(BAI Plate)
H321, H116 [-]	-	228	317	16	71		Typical	(#1)
H34 [Sheet (1.2<e<6mm)]	270	-	345	6	-		NF A 50-451 Min. values	(Pechiney)
H4 [-]	285	-	375	-	-		Typical	(Raufoss)

Aluminium Alloys (wrought) 179

5083

CEN 573 (Europe)

Wrought

Nominal composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4-4.9, Mn 0.4-1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2660

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA5083, UNS A95083, QQ -A-250/6, -A-200/4; *European (CEN):* EN573 AW-5083; AW-AMg4.5Mn0.7 (*ISO*): AlMg4.5Mn0.7, AlMg4.5Mn; *Australia:* A5083; *Canada:* GM41, GM50R; *France:* A-G4.5MC, A-GM4MC; 5083; *Germany:* AlMg4.5Mn; Wk.3.3547; *Italy:* 9005/5; 5452-64; FA60-5083; UNI 7790; P-
AlMg4.4; *Japan:* A5083P; *Spain:* L-3321; *Sweden:* 14.4140; *Switzerland:* AlMg4.5Mn; *UK:* 5083; N8 (NS 8); *Proprietary:* Alcan D54S, 05; Otto Fuchs AM40; Hoogovens 5510

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Drawn Bar (<80mm)]	110	-	270	16	-	-	EN754 Min. values	(Pechiney)
O / H111 [Drawn Tube (<20mm)]	110	-	270	16	-	-	EN754 Min. values	(Pechiney)
O / H111 [Extru. Bar (<200mm)]	110	-	270	14	-	-	EN755 Min. values	(Pechiney)
O / H111 [Extru. Tube]	110	-	270	14	-	-	EN755 Min. values	(Pechiney)
O / H111 [Sheet/Plate (>0.2 <50mm)]	125	-	275	-	-	75HB	EN485 Min. values	(Pechiney)
O / H112 [Extru. Tube]	125	-	270	12	-	-	EN755 Min. values	(Pechiney)
O/H111 [Plate 12.5 - 60mm]	125	-	275	-	-	-	Minimum	(AMAG)
O/H111 [Plate 4 - 6mm]	125	-	275	15	-	-	Minimum	(AMAG)
O/H111 [Plate 6 - 12.5mm]	125	-	275	16	-	-	Minimum	(AMAG)
F [Extru. Bar (<200mm)]	110	-	270	12	-	-	EN755 Min. values	(Pechiney)
F [Extru. Tube]	110	-	270	12	-	-	EN755 Min. values	(Pechiney)
F [Extrusion]	110	-	270	12	-	-	EN755 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <150mm)]	-	-	275	-	-	-	EN485 Max. values	(Pechiney)
H112 [Extru. Bar (<200mm)]	125	-	270	12	-	-	EN755 Min. values	(Pechiney)
H112 [Extrusion]	125	-	270	12	-	-	EN755 Min. values	(Pechiney)
H112 [Sheet/Plate (>6 <12.5mm)]	125	-	275	12	-	75HB	EN485 Min. values	(Pechiney)
H116 [Sheet/Plate (>1.5 <40mm)]	215	-	305	-	-	89HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	250	-	315	-	-	94HB	EN485 Min. values	(Pechiney)
H12/H22/H32 [Drawn Bar (<30mm)]	200	-	280	6	-	-	EN754 Min. values	(Pechiney)
H12/H22/H32 [Drawn Tube (<10mm)]	200	-	280	6	-	-	EN754 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	280	-	340	-	-	102HB	EN485 Min. values	(Pechiney)
H14/H24/H34 [Drawn Tube (<5mm)]	235	-	300	4	-	-	EN754 Min. values	(Pechiney)
H16 [Sheet/Plate (>0.2 <4mm)]	300	-	360	-	-	108HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	215	-	305	-	-	89HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	250	-	340	-	-	99HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <4mm)]	280	-	360	-	-	106HB	EN485 Min. values	(Pechiney)

5083 SPF

Superform Metals (UK)

Wrought

Proprietary composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4-4.9, Mn 0.4-1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: *USA:* AA5083, UNS A95083; *European (CEN):* EN573 AW-5083; AW-AMg4.5Mn0.7 (*ISO*): AlMg4.5Mn0.7, AlMg4.5Mn; *Canada:* GM41, GM50R; *France:* A-G4.5MC, A-GM4MC; 5083; *Germany:* AlMg4.5Mn; Wk.3.3547; *Italy:* 9005/5; 5452-64; FA60-5083; UNI 7790; P-AMg4.4; *Japan:* A5083P; *Spain:* L-3321; *Sweden:* 14.4140; *Switzerland:* AlMg4.5Mn; *UK:* 5083; N8 (NS 8); *Proprietary:* Superform 5083 SPF

Comments: Superplastic forming (SPF) alloy for complex 3-D shapes produced in 1-piece formings. Uses: rail, architectural & automotive panels. Communications dishes. Electronic housings. **Corrosion resistance:** Good **Weldability:** Successful (TIG/ MIG, with 5556A or 5356 filler). **Finishing:** Anodic (coloured), paint, powder-coat, nylon

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	150	-	300	20	-	-	Typical	(Superform Metals)

5086

AA (USA)

Wrought

Official composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 3.5-4.5, Mn 0.2-0.7, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2660

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA5086, UNS A95086, QQ -A-250/7, -A-200/5; *European (CEN):* EN573 AW-5086; AW-AMg4 (*ISO*): AlMg4Mn; *France:* A-G4MC; 5086; *Germany:* AlMg4Mn; Wk. 3.3545; *Italy:* 5452-64; FA60-5086; 9005/4; *Japan:* A5086P; *Spain:* L-3322; *Switzerland:* AlMg4Mn; *UK:* 5086; *Others:* European aerospace P-5086; *Proprietary:* Alcan E54S; Hoogovens 5503

Comments: Pressure vessels. Transportation equipment. Cryogenics. High strength - general construction. Road transport, shipbuilding, mechanical engineering.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	117	262	22	71	-	Typical	(#1)
O [-]	140	-	280	22	71	65HB	Typical	(BAI Plate)
O [Sheet (0.35<e<3.2mm)]	100	-	240	18	-	-	NF A 50-451 Min. values	(Pechiney)
O / H111 [-]	150	-	280	23	71	63HB	RT typical properties	(Pechiney)
H111 [Plate (12<e<150mm)]	100	-	240	16	-	-	NF A 50-451 Min. values	(Pechiney)
H111 [Plate (3.2<e<6mm)]	100	-	240	18	-	-	NF A 50-451 Min. values	(Pechiney)
H111 [Plate (6<e<12mm)]	100	-	240	17	-	-	NF A 50-451 Min. values	(Pechiney)
H112 [-]	-	131	269	14	71	-	Typical	(#1)
H116 [-]	230	-	320	16	71	73HB	RT typical properties	(Pechiney)
H116 [-]	230	-	320	16	71	75HB	Typical	(BAI Plate)
H116 [Plate (12<e<50mm)]	195	-	275	9	-	-	NF A 50-451 Min. values	(Pechiney)
H116 [Plate (3.2<e<12mm)]	195	-	275	11	-	-	NF A 50-451 Min. values	(Pechiney)
H116 [Sheet (1.6<e<3.2mm)]	195	-	275	12	-	-	NF A 50-451 Min. values	(Pechiney)
H22 [Sheet (0.35<e<3.2mm)]	190	-	275	10	-	-	NF A 50-451 Min. values	(Pechiney)
H24 [Sheet (0.35<e<3.2mm)]	230	-	300	8	-	-	NF A 50-451 Min. values	(Pechiney)
H32 [Plate (3.2<e<25mm)]	190	-	275	10	-	-	NF A 50-451 Min. values	(Pechiney)
H32, H116 [-]	-	207	290	12	71	-	Typical	(#1)
H34 [-]	-	255	324	10	71	-	Typical	(#1)
H34 [Plate (3.2<e<8mm)]	230	-	300	8	-	-	NF A 50-451 Min. values	(Pechiney)
H34 [Plate (8<e<20mm)]	230	-	300	7	-	-	NF A 50-451 Min. values	(Pechiney)

180 Aluminium Alloys (wrought)

5086	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 3.5-4.5, Mn 0.2-0.7, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660 Identified Product forms: Plate, Sheet/strip, Tube, Extrusion Similar/Equivalent alloys: <u>USA:</u> AA5086, UNS A95086, QQ -A-250/7, -A-200/5; <u>European (CEN):</u> EN573 AW-5086; AW-AIMg4 (<u>ISO</u>): AIMg4Mn; <u>France:</u> A-G4MC; 5086; <u>Germany:</u> AlMg4Mn; Wk. 3.3545; <u>Italy:</u> 5452-64; FA60-5086; 9005/4; <u>Japan:</u> A5086P; <u>Spain:</u> L-3322; <u>Switzerland:</u> AlMg4Mn; <u>UK:</u> 5086; <u>Others:</u> European aerospace P-5086; <u>Proprietary:</u> Alcan E54S; Hoogovens 5503 Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Drawn Bar (<80mm)]	95	-	240	16	-	-	EN754 Min. values	(Pechiney)
O / H111 [Drawn Tube (<20mm)]	95	-	240	16	-	-	EN754 Min. values	(Pechiney)
O / H111 [Extru. Bar (<200mm)]	95	-	240	18	-	-	EN755 Min. values	(Pechiney)
O / H111 [Extru. Tube]	95	-	240	18	-	-	EN755 Min. values	(Pechiney)
O / H111 [Sheet/Plate (>0.2 <150mm)]	100	-	240	-	-	65HB	EN485 Min. values	(Pechiney)
O/H111 [Plate 12.5 - 60mm]	100	-	240	-	-	-	Minimum	(AMAG)
O/H111 [Plate 4 - 6mm]	100	-	240	15	-	-	Minimum	(AMAG)
O/H111 [Plate 6 - 12.5mm]	100	-	240	17	-	-	Minimum	(AMAG)
F [Sheet/Plate (>2.5 <150mm)]	-	-	240	-	-	-	EN485 Min. values	(Pechiney)
F / H112 [Extru. Bar (<250mm)]	95	-	240	12	-	-	EN755 Min. values	(Pechiney)
F / H112 [Extru. Tube]	95	-	240	12	-	-	EN755 Min. values	(Pechiney)
F / H112 [Extrusion]	95	-	240	12	-	-	EN755 Min. values	(Pechiney)
H111 [Treadplate 1.5 - 3mm]	100	-	240	8	-	-	Minimum	(AMAG)
H111 [Treadplate 3 - 6mm]	100	-	240	10	-	-	Minimum	(AMAG)
H111 [Treadplate 6 - 10mm]	100	-	240	12	-	-	Minimum	(AMAG)
H112 [Sheet/Plate (>6 <12.5mm)]	125	-	250	8	-	69HB	EN485 Min. values	(Pechiney)
H116 [Sheet/Plate (>1.5 <50mm)]	195	-	275	-	-	81HB	EN485 Min. values	(Pechiney)
H116 [Treadplate 1.5 - 3mm]	195	-	275	4	-	-	Minimum	(AMAG)
H116 [Treadplate 3 - 6mm]	195	-	275	5	-	-	Minimum	(AMAG)
H116 [Treadplate 6 - 8mm]	195	-	275	6	-	-	Minimum	(AMAG)
H12 [Sheet/Plate (>0.2 <40mm)]	200	-	275	-	-	81HB	EN485 Min. values	(Pechiney)
H12/H22/H32 [Drawn Bar (<30mm)]	190	-	270	5	-	-	EN754 Min. values	(Pechiney)
H12/H22/H32 [Drawn Tube (<10mm)]	190	-	270	5	-	-	EN754 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	240	-	300	-	-	90HB	EN485 Min. values	(Pechiney)
H16 [Sheet/Plate (>0.2 <4mm)]	270	-	325	-	-	98HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	290	-	345	1	-	104HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	185	-	275	-	-	80HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	220	-	300	-	-	88HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <4mm)]	250	-	325	-	-	96HB	EN485 Min. values	(Pechiney)
H32 [Treadplate 1.5 - 3mm]	185	-	275	4	-	-	Minimum	(AMAG)
H32 [Treadplate 3 - 6mm]	185	-	275	5	-	-	Minimum	(AMAG)
H32 [Treadplate 6 - 8mm]	185	-	275	6	-	-	Minimum	(AMAG)
H34 [Treadplate 1.5 - 3mm]	220	-	300	2	-	-	Minimum	(AMAG)
H34 [Treadplate 3 - 6mm]	220	-	300	3	-	-	Minimum	(AMAG)
H34 [Treadplate 6 - 8mm]	220	-	300	4	-	-	Minimum	(AMAG)
5087	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 4.5-5.2, Mn 0.7-1.1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <u>USA:</u> AA5087; <u>European (CEN):</u> EN573 AW-5087								
5087	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 4.5-5.2, Mn 0.7-1.1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <u>USA:</u> AA5087; <u>European (CEN):</u> EN573 AW-5087								
5091	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Mg 3.7-4.2, Li 1.2-1.4, O ₂ 0.2-0.7, Carbon 1.0-1.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2580								
5105	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5110	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.08, Mg 0.3-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02, Aluminium rem.								
5119	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 4.5-5.6, Mn 0.2-0.6, Zn 0.2, Ti 0.15, Cr 0.3, Mn+Cr 0.2-0.6 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.								
5149	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 1.6-2.5, Mn 0.5-1.1, Zn 0.2, Ti 0.15, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
5150	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 1.3-1.7, Mn 0.03, Zn 0.1, Ti 0.06, Others: Each 0.03 Total 0.1, Aluminium rem. Similar/Equivalent alloys: <u>USA:</u> AA5150; <u>France:</u> A85-GT								
5151	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.35, Cu 0.15, Mg 1.5-2.1, Mn 0.1, Zn 0.15, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680								

Aluminium Alloys (wrought) 181

5152 AA (USA) Wrought

No composition -
Comments: Listed by AA as Inactive.

5154 AA (USA) Wrought

Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 3.1-3.9, Mn 0.1, Zn 0.2, Ti 0.2, Cr 0.15-0.35, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2660

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar, Wire

Similar/Equivalent alloys: USA: AA5154, UNS A95154; European (ISO): AlMg3.5; Canada: GR40; France: A-G3 (AG3C); Germany: AlMg3; Wk.3.3535; Italy: 3574; Russia (CIS): 1530(Si0.6); Sweden: 14.4133; UK: 5154A; BS N5; NG5; Proprietary: Alcan C54S

Comments: Welded structures. Pressure vessels, storage tanks, can be used at elevated temperatures. Chemical industry. As for other 5000 series alloys - not susceptible to stress corrosion cracking.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	117	241	27	70	HB 58	Typical	(#1)
H112 [-]	-	117	241	25	70	HB 63	Typical	(#1)
H32 [-]	-	207	269	15	70	HB 67	Typical	(#1)
H34 [-]	-	228	290	13	70	HB 73	Typical	(#1)
H36 [-]	-	248	310	12	70	HB 78	Typical	(#1)
H38 [-]	-	269	331	10	70	HB 80	Typical	(#1)

5154A AA (USA) Wrought

Official composition: Si 0.5, Fe 0.5, Cu 0.1, Mg 3.1-3.9, Mn 0.5, Zn 0.2, Ti 0.2, Cr 0.25, Mn+Cr 0.1-0.5 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Bar, Wire, Rivet stock

Similar/Equivalent alloys: USA: AA5154A; European (CEN): EN573 AW-5154A (ISO): AlMg3.5(A); Australia: C5154; Canada: GR40; France: A-G3; Germany: AlMg3; Wk.3.3535; Italy: 3574; 9005/8; Spain: L-3392; UK: 5154A; N5; Proprietary: Alcan 54S, 33

Comments: Pressure vessels, storage tanks, can be used at elevated temperatures. Chemical industry. As for other 5000 series alloys - not susceptible to stress corrosion cracking. Rivets. Tensile strength of drawn, seamless tube 245-300 MPa. **Corrosion resistance:** Excellent (atmospheric) **Weldability:** Excellent (fusion)

Machinability: Very good

5154A GEN 573 (Europe) Wrought

Nominal composition: Si 0.5, Fe 0.5, Cu 0.1, Mg 3.1-3.9, Mn 0.5, Zn 0.2, Ti 0.2, Cr 0.25, Mn+Cr 0.1-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: USA: AA5154A; European (CEN): EN573 AW-5154A (ISO): AlMg3.5(A); Australia: C5154; Canada: GR40; France: A-G3; Germany: AlMg3; Wk.3.3535; Italy: 3574; 9005/8; Spain: L-3392; UK: 5154A; N5; Proprietary: Alcan 54S, 33

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <50mm)]	85	-	215	-	-	58HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	215	-	-	-	EN485 Min. values	(Pechiney)
H112 [Sheet/Plate (>6 <12.5mm)]	125	-	220	8	-	63HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	190	-	250	-	-	75HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	220	-	270	-	-	81HB	EN485 Min. values	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	270	-	310	1	-	94HB	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <1.5mm)]	285	-	330	1	-	100HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	180	-	250	-	-	74HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	200	-	270	-	-	80HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <6mm)]	230	-	290	-	-	87HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	250	-	310	3	-	93HB	EN485 Min. values	(Pechiney)

5154B AA (USA) Wrought

Official composition: Si 0.35, Fe 0.45, Cu 0.05, Mg 3.2-3.8, Mn 0.15-0.45, Zn 0.15, Ni 0.01, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Tube

Similar/Equivalent alloys: USA: AA5154B; European (ISO): AlMg3.5

Comments: Pressure vessels, storage tanks, can be used at elevated temperatures. Chemical industry. As for other 5000 series alloys - not susceptible to stress corrosion cracking.

5155 AA (USA) Wrought

No composition -
Comments: Listed by AA as Inactive.

5180 AA (USA) Wrought

Official composition: Cu 0.1, Mg 3.5-4.5, Mn 0.2-0.7, Zn 1.7-2.8, Ti 0.06-0.2, Cr 0.1, Zr 0.08-0.25, Si+Fe 0.35 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

5182 AA (USA) Wrought

Official composition: Si 0.2, Fe 0.35, Cu 0.15, Mg 4-5, Mn 0.2-0.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2650

Similar/Equivalent alloys: USA: AA5182; European (CEN): EN573 AW-5182; AW-AlMg4.5Mn0.4 (ISO): (AlMg4.5Mn0.4); France: 5182; Germany: DIN 3.3549; Proprietary: Otto Fuchs AM54; VAW 63/45

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5182 CEN 573 (Europe) Wrought

Nominal composition: Si 0.2, Fe 0.35, Cu 0.15, Mg 4-5, Mn 0.2-0.5, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2650

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: *USA:* AA5182; *European (CEN):* EN573 AW-5182; AW-AIMg4.5Mn0.4 (*ISO:* (AIMg4.5Mn0.4)); *France:* 5182; *Germany:* DIN 3.3549; *Proprietary:* Otto Fuchs AM54; VAW 63/45

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet (>0.2 <3.0mm)]	110	-	255	-	-	69HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	255	-	-	-	EN485 Min. values	(Pechiney)
H19 [Sheet (>0.2 <1.5mm)]	320	-	380	1	-	114HB	EN485 Min. values	(Pechiney)
H19 (F29) [Foil (0.25-0.34mm)]	330	-	370	4	-	-	Min. (EN541); uncoated	(VAW France)
H48 (F37) [Foil (0.25-0.34mm)]	330	-	370	4	-	-	Min. (EN541); uncoated	(VAW France)
H48 (F37) [Foil (0.25-0.34mm)]	310	-	355	5	-	-	Min. (EN541); laquered	(VAW France)

5183 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4.3-5.2, Mn 0.5-1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2660

Identified Product forms: Wire

Similar/Equivalent alloys: *USA:* AA5183; *European (CEN):* EN573 AW-5183 (*ISO:* AIMg4.5Mn0.7(A))

Comments: Welding wire.

5183 CEN 573 (Europe) Wrought

Nominal composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4.3-5.2, Mn 0.5-1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2660

Similar/Equivalent alloys: *USA:* AA5183; *European (CEN):* EN573 AW-5183 (*ISO:* AIMg4.5Mn0.7(A))

Comments: For comments see: AA series.

5186 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.45, Cu 0.25, Mg 3.8-4.8, Mn 0.2-0.5, Zn 0.4, Ti 0.15, Cr 0.15, Zr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Comments: Designation added to AA (USA) register since previous issue (06/94)

5205 AA (USA) Wrought

Official composition: Si 0.15, Fe 0.7, Cu 0.03-0.1, Mg 0.6-1, Mn 0.1, Zn 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Similar/Equivalent alloys: *USA:* AA5205; *Others:* Al99.7Mg0.8Cu

5210 AA (USA) Wrought

Official composition: Si 0.06, Fe 0.04, Mg 0.35-0.6, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01, Aluminium rem.

5249 AA (USA) Wrought

Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 1.6-2.5, Mn 0.5-1.1, Zn 0.2, Ti 0.15, Cr 0.3, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.

5250 AA (USA) Wrought

Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 1.3-1.8, Mn 0.04-0.15, Zn 0.05, Ga 0.03, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2680

5251 AA (USA) Wrought

Official composition: Si 0.4, Fe 0.5, Cu 0.15, Mg 1.7-2.4, Mn 0.1-0.5, Zn 0.15, Ti 0.15, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2690

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA5251, UNS A95251; *European (CEN):* EN573 AW-5251; AW-AIMg2 (*ISO:* AIMg2; *Australia:* C5251; *France:* A-G2M; 5251; *Germany:* AIMg2Mn0.3; Wk 3.3525; *Italy:* 4511; *Spain:* L-3361; *Switzerland:* Al-2Mg; *UK:* 5251; BS N4, NS4; BS 3L80, 3L81, 5L44; *Others:* (CZ) CSN 42 4412; *Proprietary:* Alcan M57S, 22, Mg2

Comments: Welded structures, pressure vessels, cryogenic and marine. Containers, vehicle panels, off-shore, pressings, stock for seam welded tube, rivets. Tensile strength of drawn, seamless tube 180-250 MPa. **Corrosion resistance:** Excellent (atmospheric) **Weldability:** Very good (fusion) **Machinability:** Medium

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	60	-	180	24	70	45HB	Typical	(BAI Plate)
F [-]	110	-	210	20	70	55HB	Typical	(BAI Plate)
H22 [-]	120	-	210	6	-	-	El. min.	(Aalco (Glynwed))
H6 [-]	190	-	250	-	-	-	Typical	(Raufoss)

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5251	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.4, Fe 0.5, Cu 0.15, Mg 1.7-2.4, Mn 0.1-0.5, Zn 0.15, Ti 0.15, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Plate, Sheet/strip, Wire								
Similar/Equivalent alloys: <u>USA:</u> AA5251, UNS A95251; <u>European (CEN):</u> EN573 AW-5251; AW-ALMg2 (<u>ISO</u>): ALMg2; <u>Australia:</u> C5251; <u>France:</u> A-G2M; 5251; <u>Germany:</u> AlMg2Mn0.3; Wk.3.3525; <u>Italy:</u> 4511; <u>Spain:</u> L-3361; <u>Switzerland:</u> Al-2Mg; <u>UK:</u> 5251; BS N4, NS4; BS 3L80, 3L81, 5L44; <u>Others:</u> (CZ) CSN 42 4412; <u>Proprietary:</u> Alcan M57S, 22, Mg2								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (d<20mm)]	95	-	215	15	-	-	EN1301 / EN11715	(Pechiney)
O / H111 [Sheet/Plate (>0.2 <50mm)]	60	-	160	-	-	44HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	160	-	-	-	EN485 Min. values	(Pechiney)
H112 [Sheet/Plate (>6 <12.5mm)]	140	-	210	12	-	62HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <25mm)]	150	-	190	-	-	58HB	EN485 Min. values	(Pechiney)
H14 [Drawn wire (d<18mm)]	220	-	215	4	-	-	EN1301 / EN11715	(Pechiney)
H14 [Sheet/Plate (>0.2 <12.5mm)]	170	-	210	-	-	64HB	EN485 Min. values	(Pechiney)
H16 [Sheet (>0.2 <4mm)]	200	-	230	-	-	71HB	EN485 Min. values	(Pechiney)
H18 [Drawn wire (d<10mm)]	270	-	265	3	-	-	EN1301 / EN11715	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	230	-	255	-	-	79HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <25mm)]	120	-	190	-	-	56HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <12.5mm)]	140	-	210	-	-	62HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <4mm)]	170	-	230	-	-	69HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	200	-	255	-	-	77HB	EN485 Min. values	(Pechiney)
5251A	AA (USA)	Wrought						
Official composition: Si 0.5, Fe 0.7, Cu 0.25, Mg 1.6-2.2, Mn 0.2-0.7, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
5252	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.05, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2670								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA5252, UNS A95252; <u>France:</u> AG-G3; <u>UK:</u> 5252; <u>Others:</u> Al99.85Mg2.5								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H25 [-]	-	172	234	11	69	HB 68	Typical	(#1)
H38, H28 [-]	-	241	283	5	69	HB 75	Typical	(#1)
5254	AA (USA)	Wrought						
Official composition: Cu 0.05, Mg 3.1-3.9, Mn 0.01, Zn 0.2, Ti 0.05, Cr 0.15-0.35, Si+Fe 0.45, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
Identified Product forms: Plate, Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA5254, UNS A95254; <u>Germany:</u> AlMg3; Wk.3.3535; <u>UK:</u> 5154A; N5								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	117	241	27	70	HB 58	Typical	(#1)
H112 [-]	-	117	241	25	70	HB 63	Typical	(#1)
H32 [-]	-	207	269	15	70	HB 67	Typical	(#1)
H34 [-]	-	228	290	13	70	HB 73	Typical	(#1)
H36 [-]	-	248	310	12	70	HB 78	Typical	(#1)
H38 [-]	-	269	331	10	70	HB 80	Typical	(#1)
5257	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 0.2-0.6, Mn 0.03, Zn 0.03, Others: Each 0.02 Total 0.05, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
5280	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								
5283	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.3, Cu 0.03, Mg 4.5-5.1, Mn 0.5-1, Zn 0.1, Ni 0.03, Ti 0.03, Cr 0.05, Zr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
5283A	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.3, Cu 0.03, Mg 4.5-5.1, Mn 0.5-1, Zn 0.1, Ni 0.03, Ti 0.03, Cr 0.05, Pb 0.003, Zr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
5305	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.08, Mg 0.7-1.1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02, Aluminium rem.								
5310	AA (USA)	Wrought						
Official composition: Si 0.01, Fe 0.008, Mg 0.35-0.6, Zn 0.01, Ti 0.008, Fe+Ti 0.008, Others: Each 0.003, Aluminium rem.								
5349	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.18-0.28, Mg 1.7-2.6, Mn 0.6-1.2, Ti 0.09, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
5351	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 1.6-2.2, Mn 0.1, Zn 0.05, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2680								
5352	AA (USA)	Wrought						
Official composition: Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Si+Fe 0.45, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2670								

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5354	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 2.4-3, Mn 0.5-1, Zn 0.25, Ti 0.15, Cr 0.05-0.2, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
5356	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 4.5-5.5, Mn 0.05-0.2, Zn 0.1, Ti 0.06-0.2, Cr 0.05-0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2640								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA:</i> AA5356, UNS A95356; <i>European (CEN):</i> EN573 AW-5356 (<i>ISO:</i> AlMg5Cr(A), AlMg5; <i>Canada:</i> GM50P; <i>France:</i> A-G5M; 5356; <i>Germany:</i> AlMg5; Wk.3.3555; <i>UK:</i> 5056A; N6; BS 3L58								
Comments: Welding wire - BS 2901 pt 4.								
5356	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 4.5-5.5, Mn 0.05-0.2, Zn 0.1, Ti 0.06-0.2, Cr 0.05-0.2, (Be 0.008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2640								
Similar/Equivalent alloys: <i>USA:</i> AA5356, UNS A95356; <i>European (CEN):</i> EN573 AW-5356 (<i>ISO:</i> AlMg5Cr(A), AlMg5; <i>Canada:</i> GM50P; <i>France:</i> A-G5M; 5356; <i>Germany:</i> AlMg5; Wk.3.3555; <i>UK:</i> 5056A; N6; BS 3L58								
Comments: Welding wire.								
5357	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.17, Cu 0.2, Mg 0.8-1.2, Mn 0.15-0.45, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
5383	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.25, Cu 0.2, Mg 4-5.2, Mn 0.7-1, Zn 0.4, Ti 0.15, Cr 0.25, Zr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
5400	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> AA5454, UNS A95454; <i>European (CEN):</i> EN573 AW-5454; AW-Al3Mn (<i>ISO:</i> AlMg2.7Mn; AlMg3Mn; <i>Canada:</i> GM31N, GM31; <i>France:</i> A-G2.5MC, A-G3; 5454; <i>Germany:</i> AlMg2.7Mn, AlMg3; Wk.3.3537, 3.3585; <i>Italy:</i> 9005/3; 7789; <i>Japan:</i> A5454P; <i>Spain:</i> L-3391; <i>Switzerland:</i> AlMg2.7Mn; <i>UK:</i> 5454; BS N51								
Comments: Hoogovens version of AA 5454.								
5405	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								
5449	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.7, Cu 0.3, Mg 1.6-2.6, Mn 0.6-1.1, Zn 0.3, Ti 0.1, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem.								
5451	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 1.8-2.4, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05, Cr 0.15-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680								
5454	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.4-3, Mn 0.5-1, Zn 0.25, Ti 0.2, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Bar								
Similar/Equivalent alloys: <i>USA:</i> AA5454, UNS A95454, QQ -A-250/10, -A-200/6; <i>European (CEN):</i> EN573 AW-5454; AW-Al3Mn (<i>ISO:</i> AlMg2.7Mn; AlMg3Mn; <i>Australia:</i> A5454; <i>Canada:</i> GM31N, GM31; <i>France:</i> A-G2.5MC, A-G3; 5454; <i>Germany:</i> AlMg2.7Mn, AlMg3; Wk.3.3537, 3.3585; <i>Italy:</i> 9005/3; 7789; <i>Japan:</i> A5454P; <i>Spain:</i> L-3391; <i>Switzerland:</i> AlMg2.7Mn; <i>UK:</i> 5454; BS N51; <i>Proprietary:</i> Alcan B53S, 34; Hoogovens 5400								
Comments: Welded structures. Pressure vessels, storage tanks, marine structures can be used at elevated temperatures. Chemical industry. Construction, road transport. As for other 5000 series alloys - not susceptible to stress corrosion cracking. Corrosion resistance: Excellent (atmospheric) Weldability: Excellent (fusion)								
Machinability: Medium								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	117	248	22	70	HB 62	Typical	(#1)
O [-]	100	-	230	22	70	60HB	Typical	(BAI Plate)
O [Sheet (1.6<e<3.2mm)]	85	-	215	18	-	-	NF A 50-451 Min. values	(Pechiney)
F [-]	170	-	260	16	70	65HB	Typical	(BAI Plate)
H111 [-]	180	-	260	22	70	60HB	RT typical properties	(Pechiney)
H111 [-]	-	179	262	14	70	HB 70	Typical	(#1)
H111 [Plate (3.2<e<80mm)]	85	-	215	18	-	-	NF A 50-451 Min. values	(Pechiney)
H112 [-]	-	124	248	18	70	HB 62	Typical	(#1)
H22 / H32 [Plate (3.2<e<25mm)]	180	-	250	9	-	-	NF A 50-451 Min. values	(Pechiney)
H22 / H32 [Sheet (1.6<e<3.2mm)]	180	-	250	9	-	-	NF A 50-451 Min. values	(Pechiney)
H24 [Sheet (1.6<e<3.2mm)]	200	-	270	8	-	-	NF A 50-451 Min. values	(Pechiney)
H32 [-]	-	207	276	10	70	HB 73	Typical	(#1)
H34 [-]	-	241	303	10	70	HB 81	Typical	(#1)
H34 [Plate (3.2<e<25mm)]	200	-	270	8	-	-	NF A 50-451 Min. values	(Pechiney)

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5454	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.4-3, Mn 0.5-1, Zn 0.25, Ti 0.2, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Plate, Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA5454, UNS A95454, QQ -A-250/10, -A-200/6; <u>European (CEN):</u> EN573 AW-5454; AW-AIMg (ISO): AIMg2.7Mn; AIMg3Mn; <u>Australia:</u> A5454; <u>Canada:</u> GM31N, GM31; <u>France:</u> A-G2.5MC, A-G3; 5454; <u>Germany:</u> AIMg2.7Mn, AIMg3; Wk.3.3537, 3.3585; <u>Italy:</u> 9005/3; 7789; <u>Japan:</u> A5454P; <u>Spain:</u> L-3391; <u>Switzerland:</u> AIMg2.7Mn; <u>UK:</u> 5454; BS N51; <u>Proprietary:</u> Alcan B53S, 34; Hoogovens 5400								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O / H111 [Sheet/Plate (>0.2 <80mm)]	85	-	215	-	-	58HB	EN485 Min. values	(Pechiney)
F [Sheet/Plate (>2.5 <80mm)]	-	-	215	-	-	-	EN485 Min. values	(Pechiney)
H112 [Sheet/Plate (>6 <12.5mm)]	125	-	220	8	-	63HB	EN485 Min. values	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	190	-	250	-	-	75HB	EN485 Min. values	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	220	-	270	-	-	81HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	180	-	250	-	-	74HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	200	-	270	-	-	80HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <6mm)]	230	-	290	-	-	87HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	250	-	310	-	-	93HB	EN485 Min. values	(Pechiney)
5456	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 4.7-5.5, Mn 0.5-1, Zn 0.25, Ti 0.2, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA5456, UNS A95456, QQ -A-250/9, -A-200/7; <u>European (ISO):</u> AIMg5Mn1; <u>France:</u> A-G5; <u>Germany:</u> AIMg5; Wk.3.3555; <u>UK:</u> BS N61								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	159	310	24	71	-	Typical	(#1)
H25 [-]	-	165	310	22	71	-	Typical	(#1)
H321, H116 [-]	-	255	352	16	71	HB 90	Typical	(#1)
5456A	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 4.5-5.2, Mn 0.7-1.1, Zn 0.25, Ti 0.15, Cr 0.05-0.25, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5456A; <u>European (CEN):</u> EN573 AW-5456A; <u>Germany:</u> AIMg5								
5456A	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 5-5.5, Mn 0.6-1, Zn 0.2, Ti 0.05-0.2, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5456A, UNS A95454, QQ -A-250/9, -A-200/7; <u>European (CEN):</u> EN573 AW-5456A; <u>France:</u> A-G5; <u>Germany:</u> AIMg5; Wk.3.3555								
5457	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.2, Mg 0.8-1.2, Mn 0.15-0.45, Zn 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AA5457, UNS A95457; <u>France:</u> A9-G1; <u>UK:</u> 5457								
Comments: (See:5005)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	48	131	22	69	HB 32	Typical	(#1)
H25 [-]	-	159	179	12	69	HB 48	Typical	(#1)
H38, H28 [-]	-	186	207	6	69	HB 55	Typical	(#1)
5503	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA5086, UNS A95086; <u>European (CEN):</u> EN573 AW-5086; AW-AIMg4 (ISO): AIMg4Mn; <u>France:</u> A-G4MC; 5086; <u>Germany:</u> AIMg4Mn; Wk.3.3545; <u>Italy:</u> 5452-64; FA60-5086; 9005/4; <u>Japan:</u> A5086P; <u>Spain:</u> L-3322; <u>Switzerland:</u> AIMg4Mn; <u>UK:</u> 5086; <u>Others:</u> European aerospace P-5086								
Comments: Hoogovens version of AA 5086.								
5505	AA (USA)	Wrought						
Official composition: Si 0.06, Fe 0.04, Mg 0.8-1.1, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA5505								
5510	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA5083, UNS A95083; <u>European (CEN):</u> EN573 AW-5083; AW-AIMg4.5Mn0.7 (ISO): AIMg4.5Mn0.7, AIMg4.5Mn; <u>Canada:</u> GM41, GM50R; <u>France:</u> A-G4.5MC, A-GM4MC; 5083; <u>Germany:</u> AIMg4.5Mn; Wk.3.3547; <u>Italy:</u> 9005/5; 5452-64; FA60-5083; UNI 7790; P-AIMg4.4; <u>Japan:</u> A5083P; <u>Spain:</u> L-3321; <u>Sweden:</u> 14.4140; <u>Switzerland:</u> AIMg4.5Mn; <u>UK:</u> 5083; N8 (NS 8)								
Comments: Hoogovens version of AA 5083.								
5520	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B; <u>European (CEN):</u> EN573 AW-5052; AW-AIMg2.5 (ISO): AIMg2.5 (AECMA): AL-P31; <u>Canada:</u> GR20; <u>Germany:</u> AIMg2; AIMg2.5; DIN 3.3523; <u>Italy:</u> P-AIMg2.5; 3574; 9005/2; FA60-5052; <u>Japan:</u> A2X1; A5052P; <u>Sweden:</u> 14.4120; <u>Switzerland:</u> 10849; <u>UK:</u> 5052; BS N4; BS L80, L81, 2L55, 2L56								
Comments: Hoogovens version of AA 5052.								
5552	AA (USA)	Wrought						
Official composition: Si 0.04, Fe 0.05, Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.05, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2670								
Similar/Equivalent alloys: <u>USA:</u> AA5552								

186 Aluminium Alloys (wrought)

5554	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.4-3, Mn 0.5-1, Zn 0.25, Ti 0.05-0.2, Cr 0.05-0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA:</i> AA5554; <i>European (ISO):</i> AlMg3Mn(A); <i>Japan:</i> A5554; <i>UK:</i> 5554; N52								
5556	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 4.7-5.5, Mn 0.6-1, Zn 0.25, Ti 0.05-0.2, Cr 0.05-0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
5556A	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 5-5.5, Mn 0.6-1, Zn 0.2, Ti 0.05-0.2, Cr 0.05-0.2, (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA:</i> AA5556A; <i>European (ISO):</i> AlMg5.2MnCr; <i>UK:</i> 5556A; N61								
Comments: Welding wire - BS 2901 pt 4.								
5557	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.12, Cu 0.15, Mg 0.4-0.8, Mn 0.1-0.4, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700								
5605	AA (USA)	Wrought						
Official composition: Si 0.01, Fe 0.008, Mg 0.8-1.1, Zn 0.01, Ti 0.008, Fe+Ti 0.008, Others: Each 0.003, Aluminium rem.								
5652	AA (USA)	Wrought						
Official composition: Cu 0.04, Mg 2.2-2.8, Mn 0.01, Zn 0.1, Cr 0.15-0.35, Si+Fe 0.4, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
Identified Product forms: Plate, Sheet/strip								
Similar/Equivalent alloys: <i>USA:</i> AA5652; <i>UK:</i> 5652								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	90	193	25	70	HB 47	Typical	(#1)
H32 [-]	-	193	228	12	70	HB 60	Typical	(#1)
H34 [-]	-	214	262	10	70	HB 68	Typical	(#1)
H36 [-]	-	241	276	8	70	HB 73	Typical	(#1)
H38 [-]	-	255	290	7	70	HB 77	Typical	(#1)
5654	AA (USA)	Wrought						
Official composition: Cu 0.05, Mg 3.1-3.9, Mn 0.01, Zn 0.2, Ti 0.05-0.15, Cr 0.15-0.35, Si+Fe 0.45 (Be 0.0008 for weld electrode & filler wire only), Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
5657	AA (USA)	Wrought						
Official composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 0.6-1, Mn 0.03, Zn 0.05, Ga 0.03, V 0.05, Others: Each 0.02 Total 0.05, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Sheet/strip, Tube								
Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-AlMg0.9; <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alcan L57S								
Comments: Trim and reflectors for bright anodising.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
H25 [-]	-	138	159	12	69	HB 40	Typical	(#1)
H38, H28 [-]	-	165	193	7	69	HB 50	Typical	(#1)
5657	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.08, Fe 0.1, Cu 0.1, Mg 0.6-1, Mn 0.03, Zn 0.05, Ga 0.03, V 0.05, Others: Each 0.02 Total 0.05, Aluminium rem. Density (kg.m ⁻³) 2690								
Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-AlMg0.9; <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alcan L57S								
Comments: For comments see: AA series.								

5754

AA (USA)

Wrought

Official composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 2.6-3.6, Mn 0.5, Zn 0.2, Ti 0.15, Cr 0.3, Mn+Cr 0.1-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Plate, Sheet/strip, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA5754; *European (CEN):* EN573 AW-5754; AW-AIMg3 (*ISO:* AIMg3; *France:* A-G3, A-G3M; 5754; *Germany:* AIMg3; 3.3535; *Italy:* 3575; P-AIMg3.5; *Spain:* L-3390; *Sweden:* 14,4125; *Switzerland:* AIMg3; *UK:* BS N5; *Others:* (CZ) CSN 42 4413; AIMg3; *Proprietary:* Alcan 53S; Otto Fuchs AM30, AM32; Hoogovens 5030

Comments: Ship building, off-shore structures, road transport bodies, fish containers. Pressure vessels at elevated temperatures, rivets, welding wire. Construction, electronic parts, rail transport, mechanical engineering, food industry.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	100	-	220	22	70	60HB	Typical	(BAI Plate)
O / H111 [-]	130	-	220	25	70	50HB	RT typical properties	(Pechiney)
O / H111 [Plate (12<e<80mm)]	70	-	190	17	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
O / H111 [Plate (6<e<12mm)]	70	-	190	18	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
O / H111 [Sheet (1.6<e<6mm)]	80	-	190	20	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
O / H111 [Tube (0.5<e<5; D<100mm)]	80	-	180	17	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
F [-]	140	-	230	16	70	65HB	Typical	(BAI Plate)
F22 [-]	165	-	220	9	-	-	Minimum	(Alcan Rolled Prod.)
G22 [-]	130	-	220	14	-	-	Minimum	(Alcan Rolled Prod.)
H111 [-]	80	-	215	14	-	-	EI. min.	(Aalco (Glynwed))
H14 [Tube (0.5<e<5; D<75mm)]	190	-	250	5	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H22 / H32 [Plate (25<e<40mm)]	130	-	220	9	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H22 / H32 [Plate (3.2<e<25mm)]	130	-	220	10	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H22 / H32 [Sheet (1.6<e<6mm)]	130	-	220	11	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H24 [-]	205	-	260	20	70	68HB	RT typical properties	(Pechiney)
H24 [Plate (12<e<40mm)]	165	-	240	7	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H24 [Plate (3.2<e<8mm)]	165	-	240	10	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H24 [Plate (8<e<12mm)]	165	-	240	8	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H24 [Sheet (0.35<e<3.2mm)]	165	-	240	10	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H34 [Plate (3.2<e<8mm)]	190	-	240	5	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
H34 [Sheet (0.35<e<3.2mm)]	190	-	240	5	-	-	NF A 50-451/-411. Min. values.	(Pechiney)
W19 [-]	80	-	190	18	-	-	Minimum	(Alcan Rolled Prod.)

5754

CEN 573 (Europe)

Wrought

Nominal composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 2.6-3.6, Mn 0.5, Zn 0.2, Ti 0.15, Cr 0.3, Mn+Cr 0.1-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Wire

Similar/Equivalent alloys: *USA:* AA5754; *European (CEN):* EN573 AW-5754; AW-AIMg3 (*ISO:* AIMg3; *France:* A-G3, A-G3M; 5754; *Germany:* AIMg3; 3.3535; *Italy:* 3575; P-AIMg3.5; *Spain:* L-3390; *Sweden:* 14,4125; *Switzerland:* AIMg3; *UK:* BS N5; *Others:* (CZ) CSN 42 4413; AIMg3; *Proprietary:* Alcan 53S; Otto Fuchs AM30, AM32; Hoogovens 5030

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (<20mm)]	110	-	250	16	-	-	EN1301 / EN11715	(Pechiney)
O / H111 [Drawn. bar (<80mm)]	80	-	180	16	-	-	EN754 Min. Values	(Pechiney)
O / H111 [Drawn. tube (<80mm)]	80	-	180	16	-	-	EN754 Min. Values	(Pechiney)
O / H111 [Extru. bar (<150mm)]	80	-	180	17	-	-	EN755 Min. values	(Pechiney)
O / H111 [Extru. tube (<25mm)]	80	-	180	17	-	-	EN755 Min. values	(Pechiney)
O / H111 [Sheet/Plate (>0.2 <100mm)]	80	-	190	-	-	52HB	EN485 Min. values	(Pechiney)
O/H111 [Plate 12.5 - 60mm]	80	-	190	-	-	-	Minimum	(AMAG)
O/H111 [Plate 4 - 6mm]	80	-	190	18	-	-	Minimum	(AMAG)
O/H111 [Plate 6 - 12.5mm]	80	-	190	18	-	-	Minimum	(AMAG)
F [Sheet/Plate (>2.5 <100mm)]	-	-	190	-	-	-	EN485 Min. values	(Pechiney)
F / H112 [Extru. bar (<150mm)]	80	-	180	14	-	-	EN755 Min. values	(Pechiney)
F / H112 [Extru. tube (<25mm)]	80	-	180	14	-	-	EN755 Min. values	(Pechiney)
F / H112 [Extrusion (<25mm)]	80	-	180	14	-	-	EN755 Min. values	(Pechiney)
H111 [Treadplate 1.5 - 3mm]	80	-	190	10	-	-	Minimum	(AMAG)
H111 [Treadplate 3 - 6mm]	80	-	190	12	-	-	Minimum	(AMAG)
H111 [Treadplate 6 - 10mm]	80	-	190	14	-	-	Minimum	(AMAG)
H112 [Sheet/Plate (>6 <12.5mm)]	140	-	210	12	-	62HB	EN485 Min. values	(Pechiney)
H12 [Drawn wire (d<18mm)]	200	-	230	6	-	-	EN1301 / EN11715	(Pechiney)
H12 [Sheet/Plate (>0.2 <40mm)]	170	-	220	-	-	66HB	EN485 Min. values	(Pechiney)
H14 [Drawn wire (d<18mm)]	250	-	255	3	-	-	EN1301 / EN11715	(Pechiney)
H14 [Sheet/Plate (>0.2 <25mm)]	190	-	240	-	-	72HB	EN485 Min. values	(Pechiney)
H14 [Treadplate 1.5 - 3mm]	150	-	240	3	-	-	Minimum	(AMAG)
H14 [Treadplate 3 - 6mm]	150	-	240	4	-	-	Minimum	(AMAG)
H14 [Treadplate 6 - 10mm]	150	-	240	6	-	-	Minimum	(AMAG)
H16 [Sheet/Plate (>0.2 <6mm)]	220	-	265	-	-	80HB	EN485 Min. values	(Pechiney)
H18 [Drawn wire (d<10mm)]	300	-	305	2	-	-	EN1301 / EN11715	(Pechiney)
H18 [Sheet (>0.2 <3mm)]	250	-	290	-	-	88HB	EN485 Min. values	(Pechiney)
H22 / H32 [Sheet/Plate (>0.2 <40mm)]	130	-	220	-	-	63HB	EN485 Min. values	(Pechiney)
H24 / H34 [Sheet/Plate (>0.2 <25mm)]	160	-	240	-	-	70HB	EN485 Min. values	(Pechiney)
H26 / H36 [Sheet/Plate (>0.2 <6mm)]	190	-	265	-	-	78HB	EN485 Min. values	(Pechiney)
H28 / H38 [Sheet (>0.2 <3mm)]	230	-	290	-	-	87HB	EN485 Min. values	(Pechiney)
H32 [Drawn wire (d<18mm)]	160	-	220	11	-	-	EN1301 / EN11715	(Pechiney)
H34 [Drawn wire (d<15mm)]	210	-	245	8	-	-	EN1301 / EN11715	(Pechiney)
H38 [Drawn wire (d<10mm)]	260	-	290	4	-	-	EN1301 / EN11715	(Pechiney)

188 Aluminium Alloys (wrought)

5757	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5854	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5857	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
5954	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 3.3-4.1, Mn 0.1, Zn 0.2, Ti 0.2, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2660								
5957	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6001	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6002	AA (USA)	Wrought						
Official composition: Si 0.6-0.9, Fe 0.25, Cu 0.1-0.25, Mg 0.45-0.7, Mn 0.1-0.2, Ti 0.08, Cr 0.05, Zr 0.09-0.14, Others: Each 0.05 Total 0.15, Aluminium rem.								
6003	AA (USA)	Wrought						
Official composition: Si 0.35-1, Fe 0.6, Cu 0.1, Mg 0.8-1.5, Mn 0.8, Zn 0.2, Ti 0.1, Cr 0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Similar/Equivalent alloys: <u>USA</u> : AA6003, UNS A96003; <u>France</u> : AS-GM; <u>Germany</u> : AlMgSi1								
6004	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.1, Mg 0.4-0.7, Mn 0.2-0.6, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6005	AA (USA)	Wrought						
Official composition: Si 0.6-0.9, Fe 0.35, Cu 0.1, Mg 0.4-0.6, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Tube, Extrusion Similar/Equivalent alloys: <u>USA</u> : AA6005, UNS A96005; <u>European (ISO)</u> : AlSiMg; <u>France</u> : 6005A; ASG: 6181; <u>Germany</u> : AlMgSi0.7; DIN 3.2316; <u>Italy</u> : 9006/6; <u>Switzerland</u> : AlMgSi0.7; <u>UK</u> : H19								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	-	216	245	4	-		Typical	(ALUMISR)
6005A	AA (USA)	Wrought						
Official composition: Si 0.5-0.9, Fe 0.35, Cu 0.3, Mg 0.4-0.7, Mn 0.5, Zn 0.2, Ti 0.1, Cr 0.3, Mn+Cr 0.12-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Tube, Structural profile, Extrusion Similar/Equivalent alloys: <u>USA</u> : AA6005A; <u>European (CEN)</u> : EN573 AW-6005A (ISO): AlSiMg(A); <u>France</u> : A-SG0.5; <u>Germany</u> : AlMgSi0.7; DIN 3.3210; <u>Italy</u> : 9006/6; <u>Switzerland</u> : AlMgSi0.7; <u>Proprietary</u> : Otto Fuchs AS07 Comments: Road and rail transport, marine structures, access equipment, construction. Vehicle general extrusions. High-strength extrusions for engineering applications where surface finish is not critical. Corrosion resistance: Very good Weldability: Very good Machinability: Good Finishing: All types, anodised for protection.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	285	-	300	13	69.5	75HB	RT typical properties	(Pechiney)
T5 [Extr. (<e 6mm)]	215	-	255	8	-		NF A 50-411 Min. values	(Pechiney)
T5 [Extr. (e<6mm)]	225	-	270	8	-		NF A 50-411 Min. values	(Pechiney)
T6 [-]	225	-	270	-	-		Typical	(Raufoss)
T6 [-]	225	-	270	-	-	90HB	Typical	(P. Balloffet)
T6 [Extr. (10<e<25mm)]	200	-	250	8	-		NF A 50-411 Min. values	(Pechiney)
T6 [Extr. (6<e<15mm)]	215	-	260	8	-		NF A 50-411 Min. values	(Pechiney)
T6 [Extr. (6<e<10mm)]	200	-	250	8	-		NF A 50-411 Min. values	(Pechiney)
T6 [Extruded]	260	-	285	8	-	HB92		(Hydro Al. Cent.)
T6 [Tube (2<e<6; D<200mm)]	225	-	270	8	-		NF A 50-411 Min. values	(Pechiney)
T6 [Tube (6<e<20; D<200mm)]	215	-	260	8	-		NF A 50-411 Min. values	(Pechiney)
6005A	Alunord (France)	Wrought						
Proprietary composition: Si 0.6-0.85, Fe 0.15-0.25, Cu 0.06-0.16, Mg 0.4-0.65, Mn 0.07-0.15, Zn 0.05, Ti 0.05, Cr 0.03-0.1, Aluminium rem. Identified Product forms: Extrusion Similar/Equivalent alloys: <u>USA</u> : AA6005A; <u>European (CEN)</u> : EN573 AW-6005A (ISO): AlSiMg(A); <u>France</u> : A-SG0.5; <u>Germany</u> : AlMgSi0.7; DIN 3.3210; <u>Italy</u> : 9006/6; <u>Switzerland</u> : AlMgSi0.7; <u>Proprietary</u> : Otto Fuchs AS07; Alunord 6005A								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	200	-	250	8	-		Typical	(Alunord)
T5 [-]	215	-	260	8	-		Typical	(Alunord)
T5 [-]	225	-	270	8	-		Typical	(Alunord)

Aluminium Alloys (wrought) 189

6005A	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.5-0.9, Fe 0.35, Cu 0.3, Mg 0.4-0.7, Mn 0.5, Zn 0.2, Ti 0.1, Cr 0.3, Mn+Cr 0.12-0.5, Others: Each 0.05 Total 0.15, Aluminium rem.								
Density (kg.m ⁻³) 2700								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <u>USA</u> : AA6005A; <u>European (CEN)</u> : EN573 AW-6005A (<u>ISO</u>): AISiMg(A); <u>France</u> : 6005A; ASG; 6181; <u>Germany</u> : AlMgSi0.7; DIN 3.3210; <u>Italy</u> : 9006/6; <u>Switzerland</u> : AlMgSi0.7; <u>Proprietary</u> : Otto Fuchs AS07								
Comments: For comments see: AA series. Corrosion resistance: Very good. Weldability: Very good. Machinability: Good. Finishing: All types, anodised for protection.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Extru. Hollow (<10mm)]	90	-	180	15	-		EN755 Min. values	(Pechiney)
T4 [Extrusion (<25mm)]	90	-	180	15	-		EN755 Min. values	(Pechiney)
T6 [-]	260	-	290	8	-		Typical min.	(Alcoa Extr. (UK))
T6 [Extru. Hollow (>5 <15mm)]	200	-	250	8	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (>10 <25mm)]	200	-	250	8	-		EN755 Min. values	(Pechiney)
6005B	AA (USA)	Wrought						
Official composition: Si 0.45-0.8, Fe 0.3, Cu 0.1, Mg 0.4-0.8, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
6006	AA (USA)	Wrought						
Official composition: Si 0.2-0.6, Fe 0.35, Cu 0.15-0.3, Mg 0.45-0.9, Mn 0.05-0.2, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6007	AA (USA)	Wrought						
Official composition: Si 0.9-1.4, Fe 0.7, Cu 0.2, Mg 0.6-0.9, Mn 0.05-0.25, Zn 0.25, Ti 0.15, Cr 0.05-0.25, Zr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6008	AA (USA)	Wrought						
Official composition: Si 0.5-0.9, Fe 0.35, Cu 0.3, Mg 0.4-0.7, Mn 0.3, Zn 0.2, Ti 0.1, Cr 0.3, V 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
6009	AA (USA)	Wrought						
Official composition: Si 0.6-1, Fe 0.5, Cu 0.15-0.6, Mg 0.4-0.8, Mn 0.2-0.8, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6010	AA (USA)	Wrought						
Official composition: Si 0.8-1.2, Fe 0.5, Cu 0.15-0.6, Mg 0.6-1, Mn 0.2-0.8, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6010	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA</u> : AA6082, UNS A96082; <u>European (CEN)</u> : EN573 AW-6082; AW-AISI1MgMn (<u>ISO</u>): AlMgSi1Mn (<u>AECMA</u>): AL-P21; <u>Canada</u> : GS11R; <u>France</u> : A-SGM, A-SGM0.7; 6082; <u>Germany</u> : AlMgSi1; Wk.3.2315; <u>Italy</u> : 9006/4, 3571; FA60-6082; P-AISI1M8Mn; <u>Spain</u> : L-3453; <u>Sweden</u> : 14,4212; <u>Switzerland</u> : AlMgSi1Mn; 10850; <u>UK</u> : 6082; BS H30 (HE30, HS 30); <u>Others</u> : (CZ) CSN 42 4400; Eur. aerospace P-6082								
Comments: Hoogovens version of AA 6082.								
6011	AA (USA)	Wrought						
Official composition: Si 0.6-1.2, Fe 1, Cu 0.4-0.9, Mg 0.6-1.2, Mn 0.8, Zn 1.5, Ni 0.2, Ti 0.2, Cr 0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6012	AA (USA)	Wrought						
Official composition: Si 0.6-1.4, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.3, Ti 0.2, Cr 0.3, Bi 0.7, Pb 0.4-2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA</u> : AA6012; <u>European (CEN)</u> : EN573 AW-6012; <u>Germany</u> : AlMgSiPb; DIN 3.0615; <u>Proprietary</u> : Otto Fuchs AB13								
6012	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.6-1.4, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.3, Ti 0.2, Cr 0.3, Bi 0.7, Pb 0.4-2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: <u>USA</u> : AA6012; <u>European (CEN)</u> : EN573 AW-6012; <u>Germany</u> : AlMgSiPb; DIN 3.0615; <u>Proprietary</u> : Otto Fuchs AB13								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Drawn bar (<80mm)]	100	-	200	10	-		EN754 Min. values	(Pechiney)
T4 [Drawn tube (<20mm)]	100	-	200	10	-		EN754 Min. values	(Pechiney)
T6 [Drawn bar (<80mm)]	260	-	310	8	-		EN754 Min. values	(Pechiney)
T6 [Drawn tube (<20mm)]	260	-	310	8	-		EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<150mm)]	260	-	310	8	-		EN755 Min. values	(Pechiney)
T6 [Extru. Tube (<30mm)]	260	-	310	8	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (<30mm)]	-	-	-	8	-		EN755 Min. values	(Pechiney)
T6510/T6511 [Extru. Bar (<200mm)]	200	-	260	8	-		EN755 Min. values	(Pechiney)
T6510/T6511 [Extru. Tube (<30mm)]	260	-	310	8	-		EN755 Min. values	(Pechiney)
T6510/T6511 [Extrusion (<30mm)]	260	-	310	-	-		EN755 Min. values	(Pechiney)
6013	AA (USA)	Wrought						
Official composition: Si 0.6-1, Fe 0.5, Cu 0.6-1.1, Mg 0.8-1.2, Mn 0.2-0.8, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
Similar/Equivalent alloys: <u>USA</u> : AA6013, AMS 4347, 4216								
6014	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.35, Cu 0.25, Mg 0.4-0.8, Mn 0.05-0.2, Zn 0.1, Ti 0.1, Cr 0.2, V 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
6015	AA (USA)	Wrought						
Official composition: Si 0.2-0.4, Fe 0.1-0.3, Cu 0.1-0.25, Mg 0.8-1.1, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								

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6016	AA (USA)	Wrought						
Official composition: Si 1-1.5, Fe 0.5, Cu 0.2, Mg 0.25-0.6, Mn 0.2, Zn 0.2, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
6016A	AA (USA)	Wrought						
Official composition: Si 0.9-1.5, Fe 0.5, Cu 0.25, Mg 0.2-0.6, Mn 0.2, Zn 0.2, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
6017	AA (USA)	Wrought						
Official composition: Si 0.55-0.7, Fe 0.15-0.3, Cu 0.05-0.2, Mg 0.45-0.6, Mn 0.1, Zn 0.05, Ti 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6018	AA (USA)	Wrought						
Official composition: Si 0.5-1.2, Fe 0.7, Cu 0.15-0.4, Mg 0.6-1.2, Mn 0.3-0.8, Zn 0.3, Ti 0.2, Cr 0.1, Bi 0.4-0.7, Pb 0.4-1.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA6018; <u>European (CEN):</u> EN573 AW-6018; <u>Germany:</u> 3.0615								
6020	AA (USA)	Wrought						
Official composition: Si 0.4-0.9, Fe 0.5, Cu 0.3-0.9, Mg 0.6-1.2, Mn 0.35, Zn 0.2, Ti 0.15, Cr 0.15, Pb 0.05, Sn 0.9-1.5, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
6022	AA (USA)	Wrought						
Official composition: Si 0.8-1.5, Fe 0.05-0.2, Cu 0.01-0.11, Mg 0.45-0.7, Mn 0.02-0.1, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
6051	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								
6053	AA (USA)	Wrought						
Official composition: Fe 0.35, Cu 0.1, Mg 1.1-1.4, Zn 0.1, Cr 0.15-0.35, Si = 45-65% of Mg, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Tube, Structural profile, Extrusion, Bar								
Similar/Equivalent alloys: <u>USA:</u> AA6053, UNS A96053; <u>Canada:</u> GS11P; <u>UK:</u> 6053								
Comments: (See: 6003)								
6056	AA (USA)	Wrought						
Official composition: Si 0.7-1.3, Fe 0.5, Cu 0.5-1.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.1-0.7, Ti 0.1, Cr 0.25, Ti+Zr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA6056; <u>European (CEN):</u> EN573 AW-6056								
6056	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.7-1.3, Fe 0.5, Cu 0.5-1.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.1-0.7, Cr 0.25, Ti+Zr 0.2 max., Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA6056; <u>European (CEN):</u> EN573 AW-6056								
6060	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.1, Mg 0.35-0.6, Mn 0.1, Zn 0.15, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
Identified Product forms: Tube, Structural profile, Extrusion, Bar								
Similar/Equivalent alloys: <u>USA:</u> AA6060; <u>European (CEN):</u> EN573 AW 6060 (<u>ISO:</u> AlMgSi, AlMgSiFe; <u>France:</u> A-GS; 6060; <u>Germany:</u> AlMgSi0.5; Wk.3.3206; <u>Italy:</u> 9006/1; 3569; P-AlMgSi; <u>Japan:</u> A6063; <u>Spain:</u> L-3442; <u>Sweden:</u> 4103; <u>Switzerland:</u> AlMgSi0.5; <u>UK:</u> 6060; 6063; BS H9; <u>Others:</u> (CZ) CSN 42 4401; <u>Proprietary:</u> Otto Fuchs AS05; SECO Dilute;								
Comments: Medium strength drawn tube and extrusions. For architectural components, glazing bars, window frames, windscreen sections, road & marine transport.								
Corrosion resistance: Good Weldability: All methods Machinability: Best in T6 Finishing: All types, good anodising characteristics.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T1 [Extruded (e<15mm)]	65	-	130	15	-		NF A 50-411 Min. values	(Pechiney)
T1 [Tube (2<e<20;D<200mm)]	65	-	130	14	-		NF A 50-411 Min. values	(Pechiney)
T4 [Extruded]	60	-	120	16	-	50HB		(Hydro Al. Cent.)
T5 [-]	195	-	220	11	69.5	70HB	RT typical properties	(Pechiney)
T5 [Extr. (e<6; s<2000mm)]	150	-	190	10	-		NF A 50-411 Min. values	(Pechiney)
T5 [Extr. (e>6; s<8000mm)]	130	-	180	10	-		NF A 50-411 Min. values	(Pechiney)
T5 [Tube (2<e<20;D<200mm)]	150	-	190	10	-		NF A 50-411 Min. values	(Pechiney)
T51 [Tube (2<e<20;D<200mm)]	110	-	150	12	-		NF A 50-411 Min. values	(Pechiney)
T6 [-]	170	-	215	-	-	70HB	Typical	(P. Balloffet)
T6 [Extruded]	150	-	190	8	-	85HB		(Hydro Al. Cent.)
6060	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.1, Mg 0.35-0.6, Mn 0.1, Zn 0.15, Ti 0.1, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA6060/6063; <u>European (CEN):</u> EN573 AW 6060 (<u>ISO:</u> AlMgSi, AlMgSiFe; <u>France:</u> A-GS; 6060; <u>Germany:</u> AlMgSi0.5; Wk.3.3206; <u>Italy:</u> 9006/1; 3569; P-AlMgSi; <u>Japan:</u> A6063; <u>Spain:</u> L-3442; <u>Sweden:</u> 4103; <u>Switzerland:</u> AlMgSi0.5; <u>UK:</u> 6060; 6063; <u>Others:</u> (CZ) CSN 42 4401; <u>Proprietary:</u> Otto Fuchs AS05; Alunord 6060.48, 6060.79								
Comments: For comments see: AA series. Corrosion resistance: Good. Weldability: All methods. Machinability: Best in T6. Finishing: All types, good anodising characteristics.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Drawn Bar (<80mm)]	65	-	130	15	-		EN754 Min. values	(Pechiney)
T4 [Extrusion (<25mm)]	60	-	120	16	-		EN755 Min. values	(Pechiney)
T5 [Extrusion (>5 <25mm)]	100	-	140	8	-		EN755 Min. values	(Pechiney)
T6 [Drawn Bar (<80mm)]	160	-	215	12	-		EN754 Min. values	(Pechiney)
T6 [Extrusion (>3 <25mm)]	140	-	170	8	-		EN755 Min. values	(Pechiney)

Aluminium Alloys (wrought) 191

6060.48 Alunord (France) Wrought

Proprietary composition: Si 0.4-0.47, Fe 0.17-0.21, Cu 0.02, Mg 0.45-0.55, Mn 0.034, Zn 0.25, Ti 0.04, Cr 0.01, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* AA6060/6063; *European (CEN):* EN573 AW 6060 (*ISO:* AlMgSi, AlMgSiFe; *France:* A-GS; 6060; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 9006/1; 3569; P-AlMgSi; *Japan:* A6063; *Spain:* L-3442; *Sweden:* 4103; *Switzerland:* AlMgSi0.5; *UK:* 6060; 6063; BS H9; *Others:* (CZ) CSN 42 4401; *Proprietary:* Otto Fuchs AS05; SECO Dilute; Alunord 6060.48

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T1 [-]	65	-	130	15	-	-	Typical	(Alunord)
T5 [-]	150	-	190	10	-	-	Typical	(Alunord)

6060.79 Alunord (France) Wrought

Proprietary composition: Si 0.53-0.58, Fe 0.14-0.24, Cu 0.06, Mg 0.65-0.73, Mn 0.03, Zn 0.06, Ti 0.02, Cr 0.02, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* AA6060/6063; *European (CEN):* EN573 AW 6060 (*ISO:* AlMgSi, AlMgSiFe; *France:* A-GS; 6060; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 9006/1; 3569; P-AlMgSi; *Japan:* A6063; *Spain:* L-3442; *Sweden:* 4103; *Switzerland:* AlMgSi0.5; *UK:* 6060; 6063; BS H9; *Others:* (CZ) CSN 42 4401; *Proprietary:* Otto Fuchs AS05; SECO Dilute; Alunord 6060.79

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	180	-	225	10	-	-	Typical	(Alunord)

6061 AA (USA) Wrought

Official composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Structural profile, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock

Similar/Equivalent alloys: *USA:* AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161, MIL -A-22771, -P-25995, QQ -A-250/11, -A-225/8, -A-200/8, -A-367; *European (CEN):* EN573 AW-6061; AW-AlMg1SiCu (*ISO:* AlMg1SiCu; *Australia:* A6061; *Canada:* GS11N; *France:* A-GSUC; 6061; AIR 9048-660; *Germany:* AlMgSi1Cu; AlMgSiCu; Wk.3.3211; LW3.3214; *Italy:* 9006/2; 6170-68; FA60-6061; *Japan:* A6061P; *Spain:* L-3420; *UK:* 6061; BS H20; BS L117, L118; *Others:* USA-WW-T-700/6; Eur. aerospace P-6061; *Proprietary:* Alcan 65S, 43, Dural F; Otto Fuchs AS20; Hoogovens 6560; Reynolds R-2000 (tooling plate)

Comments: Welded structures. Stressed structural applications, road and rail transport, general construction. Similar mechanical properties to 6082. Pressure vessels, construction, aerospace, mechanical engineering. Marine applications. Structural extrusions (vehicles, lorry bodies), scaffolding. **Corrosion resistance:** Good (atmospheric) **Weldability:** Very good (fusion) **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	55	124	25	69	30HB	Typical	(#1)
O [Bar (10<D/C<50)]	110	-	155	16	-	-	NF A 50-411 UTS max.	(Pechiney)
O [Bar (20<D/C<150)]	110	-	150	16	-	-	NF A 50-411 UTS max.	(Pechiney)
H111 [Bar (20<e<150mm)]	110	-	150	16	-	-	NF A 50-411 UTS max.	(Pechiney)
H111 [Bar (8<e<30mm)]	110	-	155	16	-	-	NF A 50-411 UTS max.	(Pechiney)
T4 [-]	-	108	177	16	-	65HB	Typical	(ALUMISR)
T4 [Bar (10<D/C<50)]	110	-	205	17	-	-	NF A 50-411 Min. values	(Pechiney)
T4 [Bar (20<D/C<150)]	110	-	180	14	-	-	NF A 50-411 Min. values	(Pechiney)
T4 [Bar (20<e<150mm)]	110	-	180	14	-	-	NF A 50-411 Min. values	(Pechiney)
T4 [Bar (8<e<30mm)]	110	-	205	17	-	-	NF A 50-411 Min. values	(Pechiney)
T4 [Extr. (e<25; S12000)]	110	-	180	14	-	-	NF A 50-411 Min. values	(Pechiney)
T4, T451 [-]	-	145	241	22	69	65HB	Typical	(#1)
T6 [-]	270	-	305	13	69.5	95HB	RT typical properties	(Pechiney)
T6 [-]	240	-	260	-	-	95HB	Typical	(P. Balloffet)
T6 [-]	-	235	255	8	-	90HB	Typical	(ALUMISR)
T6 [-]	265	-	305	-	-	-	Typical	(Raufoss)
T6 [Bar (10<D/C<50)]	245	-	260	8	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Bar (20<D/C<150)]	240	-	260	8	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Bar (20<e<150mm)]	240	-	260	8	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Bar (8<e<30mm)]	245	-	260	8	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Extr. (6<e<25; S<12000)]	240	-	260	9	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Extr. (e<6; 8000)]	240	-	260	7	-	-	NF A 50-411 Min. values	(Pechiney)
T6, T651 [-]	-	276	310	12	69	95HB	Typical	(#1)
T651 [Hot rolled plate, 50mm]	305	-	330	12	69	95HB	Transverse properties (Typ.)	(BAI Plate)

192 Aluminium Alloys (wrought)

6061

CEN 573 (Europe)

Wrought

Nominal composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion

Similar/Equivalent alloys: **USA:** AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161, MIL -A-22771, -P-25995, QQ -A-250/11, -A-225/8, -A-200/8, -A-367; **European (CEN):** EN573 AW-6061; AW- $AlMg_1SiCu$ (**ISO**): $AlMg_1SiCu$; **Australia:** A6061; **Canada:** GS11N; **France:** A-GSUC; 6061; AIR 9048-660; **Germany:** $AlMgSi_1Cu$; $AlMgSiCu$; Wk.3.3211; LW3.3214; **Italy:** 9006/2; 6170-68; FA60-6061; **Japan:** A6061P; **Spain:** L-3420; **UK:** 6061; BS H20; BS L117, L118; **Others:** USA-WW-T-700/6; Eur. aerospace P-6061; **Proprietary:** Alcan 65S, 43, Dural F; Otto Fuchs AS20; Hoogovens 6560

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate (>0.4 <25mm)]	85	-	150	-	-	40HB	EN485 Max. values	(Pechiney)
O / H111 [Drawn bar (<80mm)]	110	-	150	16	-		EN754 Max. values	(Pechiney)
O / H111 [Drawn tube (<20mm)]	110	-	150	16	-		EN754 Max. values	(Pechiney)
O / H111 [Extru. Bar (<200mm)]	110	-	150	16	-		EN755 Max. values	(Pechiney)
O / H111 [Extru. Tube (<25mm)]	110	-	150	16	-		EN755 Max. values	(Pechiney)
T4 [Drawn bar (<80mm)]	110	-	205	16	-		EN754 Min. values	(Pechiney)
T4 [Drawn tube (<20mm)]	110	-	205	16	-		EN754 Min. values	(Pechiney)
T4 [Extru. Bar (<200mm)]	110	-	180	15	-		EN755 Min. values	(Pechiney)
T4 [Extru. Tube (<25mm)]	110	-	180	15	-		EN755 Min. values	(Pechiney)
T4 [Extrusion (<25mm)]	110	-	180	15	-		EN755 Min. values	(Pechiney)
T4 [Sheet (>0.4 <1.5mm)]	110	-	205	12	-	58HB	EN485 Min. values	(Pechiney)
T4 [Treadplate 1.5 - 3mm]	110	-	205	8	-		Minimum	(AMAG)
T4 [Treadplate 3 - 6mm]	110	-	205	10	-		Minimum	(AMAG)
T4 [Treadplate 6 - 10mm]	110	-	205	12	-		Minimum	(AMAG)
T4/F21 [Plate 12.5 - 40mm]	110	-	205	-	-		Minimum	(AMAG)
T4/F21 [Plate 3 - 6mm]	110	-	205	16	-		Minimum	(AMAG)
T4/F21 [Plate 6 - 12.5mm]	110	-	205	18	-		Minimum	(AMAG)
T42 [Sheet/Plate (>0.4 <80mm)]	95	-	205	-	-	57HB	EN485 Min. values	(Pechiney)
T451 [Sheet/Plate (>1.5 <80mm)]	110	-	205	-	-	58HB	EN485 Min. values	(Pechiney)
T6 [Drawn bar (<80mm)]	240	-	290	10	-		EN754 Min. values	(Pechiney)
T6 [Drawn tube (<20mm)]	240	-	290	10	-		EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<200mm)]	240	-	260	8	-		EN755 Min. values	(Pechiney)
T6 [Extru. Tube (>5 <25mm)]	240	-	260	10	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (>5 <25mm)]	240	-	260	10	-		EN755 Min. values	(Pechiney)
T6 [Sheet (>0.4 <1.5mm)]	240	-	290	6	-	88HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	240	-	290	6	-	88HB	Minimum	(AMAG)
T6 [Treadplate 1.5 - 3mm]	240	-	290	4	-		Minimum	(AMAG)
T6 [Treadplate 3 - 6mm]	240	-	290	6	-		Minimum	(AMAG)
T6 [Treadplate 6 - 10mm]	240	-	290	8	-		Minimum	(AMAG)
T6/F30 [Plate 12.5 - 40mm]	240	-	290	-	-		Minimum	(AMAG)
T6/F30 [Plate 3 - 6mm]	240	-	290	10	-		Minimum	(AMAG)
T6/F30 [Plate 6 - 12.5mm]	240	-	290	9	-		Minimum	(AMAG)
T62 [Plate (>100 <150mm)]	240	-	275	5	-	84HB	EN485 Min. values	(Pechiney)
T62 [Plate (>150 <175mm)]	230	-	265	4	-	81HB	EN485 Min. values	(Pechiney)
T62 [Plate (>80 <100mm)]	240	-	290	5	-	88HB	EN485 Min. values	(Pechiney)
T62 [Sheet/Plate (>3 <40mm)]	240	-	290	8	-	88HB	EN485 Min. values	(Pechiney)
T651 [Plate (>12.5 <80mm)]	240	-	295	8	-	89HB	EN485 Min. values	(Pechiney)
T651 [Sheet (>1.5 <3mm)]	240	-	290	7	-	88HB	EN485 Min. values	(Pechiney)

6061A

AA (USA)

Wrought

Official composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.35, Pb 0.003, Others: Each 0.05 Total 0.15, Aluminium rem.

6062

AA (USA)

Wrought

No composition: -

Comments: Listed by AA as Inactive.

6063 AA (USA) Wrought

Official composition: Si 0.2-0.6, Fe 0.35, Cu 0.1, Mg 0.45-0.9, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Tube, Pipe, Structural profile, Extrusion, Forging stock/Billet, Bar, Wire

Similar/Equivalent alloys: *USA:* AA6063, UNS A96063; *European (CEN):* EN573 AW-6063 (*ISO:* AlMg0.7Si, AlMgSi, AlMg0.5Si; *Australia:* B6063; *Austria:* AlMgSi0.5; *Canada:* GS10; *France:* A-GS; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 3569; P-AISI0.4Mg; P-AlMgSi; *Japan:* A6063; *Spain:* L-3441; *Sweden:* 14.4104; *UK:* 6063; H9, H19, HE9; DTD 372B; HG9; *Proprietary:* Alcan 50S, 46; Otto Fuchs AS05; SAPA 6063 HIS; SAPA 6063 HIP; SAPA 6063 HIT;

Comments: General purpose medium strength extrusions. For architectural components, glazing bars, window frames, windscreen sections and road transport. Car window frames. Slightly lower strength than 6082. Extrusions for interior fittings, architectural elements & other general light/moderate loaded engineering applications needing a good surface finish. **Corrosion resistance:** Good **Weldability:** All methods **Machinability:** Good, Best in T6 **Finishing:** All types, very good response to anodizing.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	48	90	-	69	25HB		(#1)
T1 [-]	-	90	152	20	69	42HB	Typical	(#1)
T4 [-]	-	90	172	22	69		Typical	(#1)
T4 [-]	90	-	160	21	69		Typical	(Alcan Extr./Auto.)
T4 [-]	-	69	123	14	-	40HB	Typical	(ALUMISR)
T4 [Extruded]	70	-	130	16	-	50HB		(Hydro Al. Cent.)
T5 [-]	-	145	186	12	69	60HB	Typical	(#1)
T5 [-]	210	-	245	12	69		Typical	(Alcan Extr./Auto.)
T5 [-]	-	103	142	8	-	60HB	Typical	(ALUMISR)
T6 [-]	-	214	241	12	69	73HB	Typical	(#1)
T6 [-]	-	167	201	10	-	70HB	Typical	(ALUMISR)
T6 [-]	180	-	210	-	-		Typical	(Raufoss)
T6 [-]	160	-	195	7	-		Typical min.	(Alcoa Extr. (UK))
T6 [Extruded]	160	-	195	8	-	75HB		(Hydro Al. Cent.)
T6 [Extrusion]	160	-	195	8	-			(Aalco (Glynwed))
T8 [-]	175	-	205	13	69		Typical	(Alcan Extr./Auto.)
T83 [-]	-	241	255	9	69	82HB	Typical	(#1)
T831 [-]	-	186	207	10	69	70HB	Typical	(#1)
T832 [-]	-	269	290	12	69	95HB	Typical	(#1)
TB (T4) [Extr. (<150mm)]	70	-	130	14	-		Typical	(SECO)
TE (T5) [Extr. (<150mm)]	160	-	195	7	-		Typical	(SECO)
TE (T5) [Extr. >150 <200mm]	130	-	150	-	-		Typical	(SECO)

6063 CEN 573 (Europe) Wrought

Nominal composition: Si 0.2-0.6, Fe 0.35, Cu 0.1, Mg 0.45-0.9, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* AA6063, UNS A96063; *European (CEN):* EN573 AW-6063 (*ISO:* AlMg0.7Si, AlMgSi, AlMg0.5Si; *Australia:* B6063; *Austria:* AlMgSi0.5; *Canada:* GS10; *France:* A-GS; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 3569; P-AISI0.4Mg; P-AlMgSi; *Japan:* A6063; *Spain:* L-3441; *Sweden:* 14.4104; *UK:* 6063; H9, H19, HE9; DTD 372B; HG9; *Proprietary:* Alcan 50S, 46; Otto Fuchs AS05

Comments: For comments see: AA series. **Corrosion resistance:** Good. **Weldability:** All methods. **Machinability:** Best in T6. **Finishing:** All types, very good response to anodizing.

6063A AA (USA) Wrought

Official composition: Si 0.3-0.6, Fe 0.15-0.35, Cu 0.1, Mg 0.6-0.9, Mn 0.15, Zn 0.15, Ti 0.1, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Tube, Structural profile, Extrusion, Bar

Similar/Equivalent alloys: *USA:* AA6063A; *European (ISO):* AlMg0.7Si(A), AlMg0.5Si; *Germany:* DIN 3.3206; *UK:* SEL1000; *Proprietary:* Alcan E50S; Otto Fuchs AS05

Comments: General purpose medium strength extrusions. For architectural components, glazing bars, window frames, windscreen sections and road transport. Slightly lower strength than 6082. Higher strength than 6063, but maintains good finish quality. **Corrosion resistance:** Good **Weldability:** All methods **Machinability:** Best in T6 **Finishing:** All types, very good response to anodizing.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Extruded]	90	-	150	14	-	52HB		(Hydro Al. Cent.)
T6 [-]	190	-	230	7	-		Typical min.	(Alcoa Extr. (UK))
T6 [Extruded]	190	-	230	8	-	90HB		(Hydro Al. Cent.)
T6 [Extrusion]	190	-	230	8	-			(Aalco (Glynwed))
TB (T4) [Extrusion (<25mm)]	90	-	150	12	-		Typical	(SECO)
TE (T4) [Extrusion (<25mm)]	160	-	200	7	-		Typical	(SECO)
TF (T6) [Extrusion (<25mm)]	190	-	230	7	-		Typical	(SECO)

6066 AA (USA) Wrought

Official composition: Si 0.9-1.8, Fe 0.5, Cu 0.7-1.2, Mg 0.8-1.4, Mn 0.6-1.1, Zn 0.25, Ti 0.2, Cr 0.4, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Tube, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: *USA:* AA6066, UNS A96066; *UK:* BS 2L84; *Proprietary:* ALCAN 623

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	83	152	18	69	43HB	Typical	(#1)
T4, T451 [-]	-	207	359	18	69	90HB	Typical	(#1)
T6, T651 [-]	-	359	393	12	69	120HB	Typical	(#1)

6069 AA (USA) Wrought

Official composition: Si 0.6-1.2, Fe 0.4, Cu 0.55-1, Mg 1.2-1.6, Mn 0.05, Zn 0.05, Ti 0.1, Cr 0.05-0.3, V 0.1-0.3, Sr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Comments: Designation added to AA (USA) register since previous issue (06/94)

6070 AA (USA) Wrought

Official composition: Si 1-1.7, Fe 0.5, Cu 0.15-0.4, Mg 0.5-1.2, Mn 0.4-1, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2710

Identified Product forms: Tube, Extrusion

Comments: Similar to 6082 but slightly higher strength.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [-]	-	352	379	10	69		Typical	(#1)

194 Aluminium Alloys (wrought)

6071 AA (USA) Wrought

No composition: -

Comments: Listed by AA as Inactive.

6081 AA (USA) Wrought

Official composition: Si 0.7-1.1, Fe 0.5, Cu 0.1, Mg 0.6-1, Mn 0.1-0.45, Zn 0.2, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.

Similar/Equivalent alloys: USA: AA6081, UNS A96081; European (CEN): EN573 AW-6081; France: A-SGM0.3; 6081; Proprietary: Alunord 6081-11

6081-11 Alunord (France) Wrought

Proprietary composition: Si 0.8-0.9, Fe 0.25, Cu 0.04, Mg 0.6-0.7, Mn 0.02, Zn 0.02, Ti 0.02, Cr 0.02, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6005, UNS A96005; European (ISO): AISiMg; France: 6005A; ASG; 6181; Germany: AlMgSi0.7; DIN 3.2316; Italy: 9006/6; Switzerland: AlMgSi0.7; UK: H19; Proprietary: Otto Fuchs AS07; Alunord 6081-11

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	200	-	275	8	-	-	Typical	(Alunord)

6082 AA (USA) Wrought

Official composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.2, Ti 0.1, Cr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Bar, Wire, Rivet stock

Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AISI1MgMn (ISO): AlMgSi1Mn (AECMA): AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AISI1M8Mn; Spain: L-3453; Sweden: 14,4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082; Proprietary: Alcan B51S, 44, Dural H; Otto Fuchs AS10; Hoogovens 6010

Comments: Welded structures. Medium strength alloy. Stressed structural applications for engineering and transport, beer kegs. General construction. Road and rail transport, scaffolding, bridges, cranes and heavy structures. Pressure vessels, aerospace, mechanical engineering. Vehicle bumper-beams, windscreen top-rail.

Structural extrusions (vehicles, lorry bodies), scaffolding. **Corrosion resistance**: Very good **Weldability**: Very good **Machinability**: Very good **Finishing**: All types, anodised for protection.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	-	-	70	-	-	(Hoogovens)
T4 [Extr. 1.2<e<20; S<10000]	110	-	205	14	-	-	NF A 50-411 Min. values	(Pechiney)
T4 [Extruded]	120	-	190	16	-	HB70	-	(Hydro Al. Cent.)
T5 [-]	310	-	340	11	69	-	Typical	(Alcan Extr./Auto.)
T6 [-]	280	-	315	12	69.5	HB95	RT typical properties	(Pechiney)
T6 [-]	260	-	310	-	-	100HB	Typical	(P. Balloffet)
T6 [-]	255	-	295	7	-	-	Typical min.	(Alcoa Extr. (UK))
T6 [-]	270	-	310	-	-	-	Typical	(Raufoss)
T6 [-]	-	245	284	7	-	90HB	Typical	(ALUMISR)
T6 [Extr. 1.2<e<20; S<10000]	250	-	290	10	-	-	NF A 50-411 Min. values	(Pechiney)
T6 [Extruded]	255	-	295	8	-	HB95	-	(Hydro Al. Cent.)
T6 [Extrusion]	270	-	310	9	-	-	EI. min.	(Aalco (Glynwed))
T651 [-]	205	-	275	4	-	-	Minimum	(Aalco (Glynwed))
T651 [Hot rolled plate, 50mm]	305	-	330	12	69	95HB	Transverse properties (Typ.)	(BAI Plate)
T8 [-]	230	-	260	12	69	-	Typical	(Alcan Extr./Auto.)
TB (T4) [Extr. (<150mm)]	120	-	190	14	-	-	Typical	(SECO)
TB (T4) [Extr. (>150 <200mm)]	100	-	170	13	-	-	Typical	(SECO)
TE (T5) [Extr. (<6mm)]	230	-	270	9	-	-	Typical	(SECO)
TF (T6) [Extr. (<20mm)]	225	-	295	7	-	-	Typical	(SECO)
TF (T6) [Extr. (>150 <200mm)]	240	-	280	5	-	-	Typical	(SECO)
TF (T6) [Extr. (>20 <150mm)]	270	-	310	8	-	-	Typical	(SECO)

Aluminium Alloys (wrought) 195

6082 CEN 573 (Europe) Wrought

Nominal composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.2, Ti 0.1, Cr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion

Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AISi1MgMn (ISO: AlMgSi1Mn (AECMA: AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AISi1M8Mn; Spain: L-3453; Sweden: 14, 4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082; Proprietary: Alcan B51S, 44, Dural H; Otto Fuchs AS10; Hoogovens 6010; Alunord 6082-50

Comments: For comments see: AA series. **Corrosion resistance:** Very good. **Weldability:** Very good. **Machinability:** Good. **Finishing:** All types, anodised for protection.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate (>0.4 <12.5mm)]	85	-	150	-	-	40HB	EN485 Min. values	(Pechiney)
O / H111 [Drawn bar (<80mm)]	110	-	160	15	-		EN754 Max. values	(Pechiney)
O / H111 [Drawn tube (<20mm)]	110	-	160	15	-		EN754 Max. values	(Pechiney)
O / H111 [Extru. Bar (<200mm)]	110	-	160	14	-		EN755 Max. values	(Pechiney)
O / H111 [Extrusion]	110	-	160	14	-		EN755 Max. values	(Pechiney)
O H111 [Extru. Tube (<25mm)]	110	-	160	14	-		EN755 Max. values	(Pechiney)
T4 [Drawn bar (<80mm)]	110	-	205	14	-		EN754 Min. values	(Pechiney)
T4 [Drawn tube (<20mm)]	110	-	205	14	-		EN754 Min. values	(Pechiney)
T4 [Extru. Bar (<200mm)]	110	-	205	14	-		EN755 Min. values	(Pechiney)
T4 [Extru. Tube (<25mm)]	110	-	205	14	-		EN755 Min. values	(Pechiney)
T4 [Extrusion (<25mm)]	110	-	205	14	-		EN755 Min. values	(Pechiney)
T4 [Sheet (>0.4 <1.5mm)]	110	-	205	12	-	58HB	EN485 Min. values	(Pechiney)
T4 [Treadplate 1.5 - 3mm]	110	-	205	8	-		Minimum	(AMAG)
T4 [Treadplate 3 - 6mm]	110	-	205	10	-		Minimum	(AMAG)
T4 [Treadplate 6 - 10mm]	110	-	205	12	-		Minimum	(AMAG)
T4/F21 [Plate 12.5 - 40mm]	110	-	205	-	-		Minimum	(AMAG)
T4/F21 [Plate 3 - 6mm]	110	-	205	15	-		Minimum	(AMAG)
T4/F21 [Plate 6 - 12.5mm]	110	-	205	14	-		Minimum	(AMAG)
T42 [Sheet/Plate (>0.4 <80mm)]	95	-	205	-	-	57HB	EN485 Min. values	(Pechiney)
T451 [Sheet/Plate (>1.5 <80mm)]	110	-	205	-	-	58HB	EN485 Min. values	(Pechiney)
T5 [Extru. hollow(<5mm)]	230	-	270	8	-		EN755 Min. values	(Pechiney)
T5 [Extrusion (<5mm)]	230	-	270	8	-		EN755 Min. values	(Pechiney)
T6 [Drawn bar (<80mm)]	255	-	310	10	-		EN754 Min. values	(Pechiney)
T6 [Drawn tube (>5 <20mm)]	240	-	310	10	-		EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<200: <250mm)]	200	-	270	6	-		EN755 Min. values	(Pechiney)
T6 [Extru. Tube (>5 <25mm)]	250	-	310	10	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (>5 <25mm)]	260	-	310	10	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (>5 <25mm)]	260	-	310	10	-		EN755 Min. values	(Pechiney)
T6 [Sheet (>0.4 <1.5mm)]	260	-	310	6	-	94HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	260	-	310	6	-	94HB	Minimum	(AMAG)
T6 [Treadplate 1.5 - 3mm]	260	-	310	4	-		Minimum	(AMAG)
T6 [Treadplate 3 - 6mm]	260	-	310	6	-		Minimum	(AMAG)
T6 [Treadplate 6 - 10mm]	260	-	310	9	-		Minimum	(AMAG)
T6/F30 [Plate 12.5 - 40mm]	240	-	295	-	-		Minimum	(AMAG)
T6/F30 [Plate 3 - 6mm]	260	-	310	10	-		Minimum	(AMAG)
T6/F30 [Plate 6 - 12.5mm]	255	-	300	9	-		Minimum	(AMAG)
T62 [Plate (>100 <150mm)]	240	-	275	6	-	84HB	EN485 Min. values	(Pechiney)
T62 [Plate (>12.5 <100mm)]	240	-	295	-	-	89HB	EN485 Min. values	(Pechiney)
T62 [Plate (>150 <175mm)]	230	-	275	4	-	83HB	EN485 Min. values	(Pechiney)
T62 [Plate (>6 <12.5mm)]	255	-	310	9	-	91HB	EN485 Min. values	(Pechiney)
T62 [Sheet/Plate (>3 <6mm)]	260	-	310	10	-	94HB	EN485 Min. values	(Pechiney)
T651 [Plate (>12.5 <60mm)]	240	-	295	8	-	89HB	EN485 Min. values	(Pechiney)
T651 [Sheet (>1.5 <3mm)]	260	-	310	7	-	94HB	EN485 Min. values	(Pechiney)

6082-50 Alunord (France) Wrought

Proprietary composition: Si 0.95-1.05, Fe 0.15-0.23, Cu 0.03, Mg 0.62-0.7, Mn 0.5-0.57, Zn 0.02, Ti 0.02, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6351, UNS A96351; European (ISO): AISi1Mg0.5Mn, AISi1Mg; Proprietary: Alunord 6082-50

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	250	-	290	8	-		Typical	(Alunord)

6082A AA (USA) Wrought

Official composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.2, Ti 0.1, Cr 0.25, Pb 0.003, Others: Each 0.05 Total 0.15, Aluminium rem.

6090 AA (USA) Wrought

No composition: -

Comments: Listed by AA as Inactive.

6091 AA (USA) Wrought

Official composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.15, O₂ 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

6092 AA (USA) Wrought

Official composition: Si 0.4-0.8, Fe 0.3, Cu 0.7-1, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.15, O₂ 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

196 Aluminium Alloys (wrought)

6101	AA (USA)	Wrought						
Official composition: Si 0.3-0.7, Fe 0.5, Cu 0.1, Mg 0.35-0.8, Mn 0.03, Zn 0.1, Cr 0.03, B 0.06, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Tube, Pipe, Structural profile, Extrusion Similar/Equivalent alloys: <i>USA:</i> AA6101, UNS A96101; <i>European (CEN):</i> EN573 AW-6101 (<i>ISO:</i> E-AIMgSi; <i>Austria:</i> E-AIMgSi; <i>France:</i> A-GS/L, E-AIMgSi; <i>Germany:</i> E-AIMgSi0.5; Wk.3.2307; <i>Italy:</i> P-AISI0.5Mg; <i>Switzerland:</i> AIMgSi; <i>UK:</i> 91E Comments: Electrical conductors. Corrosion resistance: Very good (atmospheric) Weldability: Excellent (fusion) Machinability: Medium								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
H111 [-]	-	76	97	-	69			(#1)
T6 [-]	-	193	221	15	69	71HB		(#1)
T6 [-]	160	-	215	-	-	75HB	Typical	(P. Balloffet)
6101	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.3-0.7, Fe 0.5, Cu 0.1, Mg 0.35-0.8, Mn 0.03, Zn 0.1, Cr 0.03, B 0.06, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700 Similar/Equivalent alloys: <i>USA:</i> AA6101, UNS A96101; <i>European (CEN):</i> EN573 AW-6101 (<i>ISO:</i> E-AIMgSi; <i>Austria:</i> E-AIMgSi; <i>France:</i> A-GS/L, E-AIMgSi; <i>Germany:</i> E-AIMgSi0.5; Wk.3.2307; <i>Italy:</i> P-AISI0.5Mg; <i>Switzerland:</i> AIMgSi; <i>UK:</i> 91E								
6101A	AA (USA)	Wrought						
Official composition: Si 0.3-0.7, Fe 0.4, Cu 0.05, Mg 0.4-0.9, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Tube, Extrusion, Bar, Wire Similar/Equivalent alloys: <i>USA:</i> AA6101A; <i>European (CEN):</i> EN573 AW-6161A (<i>ISO:</i> E-AIMgSi(A), EAIMgSi0.5; <i>France:</i> E-AIMgSi; <i>Germany:</i> Wk. 3.2305 (AIMgSi); <i>Italy:</i> 9006/3; <i>Spain:</i> L-3431; <i>Sweden:</i> 14.4102; <i>UK:</i> 6101A; BS 91E; <i>Proprietary:</i> Alcan D50S, 47E Comments: Controlled electrical conductivity - busbars, etc., overhead conductors. Corrosion resistance: Very good (atmospheric) Weldability: Excellent (fusion) Machinability: Medium								
6101B	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.05, Mg 0.35-0.6, Mn 0.05, Zn 0.1, Others: Each 0.03 Total 0.1, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA6101B; <i>European (CEN):</i> EN573 AW-6101B; <i>Germany:</i> 3.3207; <i>Italy:</i> 3570								
6103	AA (USA)	Wrought						
Official composition: Si 0.35-1, Fe 0.6, Cu 0.2-0.3, Mg 0.8-1.5, Mn 0.8, Zn 0.2, Ti 0.1, Cr 0.35, Others: Each 0.05 Total 0.15, Aluminium rem.								
6105	AA (USA)	Wrought						
Official composition: Si 0.6-1, Fe 0.35, Cu 0.1, Mg 0.45-0.8, Mn 0.15, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690 Identified Product forms: Tube, Extrusion								
6106	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.35, Cu 0.25, Mg 0.4-0.8, Mn 0.05-0.2, Zn 0.1, Cr 0.2, Others: Each 0.05 Total 0.1, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA6106; <i>European (CEN):</i> EN573 AW-6106 (<i>ISO:</i> AIMgSiMn; <i>Proprietary:</i> Alunord 6106 Comments: Extruded profiles and tubes for industrial vehicle construction. Marine applications. Corrosion resistance: Very good Weldability: Good (TIG/MIG)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	285	-	300	13	69.5	95HB	Typical properties	(Pechiney)
T5 [-]	200	-	250	10	69.5	85HB	RT typical properties	(Pechiney)
T5 [Extr. (e<10mm)]	195	-	240	10	-	-	NF A 50-411 Min. values	(Pechiney)
T5 [Tube (e<10mm)]	195	-	240	10	-	-	NF A 50-411 Min. values	(Pechiney)
6106	Alunord (France)	Wrought						
Proprietary composition: Si 0.3-0.6, Fe 0.35, Cu 0.25, Mg 0.4-0.8, Mn 0.05-0.2, Zn 0.1, Cr 0.2, Aluminium rem. Identified Product forms: Extrusion Similar/Equivalent alloys: <i>USA:</i> AA6106; <i>European (CEN):</i> EN573 AW-6106 (<i>ISO:</i> AIMgSiMn; <i>Proprietary:</i> Alunord 6106								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	195	-	240	9	-	-	Typical	(Alunord)
T5 [-]	215	-	250	8	-	-	Typical	(Alunord)
6106	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.3-0.6, Fe 0.35, Cu 0.25, Mg 0.4-0.8, Mn 0.05-0.2, Zn 0.1, Cr 0.2, Others: Each 0.05 Total 0.1, Aluminium rem. Identified Product forms: Extrusion Similar/Equivalent alloys: <i>USA:</i> AA6106; <i>European (CEN):</i> EN573 AW-6106 (<i>ISO:</i> AIMgSiMn Comments: For comments see: AA series. Corrosion resistance: Very good Weldability: Good (TIG/MIG)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Extrusion (<10mm)]	200	-	250	8	-	-	EN755 Min. values	(Pechiney)
6110	AA (USA)	Wrought						
Official composition: Si 0.7-1.5, Fe 0.8, Cu 0.2-0.7, Mg 0.5-1.1, Mn 0.2-0.7, Zn 0.3, Ti 0.15, Cr 0.04-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6110A	AA (USA)	Wrought						
Official composition: Si 0.7-1.1, Fe 0.5, Cu 0.3-0.8, Mg 0.7-1.1, Mn 0.3-0.9, Zn 0.2, Cr 0.05-0.25, Ti+Zr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)								
6111	AA (USA)	Wrought						
Official composition: Si 0.6-1.1, Fe 0.4, Cu 0.5-0.9, Mg 0.5-1, Mn 0.1-0.45, Zn 0.15, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710 Similar/Equivalent alloys: <i>USA:</i> AA6111; <i>Proprietary:</i> Reynolds: 6111 (modified)								

Aluminium Alloys (wrought) 197

6113	AA (USA)	Wrought						
Official composition: Si 0.6-1, Fe 0.3, Cu 0.6-1.1, Mg 0.8-1.2, Mn 0.1-0.6, Zn 0.25, Ti 0.1, Cr 0.1, O ₂ 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6116	AA (USA)	Wrought						
Official composition: Si 0.9-1.3, Fe 0.25, Cu 0.2, Mg 0.25-0.6, Mn 0.15, Zn 0.2, Ti 0.15, Cr 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)								
6151	AA (USA)	Wrought						
Official composition: Si 0.6-1.2, Fe 1, Cu 0.35, Mg 0.45-0.8, Mn 0.2, Zn 0.25, Ti 0.15, Cr 0.15-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710 Identified Product forms: Forging stock/Billet Similar/Equivalent alloys: <u>USA:</u> AA6151, UNS A96151, MIL -A-22771; <u>Canada:</u> SG11P Comments: (See: 6101)								
6160	AA (USA)	Wrought						
Official composition: Si 0.3-0.6, Fe 0.15, Cu 0.2, Mg 0.35-0.6, Mn 0.05, Zn 0.05, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6162	AA (USA)	Wrought						
Official composition: Si 0.4-0.8, Fe 0.5, Cu 0.2, Mg 0.7-1.1, Mn 0.1, Zn 0.25, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Extrusion Similar/Equivalent alloys: <u>USA:</u> AA6162, UNS A96162 Comments: (See: 6101)								
6181	AA (USA)	Wrought						
Official composition: Si 0.8-1.2, Fe 0.45, Cu 0.1, Mg 0.6-1, Mn 0.15, Zn 0.2, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Tube Similar/Equivalent alloys: <u>USA:</u> AA6181; <u>European (ISO):</u> AISi1Mg0.8; <u>France:</u> A-SG Comments: V. good mechanical strength and formability, good machining properties.								
6201	AA (USA)	Wrought						
Official composition: Si 0.5-0.9, Fe 0.5, Cu 0.1, Mg 0.6-0.9, Mn 0.03, Zn 0.1, Cr 0.03, B 0.06, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2690 Identified Product forms: Wire Similar/Equivalent alloys: <u>USA:</u> AA6201, UNS A96201 Comments: (See: 6101)								
6201A	AA (USA)	Wrought						
Official composition: Si 0.5-0.7, Fe 0.5, Cu 0.04, Mg 0.6-0.9, B 0.06, Others: Each 0.03 Total 0.1, Aluminium rem.								
6205	AA (USA)	Wrought						
Official composition: Si 0.6-0.9, Fe 0.7, Cu 0.2, Mg 0.4-0.6, Mn 0.05-0.15, Zn 0.25, Ti 0.15, Cr 0.05-0.15, Zr 0.05-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6206	AA (USA)	Wrought						
Official composition: Si 0.35-0.7, Fe 0.35, Cu 0.2-0.5, Mg 0.45-0.8, Mn 0.13-0.3, Zn 0.2, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
6253	AA (USA)	Wrought						
Official composition: Fe 0.5, Cu 0.1, Mg 1-1.5, Zn 1.6-2.4, Cr 0.04-0.35, Si = 45-65% of Mg, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Similar/Equivalent alloys: <u>USA:</u> AA6253, UNS A96253								
6261	AA (USA)	Wrought						
Official composition: Si 0.4-0.7, Fe 0.4, Cu 0.15-0.4, Mg 0.7-1, Mn 0.2-0.35, Zn 0.2, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
6262	AA (USA)	Wrought						
Official composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.14, Bi 0.4-0.7, Pb 0.4-0.7, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Tube, Extrusion, Rod, Bar, Wire Similar/Equivalent alloys: <u>USA:</u> AA6262, UNS A96262; <u>European (CEN):</u> EN573 AW-6262 (<u>ISO:</u> AIMg1SiPb) Condition [Form]								
	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T9 [-]	-	379	400	10	69	HB 120	Typical	(#1)
T9 [Extrusion]	315	-	345	4	-	-	-	(Aalco (Glywed))
6262	CEN 573 (Europe)							Wrought
Nominal composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.14, Bi 0.4-0.7, Pb 0.4-0.7, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Tube, Extrusion Similar/Equivalent alloys: <u>USA:</u> AA6262, UNS A96262; <u>European (CEN):</u> EN573 AW-6262 (<u>ISO:</u> AIMg1SiPb) Condition [Form]								
	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Drawn bar (<80mm)]	240	-	290	10	-	-	EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<200mm)]	240	-	260	10	-	-	EN755 Min. values	(Pechiney)
T6 [Extru. Tube (<25mm)]	240	-	260	10	-	-	EN755 Min. values	(Pechiney)
T6 [Extrusion (<25mm)]	240	-	260	10	-	-	EN755 Min. values	(Pechiney)
T8 [Drawn bar (<50mm)]	315	-	345	4	-	-	EN754 Min. values	(Pechiney)
T9 [Drawn bar (<50mm)]	330	-	360	4	-	-	EN754 Min. values	(Pechiney)

198 Aluminium Alloys (wrought)

6301	AA (USA)	Wrought						
Official composition: Si 0.5-0.9, Fe 0.7, Cu 0.1, Mg 0.6-0.9, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6306	AA (USA)	Wrought						
Official composition: Si 0.2-0.6, Fe 0.1, Cu 0.05-0.16, Mg 0.45-0.9, Mn 0.1-0.4, Zn 0.05, Ti 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
6351	AA (USA)	Wrought						
Official composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.4-0.8, Mn 0.4-0.8, Zn 0.2, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
Identified Product forms: Tube, Pipe, Extrusion								
Similar/Equivalent alloys: <u>USA</u> : AA6351, UNS A96351; <u>European (ISO)</u> : AISi1Mg0.5Mn, AISi1Mg								
Comments: Welded structures, general engineering. Highly-stressed structural applications in bridges, cranes, roof trusses. Corrosion resistance : Good (atmospheric)								
Weldability : Very good Machinability : Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T4 [-]	-	152	248	20	69		Typical	(#1)
T6 [-]	-	283	310	14	69	HB 95	Typical	(#1)
6351A	AA (USA)	Wrought						
Official composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.4-0.8, Mn 0.4-0.8, Zn 0.2, Ti 0.2, Pb 0.003, Others: Each 0.05 Total 0.15, Aluminium rem.								
6363	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6401	AA (USA)	Wrought						
Official composition: Si 0.35-0.7, Fe 0.04, Cu 0.05-0.2, Mg 0.35-0.7, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01, Aluminium rem.								
6463	AA (USA)	Wrought						
Official composition: Si 0.2-0.6, Fe 0.15, Cu 0.2, Mg 0.45-0.9, Mn 0.05, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2690								
Identified Product forms: Tube, Extrusion, Bar								
Similar/Equivalent alloys: <u>USA</u> : AA6463; <u>European (ISO)</u> : AlMgSi; <u>France</u> : A 85-GS; <u>Germany</u> : E-AlMgSi; Wk. 3.2307; <u>Italy</u> : 3570; <u>Sweden</u> : 14,4102; <u>Switzerland</u> : 10851; <u>UK</u> : 6463; E6, BT R6; BTRE6; <u>Proprietary</u> : Alcan C50S, 18								
Comments: Bright anodised trim.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T1 [-]	-	90	152	20	69	HB 42	Typical	(#1)
T5 [-]	-	145	186	12	69	HB 60	Typical	(#1)
T6 [-]	-	214	241	12	69	HB 74	Typical	(#1)
TB (T4) [Extrusion (<50mm)]	75	-	125	14	-		Typical	(SECO)
TF (T6) [Extrusion (<50mm)]	160	-	185	9	-		Typical	(SECO)
6463A	AA (USA)	Wrought						
Official composition: Si 0.2-0.6, Fe 0.15, Cu 0.25, Mg 0.3-0.9, Mn 0.05, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
6560	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA</u> : AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161; <u>European (CEN)</u> : EN573 AW-6061; AW-AlMg1SiCu (<u>ISO</u>): AlMg1SiCu; <u>Canada</u> : GS11N; <u>France</u> : A-GSUC; 6061; AIR 9048-660; <u>Germany</u> : AlMgSi1Cu; AlMgSiCu; Wk.3.3211; LW3.3214; <u>Italy</u> : 9006/2; 6170-68; FA60-6061; <u>Japan</u> : A6061P; <u>Spain</u> : L-3420; <u>UK</u> : 6061; BS H20; BS L117, L118; <u>Others</u> : USA-WW-T-700/6; Eur. aerospace P-6061								
Comments: Hoogovens version of AA 6061.								
6563	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6630 Clad	Hoogovens (Netherlands)	Wrought						
No composition: - Comments: Hoogovens clad version of AA 6063.								
6663	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6763	AA (USA)	Wrought						
Official composition: Si 0.2-0.6, Fe 0.08, Cu 0.04-0.16, Mg 0.45-0.9, Mn 0.03, Zn 0.03, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2690								
6863	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
6951	AA (USA)	Wrought						
Official composition: Si 0.2-0.5, Fe 0.8, Cu 0.15-0.4, Mg 0.4-0.8, Mn 0.1, Zn 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2700								
Similar/Equivalent alloys: <u>USA</u> : AA6951, UNS A96951								

Aluminium Alloys (wrought) 199

6963	AA (USA)	Wrought						
Official composition: Si 0.4-0.6, Fe 0.25, Cu 0.15-0.25, Mg 0.35-0.7, Mn 0.05, Zn 0.1, Ti 0.1, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
7001	AA (USA)	Wrought						
Official composition: Si 0.35, Fe 0.4, Cu 1.6-2.6, Mg 2.6-3.4, Mn 0.2, Zn 6.8-8, Ti 0.2, Cr 0.18-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
Similar/Equivalent alloys: <u>USA:</u> AA7001, UNS A97001; <u>France:</u> A-Z8GU								
7002	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								
7003	AA (USA)	Wrought						
Official composition: Si 0.3, Fe 0.35, Cu 0.2, Mg 0.5-1, Mn 0.3, Zn 5-6.5, Ti 0.2, Cr 0.2, Zr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
7004	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.35, Cu 0.05, Mg 1-2, Mn 0.2-0.7, Zn 3.8-4.6, Ti 0.05, Cr 0.05, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
7005	AA (USA)	Wrought						
Official composition: Si 0.35, Fe 0.4, Cu 0.1, Mg 1-1.8, Mn 0.2-0.7, Zn 4-5, Ti 0.01-0.06, Cr 0.06-0.2, Zr 0.08-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA7005; <u>European (ISO):</u> AlZn4.5Mg1.5Mn; <u>Germany:</u> AlZnMg1; <u>Sweden:</u> 14.4425; <u>Switzerland:</u> 10859								
7008	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.1, Cu 0.05, Mg 0.7-1.4, Mn 0.05, Zn 4.5-5.5, Ti 0.05, Cr 0.12-0.25, Others: Each 0.05 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2780								
7009	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.2, Cu 0.6-1.3, Mg 2.1-2.9, Mn 0.1, Zn 5.5-6.5, Ti 0.2, Cr 0.1-0.25, Ag 0.25-0.4, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA7009, UNS A97009; <u>European (CEN):</u> EN573 AW-7009; <u>Germany:</u> LW3.4354; <u>Proprietary:</u> Alcan 74; Otto Fuchs AZ74								
Comments: High strength extrusions.								
7010	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.5-2, Mg 2.1-2.6, Mn 0.1, Zn 5.7-6.7, Ni 0.05, Ti 0.06, Cr 0.05, Zr 0.1-0.16, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate, Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA7010, AMS 4204, 4205; <u>European (CEN):</u> EN573 AW-7010 (<u>ISO:</u> AlZn6MgCu; <u>Germany:</u> LW. 3.4394; <u>UK:</u> 7010; DTD 5120, 5130A, 5636; <u>Others:</u> Eur. aerospace P-7010; <u>Proprietary:</u> Alcan 81; Otto Fuchs AZ83; HDA 81								
Comments: Aircraft structures. Non welded. High strength extrusions. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T651 [Hot rolled plate, 50mm]	530	-	580	10	-	-	Transverse properties (Typ.)	(BAI Plate)
T7351 [Hot rolled plate, 50mm]	410	-	500	11	-	-	Transverse properties (Typ.)	(BAI Plate)
T7451 [Hot rolled plate, 50mm]	460	-	530	10	-	-	Transverse properties (Typ.)	(BAI Plate)
T7651 [Hot rolled plate, 50mm]	485	-	545	10	-	-	Transverse properties (Typ.)	(BAI Plate)
7010	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.12, Fe 0.15, Cu 1.5-2, Mg 2.1-2.6, Mn 0.1, Zn 5.7-6.7, Ni 0.05, Ti 0.06, Cr 0.05, Zr 0.1-0.16, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA7010, AMS 4204, 4205; <u>European (CEN):</u> EN573 AW-7010 (<u>ISO:</u> AlZn6MgCu; <u>Germany:</u> LW. 3.4394; <u>UK:</u> 7010; DTD 5120, 5130A, 5636; <u>Others:</u> Eur. aerospace P-7010; <u>Proprietary:</u> Alcan 81; Otto Fuchs AZ83; HDA 81								
Comments: For comments see: AA series.								
7011	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.2, Cu 0.05, Mg 1-1.6, Mn 0.1-0.3, Zn 4-5.5, Ti 0.05, Cr 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
7012	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.25, Cu 0.8-1.2, Mg 1.8-2.2, Mn 0.08-0.15, Zn 5.8-6.5, Ti 0.02-0.08, Cr 0.04, Zr 0.1-0.18, Others: Each 0.05 Total 0.15, Aluminium rem.								
7013	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.7, Cu 0.1, Mn 1-1.5, Zn 1.5-2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2760								
7014	AA (USA)	Wrought						
Official composition: Si 0.5, Fe 0.5, Cu 0.3-0.7, Mg 2.2-3.2, Mn 0.3-0.7, Zn 5.2-6.2, Ni 0.1, Ti+Zr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Tube, Extrusion, Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA7014; <u>UK:</u> 7014; DTD 5104A, 6094A; <u>Proprietary:</u> Alcan 77; HDA 77								
Comments: Aerospace and military use. Forgings and pressings for high strength non-welded applications. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good								
7015	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Cu 0.06-0.15, Mg 1.3-2.1, Mn 0.1, Zn 4.6-5.2, Ti 0.1, Cr 0.15, Zr 0.1-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.								
7016	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.12, Cu 0.45-1, Mg 0.8-1.4, Mn 0.03, Zn 4-5, Ti 0.03, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2780								

200 Aluminium Alloys (wrought)

7017	AA (USA)							Wrought
Official composition: Si 0.35, Fe 0.45, Cu 0.2, Mg 2-3, Mn 0.05-0.5, Zn 4-5.2, Ni 0.1, Ti 0.15, Cr 0.35, Zr 0.1-0.25, Mn+Cr 0.15 min., Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate, Tube, Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA7017; <i>Italy:</i> 9007/6; <i>UK:</i> 7017; <i>Proprietary:</i> Alcan 45, Dural 2C								
Comments: High strength extrusions. Tube and armour plate - high penetration resistance. Weldable - naturally ages after welding.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T651 [-]	425	-	485	10	-		Typical	(BAI Plate)
7018	AA (USA)							Wrought
Official composition: Si 0.35, Fe 0.45, Cu 0.2, Mg 0.7-1.5, Mn 0.15-0.5, Zn 4.5-5.5, Ni 0.1, Ti 0.15, Cr 0.2, Zr 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate								
Similar/Equivalent alloys: <i>USA:</i> AA7018; <i>Germany:</i> (AlZn5Mg1.5); <i>Proprietary:</i> Alcan Dural 2X								
Comments: Armour plate. Heat-treatable alternative to 5083, weldable.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T651 [-]	300	-	360	12	-		Typical	(BAI Plate)
7019	AA (USA)							Wrought
Official composition: Si 0.35, Fe 0.45, Cu 0.2, Mg 1.5-2.5, Mn 0.15-0.5, Zn 3.5-4.5, Ni 0.1, Ti 0.15, Cr 0.2, Zr 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate, Tube, Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA7019; <i>UK:</i> 7019; <i>Proprietary:</i> Alcan Dural 2D								
Comments: Military applications, bridging, weldable.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T7651 [-]	360	-	415	11.5	-		Typical	(BAI Plate)
7019A	AA (USA)							Wrought
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 1.5-2.5, Mn 0.1-0.6, Zn 3-5, Ti 0.1, Cr 0.05-0.35, Others: Each 0.05 Total 0.15, Aluminium rem.								
7020	AA (USA)							Wrought
Official composition: Si 0.35, Fe 0.4, Cu 0.2, Mg 1-1.4, Mn 0.05-0.5, Zn 4-5, Cr 0.1-0.35, Zr 0.08-0.2, Ti+Zr 0.08-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar								
Similar/Equivalent alloys: <i>USA:</i> AA7020, SAE 214; <i>European (CEN):</i> EN573 AW-7020; AW-AlZn4.5Mg1 (<i>ISO:</i> AlZn4.5Mg1; <i>France:</i> A-25G; 7020; AIR 9048-670; <i>Germany:</i> AlZn4.5Mg1; 3.4335; <i>Italy:</i> 9007/1; 7791; P-AlZn4.5Mg; <i>Japan:</i> A7020; <i>Spain:</i> L-3741; <i>Sweden:</i> 14,4425; <i>Switzerland:</i> AlZn4.5Mg1; <i>UK:</i> 7020; BS H17; <i>Others:</i> (CZ) CSN 42 4441; Eur. aerospace P-7020; <i>Proprietary:</i> Alcan 45, Dural 2W; Otto Fuchs AZ14; Hoogovens 7350								
Comments: Welded structures, general engineering. Medium strength armour plate and extrusions. AFV and military bridges, naturally age hardens after welding. Pressure vessels, construction, road transport, rail transport, shipbuilding, aerospace, mechanical engineering. Corrosion resistance: Good (atmospheric) Weldability: Very good (fusion) Machinability: Medium								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	-	-	70			(Hoogovens)
T6 [-]	275	-	340	-	-	105HB	Typical	(P. Balloffet)
T6 [-]	290	-	350	-	-		Typical	(Raufoss)
T6 [-]	335	-	380	13	69		Typical	(Alcan Extr./Auto.)
T651 [-]	360	-	400	12	72	105HB	Typical	(BAI Plate)
7020	CEN 573 (Europe)							Wrought
Nominal composition: Si 0.35, Fe 0.4, Cu 0.2, Mg 1-1.4, Mn 0.05-0.5, Zn 4-5, Cr 0.1-0.35, Zr 0.08-0.2, Ti+Zr 0.08-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA7020, SAE 214; <i>European (CEN):</i> EN573 AW-7020; AW-AlZn4.5Mg1 (<i>ISO:</i> AlZn4.5Mg1; <i>France:</i> A-25G; 7020; AIR 9048-670; <i>Germany:</i> AlZn4.5Mg1; 3.4335; <i>Italy:</i> 9007/1; 7791; P-AlZn4.5Mg; <i>Japan:</i> A7020; <i>Spain:</i> L-3741; <i>Sweden:</i> 14,4425; <i>Switzerland:</i> AlZn4.5Mg1; <i>UK:</i> 7020; BS H17; <i>Others:</i> (CZ) CSN 42 4441; Eur. aerospace P-7020; <i>Proprietary:</i> Alcan 45, Dural 2W; Otto Fuchs AZ14; Hoogovens 7350								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet/Plate (>0.4 <12.5mm)]	140	-	220	-	-	45HB	EN485 Max. values	(Pechiney)
T4 [Sheet (>0.4 <1.5mm)]	210	-	320	11	-	92HB	EN485 Min. values	(Pechiney)
T451 [Sheet/Plate (>0.4 <12.5mm)]	210	-	320	-	-	92HB	EN485 Min. values	(Pechiney)
T6 [Drawn bar (<80mm)]	280	-	350	10	-		EN754 Min. values	(Pechiney)
T6 [Drawn tube (<20mm)]	280	-	350	10	-		EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<200mm)]	275	-	340	10	-		EN755 Min. values	(Pechiney)
T6 [Extru. Tube (<15mm)]	290	-	350	10	-		EN755 Min. values	(Pechiney)
T6 [Extrusion (<40mm)]	290	-	350	10	-		EN755 Min. values	(Pechiney)
T6 [Sheet (>0.4 <1.5mm)]	280	-	350	7	-	104HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	280	-	350	7	-	104HB	Minimum	(AMAG)
T6 [Treadplate 1.5 - 3mm]	280	-	350	4	-		Minimum	(AMAG)
T6 [Treadplate 3 - 6mm]	280	-	350	6	-		Minimum	(AMAG)
T6 [Treadplate 6 - 8mm]	280	-	350	8	-		Minimum	(AMAG)
T62 [Sheet/Plate (>3 <40mm)]	280	-	350	-	-	104HB	EN485 Min. values	(Pechiney)
T651 [Plate (>40<100mm)]	270	-	340	8	-	101HB	EN485 Min. values	(Pechiney)
T651 [Plate (100 <175mm)]	260	-	330	-	-	98HB	EN485 Min. values	(Pechiney)
T651 [Sheet (>1.5 <3mm)]	280	-	350	8	-	104HB	EN485 Min. values	(Pechiney)
7021	AA (USA)							Wrought
Official composition: Si 0.25, Fe 0.4, Cu 0.25, Mg 1.2-1.8, Mn 0.1, Zn 5-6, Ti 0.1, Cr 0.05, Zr 0.08-0.18, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg·m ⁻³) 2780								
Similar/Equivalent alloys: <i>USA:</i> AA7021; <i>European (CEN):</i> EN573 AW-7021; <i>Proprietary:</i> Reynolds: 7021								
Comments: Vehicle bumpers.								

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7021	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.25, Fe 0.4, Cu 0.25, Mg 1.2-1.8, Mn 0.1, Zn 5-6, Ti 0.1, Cr 0.05, Zr 0.08-0.18, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780		
Similar/Equivalent alloys: <u>USA:</u> AA7021; <u>European (CEN):</u> EN573 AW-7021		
7022	AA (USA)	Wrought
Official composition: Si 0.5, Fe 0.5, Cu 0.5-1, Mg 2.6-3.7, Mn 0.1-0.4, Zn 4.3-5.2, Cr 0.1-0.3, Ti+Zr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Similar/Equivalent alloys: <u>USA:</u> AA7022; <u>European (CEN):</u> EN573 AW-7022; <u>Germany:</u> AlZnMgCu0.5; DIN 3.4345; <u>Spain:</u> L-3751; <u>UK:</u> 7022; <u>Proprietary:</u> Otto Fuchs AZ54		
7023	AA (USA)	Wrought
Official composition: Si 0.5, Fe 0.5, Cu 0.5-1, Mg 2-3, Mn 0.1-0.6, Zn 4-6, Ti 0.1, Cr 0.05-0.35, Others: Each 0.05 Total 0.15, Aluminium rem.		
7024	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 0.5-1, Mn 0.1-0.6, Zn 3-5, Ti 0.1, Cr 0.05-0.35, Others: Each 0.05 Total 0.15, Aluminium rem.		
7025	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 0.8-1.5, Mn 0.1-0.6, Zn 3-5, Ti 0.1, Cr 0.05-0.35, Others: Each 0.05 Total 0.15, Aluminium rem.		
7026	AA (USA)	Wrought
Official composition: Si 0.08, Fe 0.12, Cu 0.6-0.9, Mg 1.5-1.9, Mn 0.05-0.2, Zn 4.6-5.2, Ti 0.05, Zr 0.09-0.14, Others: Each 0.03 Total 0.1, Aluminium rem.		
7027	AA (USA)	Wrought
No composition: -		
Similar/Equivalent alloys: <u>USA:</u> AA7027; <u>Germany:</u> (AlZn4Mg0.8)		
Comments: Listed by AA as Inactive.		
7028	AA (USA)	Wrought
Official composition: Si 0.35, Fe 0.5, Cu 0.1-0.3, Mg 1.5-2.3, Mn 0.15-0.6, Zn 4.5-5.2, Ti 0.05, Cr 0.2, Ti+Zr 0.08-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
7029	AA (USA)	Wrought
Official composition: Si 0.1, Fe 0.12, Cu 0.5-0.9, Mg 1.3-2, Mn 0.03, Zn 4.2-5.2, Ti 0.05, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2770		
Similar/Equivalent alloys: <u>USA:</u> AA7029; <u>Proprietary:</u> Reynolds: 7029		
Comments: Vehicle bumpers.		
7030	AA (USA)	Wrought
Official composition: Si 0.2, Fe 0.3, Cu 0.2-0.4, Mg 1-1.5, Mn 0.05, Zn 4.8-5.9, Ti 0.03, Cr 0.04, Ga 0.03, Zr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740		
7031	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.8-1.4, Cu 0.1, Mg 0.1, Mn 0.1-0.4, Zn 0.8-1.8, Others: Each 0.05 Total 0.15, Aluminium rem.		
7032	AA (USA)	Wrought
Official composition: Si 0.1, Fe 0.12, Cu 1.7-2.3, Mg 1.5-2.5, Mn 0.05, Zn 5.5-6.5, Ti 0.1, Cr 0.15-0.25, Bi 0.01, Pb 0.01, Others: Each 0.05 Total 0.15, Aluminium rem.		
Comments: Designation added to AA (USA) register since previous issue (06/94)		
7033	AA (USA)	Wrought
Official composition: Si 0.15, Fe 0.3, Cu 0.7-1.3, Mg 1.3-2.2, Mn 0.1, Zn 4.6-5.6, Ti 0.1, Cr 0.2, Ga 0.03, V 0.05, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem.		
Comments: Designation added to AA (USA) register since previous issue (06/94)		
7039	AA (USA)	Wrought
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 2.3-3.3, Mn 0.1-0.4, Zn 3.5-4.5, Ti 0.1, Cr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740		
Identified Product forms: Plate, Tube, Extrusion		
Similar/Equivalent alloys: <u>USA:</u> AA7039, UNS A97039; <u>European (CEN):</u> EN573 AW-7039; <u>Proprietary:</u> Alcan Dural 2E		
Comments: Aerospace and military - as for 7017/7018. Armour plate.		
Condition [Form]	PS (MPa)	YS (MPa)
T651 [-]	400	-
	UTS (MPa)	EI (%)
	460	11
	E (GPa)	Hardness
	-	-
	Notes	(Source)
	Typical	(BAI Plate)
7039	CEN 573 (Europe)	Wrought
Nominal composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 2.3-3.3, Mn 0.1-0.4, Zn 3.5-4.5, Ti 0.1, Cr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740		
Similar/Equivalent alloys: <u>USA:</u> AA7039, UNS A97039; <u>European (CEN):</u> EN573 AW-7039; <u>Proprietary:</u> Alcan Dural 2E		
Comments: For comments see: AA series.		
7041	AA (USA)	Wrought
Official composition: Si 0.1, Fe 0.13, Cu 1.5-2.3, Mg 1.7-2.4, Mn 0.04, Zn 5.7-6.7, Ti 0.06, Cr 0.04, Zr 0.05-0.12, Others: Each 0.05 Total 0.15, Aluminium rem.		
Comments: Designation added to AA (USA) register since previous issue (06/94)		

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7046	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.4, Cu 0.25, Mg 1-1.6, Mn 0.3, Zn 6.6-7.6, Ti 0.06, Cr 0.2, Zr 0.1-0.18, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2820								
Identified Product forms: Sheet/strip, Tube, Extrusion								
Comments: High strength, heat-treatable alloy with good general corrosion resistance. Automotive and aerospace lightweight structural applications. Corrosion resistance: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Extrusion]	-	83	179	22	-	-	Typical (AA X7046)	(Ammco)
O [Sheet]	-	117	199	16	-	-	Typical (AA X7046)	(Ammco)
T63 [Extrusion]	-	393	434	10	-	-	Expected minimum (AA X7046)	(Ammco)
T63 [Extrusion]	-	427	469	13	-	-	Typical (AA X7046)	(Ammco)
T63 [Sheet]	-	345	386	10	-	-	Expected minimum (AA X7046)	(Ammco)
T63 [Sheet]	-	379	421	13	-	-	Typical (AA X7046)	(Ammco)
7049	AA (USA)	Wrought						
Official composition: Si 0.25, Fe 0.35, Cu 1.2-1.9, Mg 2-2.9, Mn 0.2, Zn 7.2-8.2, Ti 0.1, Cr 0.1-0.22, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
Identified Product forms: Tube, Extrusion, Forging stock/Billet								
Similar/Equivalent alloys: <u>USA:</u> AA7049, UNS A97049, AMS 4111, 4157, 4200, QQ -A-367; <u>Proprietary:</u> Otto Fuchs AZ66								
Comments: Aerospace and military.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T73 [-]	-	448	517	12	72	HB 135	Typical	(#1)
T7352 [-]	-	434	517	11	72	HB 135	Typical	(#1)
7049A	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.5, Cu 1.2-1.9, Mg 2.1-3.1, Mn 0.5, Zn 7.2-8.4, Cr 0.05-0.25, Ti+Zr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA7049A; <u>European (CEN):</u> EN573 AW-7049A (<u>ISO:</u> AlZn8MgCu; <u>France:</u> 7049A; A-Z8GU; <u>Germany:</u> (AlZn8MgCu1.5); <u>UK:</u> 7049A; <u>Proprietary:</u> Otto Fuchs AZ86								
Comments: Aerospace and military. High strength extrusions.								
7049A	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.4, Fe 0.5, Cu 1.2-1.9, Mg 2.1-3.1, Mn 0.5, Zn 7.2-8.4, Cr 0.05-0.25, Ti+Zr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AA7049A; <u>European (CEN):</u> EN573 AW-7049A (<u>ISO:</u> AlZn8MgCu; <u>France:</u> 7049A; A-Z8GU; <u>Germany:</u> (AlZn8MgCu1.5); <u>UK:</u> 7049A; <u>Proprietary:</u> Otto Fuchs AZ86								
Comments: For comments see: AA series.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Drawn bar (<80mm)]	500	-	590	7	-	-	EN754 Min. values	(Pechiney)
T6 [Extru. Bar (<100mm)]	530	-	610	5	-	-	EN755 Max. values	(Pechiney)
T6 [Extru. Tube (<30mm)]	530	-	610	5	-	-	EN755 Min. values	(Pechiney)
T6 [Extrusion (<30mm)]	530	-	610	5	-	-	EN755 Min. values	(Pechiney)
T6/T6510/T6511 [Drawn tube (<5mm)]	480	-	590	6	-	-	EN754 Min. values	(Pechiney)
T6/T6510/T6511 [Drawn tube (>5 <20mm)]	500	-	590	7	-	-	EN754 Min. values	(Pechiney)
T6510/T6511 [Extru. Tube (<30mm)]	530	-	610	5	-	-	EN755 Min. values	(Pechiney)
T6510/T6511 [Extrusion (<30mm)]	530	-	610	5	-	-	EN755 Min. values	(Pechiney)
7050	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 2-2.6, Mg 1.9-2.6, Mn 0.1, Zn 5.7-6.7, Ti 0.06, Cr 0.04, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830								
Identified Product forms: Plate, Tube, Extrusion, Forging stock/Billet, Rod, Wire, Rivet stock								
Similar/Equivalent alloys: <u>USA:</u> AA7050, UNS A97050, AMS 4050, 4107, 4108, 4201, 4340, 4341, 4342, MIL -A-22771; <u>European (CEN):</u> EN573 AW-7050 (<u>ISO:</u> AlZn6CuMgZr; <u>Germany:</u> LW3.4144; <u>UK:</u> 7050; <u>Others:</u> Eur. aerospace P-7050; <u>Proprietary:</u> Alcan Dural AD; Otto Fuchs AZ84; HDA 75								
Comments: Aerospace, rivets.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T73510, T73511 [-]	-	434	496	12	72	-	Typical	(#1)
T7451 [Hot rolled plate, 50mm]	460	-	530	10	-	-	Transverse properties (Typ.)	(BAI Plate)
T7451 (T73651) [-]	-	469	524	11	72	-	Typical	(#1)
T7651 [-]	-	490	552	11	72	-	Typical	(#1)
T7651 [Hot rolled plate, 50mm]	485	-	545	10	-	-	Transverse properties (Typ.)	(BAI Plate)
7050	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.12, Fe 0.15, Cu 2-2.6, Mg 1.9-2.6, Mn 0.1, Zn 5.7-6.7, Ti 0.06, Cr 0.04, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830								
Similar/Equivalent alloys: <u>USA:</u> AA7050, UNS A97050, AMS 4050, 4107, 4108, 4201, 4340, 4341, 4342, MIL -A-22771; <u>European (CEN):</u> EN573 AW-7050 (<u>ISO:</u> AlZn6CuMgZr; <u>Germany:</u> LW3.4144; <u>UK:</u> 7050; <u>Others:</u> Eur. aerospace P-7050; <u>Proprietary:</u> Alcan Dural AD; Otto Fuchs AZ84; HDA 75								
Comments: For comments see: AA series.								
7050A	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.7-2.4, Mg 1.7-2.6, Mn 0.04, Zn 5.7-6.9, Ni 0.03, Ti 0.06, Cr 0.04, Zr 0.05-0.12, Others: Each 0.05 Total 0.15, Aluminium rem.								
Comments: Designation added to AA (USA) register since previous issue (06/94)								
7051	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								

Aluminium Alloys (wrought) 203

7055	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.15, Cu 2-2.6, Mg 1.8-2.3, Mn 0.05, Zn 7.6-8.4, Ti 0.06, Cr 0.04, Zr 0.08-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2860								
7060	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.2, Cu 1.8-2.6, Mg 1.3-2.1, Mn 0.2, Zn 6.1-7.5, Ti 0.05, Cr 0.15-0.25, Pb 0.003, Zr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
7064	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.8-2.4, Mg 1.9-2.9, Zn 6.8-8, Cr 0.06-0.25, Co 0.1-0.4, Zr 0.1-0.5, O ₂ 0.05-0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2850								
7070	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
7072	AA (USA)	Wrought						
Official composition: Cu 0.1, Mg 0.1, Mn 0.1, Zn 0.8-1.3, Si+Fe 0.7, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Sheet/strip, Fin stock, Tube, Extrusion, Wire, Rivet stock Similar/Equivalent alloys: <u>USA:</u> AA7072; <u>European (CEN):</u> EN573 AW-7072 (<u>ISO:</u> AlZn1; <u>Proprietary:</u> Alcan 72S Comments: Aerospace, rivets, cladding sheet.								
7072	GEN 573 (Europe)	Wrought						
Nominal composition: Cu 0.1, Mg 0.1, Mn 0.1, Zn 0.8-1.3, Si+Fe 0.7, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Similar/Equivalent alloys: <u>USA:</u> AA7072; <u>European (CEN):</u> EN573 AW-7072 (<u>ISO:</u> AlZn1; <u>Proprietary:</u> Alcan 72S Comments: Cladding sheet.								
7075	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.5, Cu 1.2-2, Mg 2.1-2.9, Mn 0.3, Zn 5.1-6.1, Ti 0.2, Cr 0.18-0.28, By agreement Zr+Ti limit may be 0.25 for extrusion & forging, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810 Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Rod, Bar, Wire, Rivet stock Similar/Equivalent alloys: <u>USA:</u> AA7075, UNS A97075, AMS 4045, 4078, MIL -A-22771, QQ -A250/12, -A250/24, -A-225/9, -A-200/11, -A-200/15, -A-367; <u>European (CEN):</u> EN573 AW-7075, AW-AlZn5.5MgCu (<u>ISO:</u> AlZn5.5MgCu, AlZn6MgCu1.5 (<u>AECMA:</u> AL-P42; <u>Austria:</u> AlZnMgCu1.5; <u>Canada:</u> ZG62; <u>France:</u> A-Z5GU; 7075; AIR 9048-680, -690, -700, -710.; <u>Germany:</u> AlZnMgCu1.5; Wk.3.4365; LW3.4364; <u>Italy:</u> 9007/2; 3735, 3736; FA60-7075; <u>Japan:</u> A7075P; <u>Spain:</u> L-3710; <u>Switzerland:</u> AlZn6MgCu1.5, AlZnMnCu; 10858; <u>UK:</u> 7075; BS 2L95, L96, L160, L161, L162, L170; DTD5074A, DTD5124, DTD5121, DTD5110; <u>Others:</u> (CZ) CSN 42 4222; Eur. aerospace P-7075; <u>Proprietary:</u> Alcan 75S, 89; Otto Fuchs AZ64; Hoogovens 7750; HDA 89 Comments: Aerospace, aircraft structures, high strength non-welded applications. Rivets. Road transport, mechanical engineering. Vehicle high-strength structures. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	103	228	17	72	60HB	Typical	(#1)
T6 [-]	470	-	530	-	-	155HB	Typical	(P. Balloffet)
T6 [-]	505	-	570	-	-	-	Typical	(Raufoss)
T6, T651 [-]	-	503	572	11	72	150HB	Typical	(#1)
T651 [Hot rolled plate, 50mm]	480	-	550	8	72	150HB	Transverse properties (Typ.)	(BAI Plate)
T7351 [Hot rolled plate, 50mm]	420	-	500	9	72	135HB	Transverse properties (Typ.)	(BAI Plate)

204 Aluminium Alloys (wrought)

7075

CEN 573 (Europe)

Wrought

Nominal composition: Si 0.4, Fe 0.5, Cu 1.2-2, Mg 2.1-2.9, Mn 0.3, Zn 5.1-6.1, Ti 0.2, Cr 0.18-0.28, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2810

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Wire

Similar/Equivalent alloys: USA: AA7075, UNS A97075, AMS 4045, 4078, MIL -A-22771, QQ -A250/12, -A250/24, -A-225/9, -A-200/11, -A-200/15, -A-367; European (CEN): EN573 AW-7075; AW-AlZn5.5MgCu (ISO); AlZn5.5MgCu, AlZn6MgCu1.5 (AECMA); AL-P42; Austria: AlZnMgCu1.5; Canada: ZG62; France: A-Z5GU; 7075; AIR 9048-680, -690, -700, -710,.; Germany: AlZnMgCu1.5; Wk.3.4365; LW3.4364; Italy: 9007/2; 3735, 3736; FA60-7075; Japan: A7075P; Spain: L-3710; Switzerland: AlZn6MgCu1.5, AlZnMnCu; 10858; UK: 7075; BS 2L95, L96, L160, L161, L162, L170; DTD5074A, DTD5124, DTD5121, DTD5110; Others: (CZ) CSN 42 4222; Eur. aerospace P-7075; Proprietary: Alcan 75S, 89; Otto Fuchs AZ64; Hoogovens 7750; HDA 89

Comments: For comments see: AA series.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Drawn wire (<20mm)]	110	-	275	13	-	-	EN1301 / EN11715	(Pechiney)
O [Sheet/Plate (>0.4 <75mm)]	145	-	275	10	-	55HB	EN485 Max. values	(Pechiney)
O / H111 [Drawn bar (<80mm)]	165	-	275	10	-	-	EN754 Max. values	(Pechiney)
O / H111 [Drawn tube (<20mm)]	165	-	275	10	-	-	EN754 Max. values	(Pechiney)
O / H111 [Extru. Bar (<200mm)]	165	-	275	10	-	-	EN755 Max. values	(Pechiney)
O / H111 [Extru. Tube (<10mm)]	165	-	275	10	-	-	EN755 Max. values	(Pechiney)
H13 [Drawn wire (<18mm)]	230	-	230	2.5	-	-	EN1301 / EN11715	(Pechiney)
T6 [Drawn bar (<80mm)]	460	-	520	7	-	-	EN754 Min. values	(Pechiney)
T6 [Drawn tube (<20mm)]	460	-	520	7	-	-	EN754 Min. values	(Pechiney)
T6 [Drawn wire (<20mm)]	485	-	510	10	-	-	EN1301 / EN11715	(Pechiney)
T6 [Extru. Tube (<5mm)]	485	-	540	8	-	-	EN755 Min. values	(Pechiney)
T6 [Extrusion (<25mm)]	460	-	530	6	-	-	EN755 Min. values	(Pechiney)
T6 [Sheet (>0.4 <0.8mm)]	460	-	525	6	-	157HB	EN485 Min. values	(Pechiney)
T6 [Strip/sheet]	460	-	525	6	-	157HB	Minimum	(AMAG)
T6/T6510/T6511 [Extru. Bar (<200mm)]	400	-	470	5	-	-	EN755 Max. values	(Pechiney)
T62 [Plate (>100 <120mm)]	300	-	410	2	-	119HB	EN485 Min. values	(Pechiney)
T62 [Plate (>120 <150mm)]	260	-	360	2	-	104HB	EN485 Min. values	(Pechiney)
T62 [Plate (>25 <50mm)]	460	-	530	5	-	158HB	EN485 Min. values	(Pechiney)
T62 [Plate (>50 <60mm)]	440	-	525	4	-	155HB	EN485 Min. values	(Pechiney)
T62 [Plate (>6 <12mm)]	460	-	540	8	-	160HB	EN485 Min. values	(Pechiney)
T62 [Plate (>60 <80mm)]	420	-	495	4	-	147HB	EN485 Min. values	(Pechiney)
T62 [Plate (>80 <90mm)]	390	-	490	4	-	144HB	EN485 Min. values	(Pechiney)
T62 [Plate (>90 <100mm)]	360	-	460	3	-	135HB	EN485 Min. values	(Pechiney)
T62 [Sheet (>1.5 <3mm)]	470	-	540	7	-	161HB	EN485 Min. values	(Pechiney)
T62 [Sheet/Plate (>3 <6mm)]	475	-	545	8	-	163HB	EN485 Min. values	(Pechiney)
T651 [Drawn bar (<80mm)]	460	-	520	5	-	-	EN754 Min. values	(Pechiney)
T651 [Plate (>12.5 <25mm)]	470	-	540	6	-	161HB	EN485 Min. values	(Pechiney)
T651 [Sheet (>0.8 <1.5mm)]	460	-	540	6	-	160HB	EN485 Min. values	(Pechiney)
T6510/T6511 [Extrusion (>25 <60mm)]	470	-	540	6	-	-	EN755 Min. values	(Pechiney)
T73 [Drawn tube (<20mm)]	385	-	455	10	-	-	EN754 Min. values	(Pechiney)
T73 [Extru. Bar (<25mm)]	420	-	485	7	-	-	EN755 Max. values	(Pechiney)
T73 [Extru. Tube (<5mm)]	400	-	470	7	-	-	EN755 Min. values	(Pechiney)
T73 [Extrusion (<25mm)]	420	-	485	7	-	-	EN755 Min. values	(Pechiney)
T73 [Sheet (>1.5 <3mm)]	385	-	460	7	-	137HB	EN485 Min. values	(Pechiney)
T73 / T7351 [Drawn bar (<80mm)]	385	-	455	-	-	-	EN754 Min. values	(Pechiney)
T7351 [Plate (>50 <60mm)]	360	-	455	5	-	133HB	EN485 Min. values	(Pechiney)
T7351 [Plate (>6 <50mm)]	390	-	475	-	-	140HB	EN485 Min. values	(Pechiney)
T7351 [Plate (>60 <80mm)]	340	-	440	5	-	129HB	EN485 Min. values	(Pechiney)
T7351 [Plate (>80 <100mm)]	340	-	430	5	-	126HB	EN485 Min. values	(Pechiney)
T7351 [Sheet/Plate (>3 <6mm)]	385	-	460	8	-	137HB	EN485 Min. values	(Pechiney)
T73510/T73511 [Extrusion (<25mm)]	420	-	485	7	-	-	EN755 Min. values	(Pechiney)
T76 [Sheet (>1.5 <3mm)]	425	-	500	7	-	149HB	EN485 Min. values	(Pechiney)
T7651 [Sheet/Plate (>3 <6mm)]	425	-	500	8	-	149HB	EN485 Min. values	(Pechiney)

7075 Alclad

AA (USA)

Wrought

No composition: (7075 + Al)

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: USA: AA7075 Alclad, AMS 4049, QQ -A250/13, -A250/25; Canada: ZG62 ALCLAD; Switzerland: AlZnMnCu-p1

Comments: Clad sheet. See AA7075

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	97	221	17	72	-	Typical	(#1)
T6, T651 [-]	-	462	524	11	72	-	Typical	(#1)

7076

AA (USA)

Wrought

Official composition: Si 0.4, Fe 0.6, Cu 0.3-1, Mg 1.2-2, Mn 0.3-0.8, Zn 7-8, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2840

7079

AA (USA)

Wrought

Nominal composition: Cu 0.6, Mg 3, Mn 0.2, Zn 4, Cr 0.2, Aluminium rem.

Identified Product forms: Tube, Extrusion, Wire

Similar/Equivalent alloys: USA: AA7079; Germany: AlZnMgCu0.5; DIN 3.4345; LW3.4344; Proprietary: Alcan 79; Otto Fuchs AZ54; Hoogovens 7790

Comments: Listed by AA as Inactive. Aerospace, rivets.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	-	-	71	-	-	(Hoogovens)

Aluminium Alloys (wrought) 205

7090	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 0.6-1.3, Mg 2-3, Zn 7.3-8.7, Co 1-1.9, O ₂ 0.2-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2860								
7091	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.1-1.8, Mg 2-3, Zn 5.8-7.1, Co 0.2-0.6, O ₂ 0.2-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810								
7093	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.1-1.9, Mg 2-3, Zn 8.3-9.7, Ni 0.04-0.16, Co 0.08-0.2, O ₂ 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2860								
7104	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
7108	AA (USA)	Wrought						
Official composition: Si 0.1, Fe 0.1, Cu 0.05, Mg 0.7-1.4, Mn 0.05, Zn 4.5-5.5, Ti 0.05, Zr 0.12-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780								
7108A	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.3, Cu 0.05, Mg 0.7-1.5, Mn 0.05, Zn 4.8-5.8, Ti 0.03, Cr 0.04, Ga 0.03, Zr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
7109	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
7116	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.3, Cu 0.5-1.1, Mg 0.8-1.4, Mn 0.05, Zn 4.2-5.2, Ti 0.05, Ga 0.03, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780								
7129	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.3, Cu 0.5-0.9, Mg 1.3-2, Mn 0.1, Zn 4.2-5.2, Ti 0.05, Cr 0.1, Ga 0.03, V 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2780								
7139	AA (USA)	Wrought						
No composition: - Comments: Listed by AA as Inactive.								
7146	AA (USA)	Wrought						
Official composition: Si 0.2, Fe 0.4, Mg 1-1.6, Zn 6.6-7.6, Ti 0.06, Zr 0.1-0.18, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810								
7149	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.2, Cu 1.2-1.9, Mg 2-2.9, Mn 0.2, Zn 7.2-8.2, Ti 0.1, Cr 0.1-0.22, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840 Similar/Equivalent alloys: <u>USA:</u> AA7149, AMS 4320, 4343; <u>European (CEN):</u> EN573 AW-7149; <u>Proprietary:</u> Otto Fuchs AZ66								
7149	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.15, Fe 0.2, Cu 1.2-1.9, Mg 2-2.9, Mn 0.2, Zn 7.2-8.2, Ti 0.1, Cr 0.1-0.22, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840 Similar/Equivalent alloys: <u>USA:</u> AA7149, AMS 4320, 4343; <u>European (CEN):</u> EN573 AW-7149; <u>Proprietary:</u> Otto Fuchs AZ66								
7150	AA (USA)	Wrought						
Official composition: Si 0.12, Fe 0.15, Cu 1.9-2.5, Mg 2-2.7, Mn 0.1, Zn 5.9-6.9, Ti 0.06, Cr 0.04, Zr 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830 Identified Product forms: Plate, Tube, Extrusion Similar/Equivalent alloys: <u>USA:</u> AA7150, AMS 4306, 4252, 4307, 4345; <u>Germany:</u> LW3.4144; <u>UK:</u> 7150; <u>Others:</u> Eur. aerospace P-7150; <u>Proprietary:</u> Alcan Dural AX; Otto Fuchs AZ84 Comments: Aerospace, aircraft structures, high strength non-welded applications. Corrosion resistance: Fair (atmospheric) Weldability: Unsuitable (fusion) Machinability: Very good								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
T651 [Hot rolled plate, 50mm]	570	-	610	9	-		Transverse properties (Typ.)	(BAI Plate)
7175	AA (USA)	Wrought						
Official composition: Si 0.15, Fe 0.2, Cu 1.2-2, Mg 2.1-2.9, Mn 0.1, Zn 5.1-6.1, Ti 0.1, Cr 0.18-0.28, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2800 Identified Product forms: Plate, Tube, Extrusion, Forging stock/Billet Similar/Equivalent alloys: <u>USA:</u> AA7175, UNS A97175, AMS 4148, 4149, 4179, 4344, MIL -A-22771; <u>European (CEN):</u> EN573 AW-7175; <u>France:</u> 7175; <u>Germany:</u> LW3.4334; <u>UK:</u> 7175; <u>Others:</u> Eur. aerospace P-7175; <u>Proprietary:</u> Otto Fuchs AZ69; HDA 89 Comments: Aerospace.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
T7351 [Hot rolled plate, 50mm]	420	-	500	9	-		Transverse properties (Typ.)	(BAI Plate)
T74 [-]	-	455	524	11	72	HB 135	Typical	(#1)

206 Aluminium Alloys (wrought)

7175	CEN 573 (Europe)						Wrought	
Nominal composition: Si 0.15, Fe 0.2, Cu 1.2-2, Mg 2.1-2.9, Mn 0.1, Zn 5.1-6.1, Ti 0.1, Cr 0.18-0.28, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2800								
Similar/Equivalent alloys: <i>USA:</i> AA7175, UNS A97175, AMS 4148, 4149, 4179, 4344, MIL -A-22771; <i>European (CEN):</i> EN573 AW-7175; <i>France:</i> 7175; <i>Germany:</i> LW3.4334; <i>UK:</i> 7175; <i>Others:</i> Eur. aerospace P-7175; <i>Proprietary:</i> Otto Fuchs AZ69; HDA 89								
Comments: For comments see: AA series.								
7178	AA (USA)						Wrought	
Official composition: Si 0.4, Fe 0.5, Cu 1.6-2.4, Mg 2.4-3.1, Mn 0.3, Zn 6.3-7.3, Ti 0.2, Cr 0.18-0.28, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Wire, Rivet stock								
Similar/Equivalent alloys: <i>USA:</i> AA7178, UNS A97178; <i>European (CEN):</i> EN573 AW-7178 (<i>ISO:</i> AlZn7MgCu; <i>France:</i> A-Z5GU								
Comments: Aerospace.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	103	228	16	72	-	Typical	(#1)
T6, T651 [-]	-	538	607	11	72	-	Typical	(#1)
T76, T7651 [-]	-	503	572	11	71	-	Typical	(#1)
7178	CEN 573 (Europe)						Wrought	
Nominal composition: Si 0.4, Fe 0.5, Cu 1.6-2.4, Mg 2.4-3.1, Mn 0.3, Zn 6.3-7.3, Ti 0.2, Cr 0.18-0.28, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830								
Similar/Equivalent alloys: <i>USA:</i> AA7178, UNS A97178; <i>European (CEN):</i> EN573 AW-7178 (<i>ISO:</i> AlZn7MgCu; <i>France:</i> A-Z5GU								
Comments: For comments see: AA series.								
7179	AA (USA)						Wrought	
No composition: -								
Comments: Listed by AA as Inactive.								
7229	AA (USA)						Wrought	
Official composition: Si 0.06, Fe 0.08, Cu 0.5-0.9, Mg 1.3-2, Mn 0.03, Zn 4.2-5.2, Ti 0.05, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2770								
7249	AA (USA)						Wrought	
Official composition: Si 0.1, Fe 0.12, Cu 1.3-1.9, Mg 2-2.4, Mn 0.1, Zn 7.5-8.2, Ti 0.06, Cr 0.12-0.18, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840								
7277	AA (USA)						Wrought	
Official composition: Si 0.5, Fe 0.7, Cu 0.8-1.7, Mg 1.7-2.3, Zn 3.7-4.3, Ti 0.1, Cr 0.18-0.35, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770								
7278	AA (USA)						Wrought	
Official composition: Si 0.15, Fe 0.2, Cu 1.6-2.2, Mg 2.5-3.2, Mn 0.02, Zn 6.6-7.4, Ti 0.03, Cr 0.17-0.25, Ga 0.03, V 0.05, Others: Each 0.03 Total 0.1, Aluminium rem.								
7278A	AA (USA)						Wrought	
Official composition: Si 0.12, Fe 0.15, Cu 1.3-2.1, Mg 2.3-3.2, Mn 0.25, Zn 6.4-7.4, Ti 0.05, Cr 0.05, Zr 0.05-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
7349	AA (USA)						Wrought	
Official composition: Si 0.12, Fe 0.15, Cu 1.4-2.1, Mg 1.8-2.7, Mn 0.2, Zn 7.5-8.7, Cr 0.1-0.22, Ti+Zr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
7350	Hoogovens (Netherlands)						Wrought	
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> AA7020, SAE 214; <i>European (CEN):</i> EN573 AW-7020; AW-AlZn4.5Mg1 (<i>ISO:</i> AlZn4.5Mg1; <i>France:</i> A-Z5G; 7020; AIR 9048-670; <i>Germany:</i> AlZn4.5Mg1; 3.4335; <i>Italy:</i> 9007/1; 7791; P-AlZn4.5Mg; <i>Japan:</i> A7020; <i>Spain:</i> L-3741; <i>Sweden:</i> 14,4425; <i>Switzerland:</i> AlZn4.5Mg1; <i>UK:</i> 7020; BS H17; <i>Others:</i> (CZ) CSN 42 4441; Eur. aerospace P-7020								
Comments: Hoogovens version of AA 7020.								
7449	AA (USA)						Wrought	
Official composition: Si 0.12, Fe 0.15, Cu 1.4-2.1, Mg 1.8-2.7, Mn 0.2, Zn 7.5-8.7, Ti+Zr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.								
7472	AA (USA)						Wrought	
Official composition: Si 0.25, Fe 0.6, Cu 0.05, Mg 0.9-1.5, Mn 0.05, Zn 1.3-1.9, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
7475	AA (USA)						Wrought	
Official composition: Si 0.1, Fe 0.12, Cu 1.2-1.9, Mg 1.9-2.6, Mn 0.06, Zn 5.2-6.2, Ti 0.06, Cr 0.18-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod								
Similar/Equivalent alloys: <i>USA:</i> AA7475, AMS 4084, 4085, 4089, 4090, 4202; <i>European (CEN):</i> EN573 AW-7475 (<i>ISO:</i> AlZn5.5MgCu(A); <i>France:</i> AIR 9048-720, -730; <i>Germany:</i> LW3.4384; <i>UK:</i> 7475; <i>Others:</i> Eur. aerospace P-7475; <i>Proprietary:</i> Alcan Dural LE, Dural LT; Otto Fuchs AZ62								
Comments: Superplastic forming, aerospace.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T61 [-]	-	490	565	11	70	-	Typical	(#1)
T651 [-]	-	510	586	13	72	-	Typical	(#1)
T651 [Hot rolled plate, 50mm]	480	-	550	9	-	-	Transverse properties (Typ.)	(BAI Plate)
T7351 [-]	-	421	496	13	72	-	Typical	(#1)
T7351 [Hot rolled plate, 50mm]	420	-	500	10	-	-	Transverse properties (Typ.)	(BAI Plate)
T76 [Superplastic forming]	460	-	560	-	-	-	Typical	(Superform Metals)
T761 [-]	-	448	517	12	70	-	Typical	(#1)
T7651 [-]	-	462	531	12	72	-	Typical	(#1)

Aluminium Alloys (wrought) 207

7475	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.1, Fe 0.12, Cu 1.2-1.9, Mg 1.9-2.6, Mn 0.06, Zn 5.2-6.2, Ti 0.06, Cr 0.18-0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2810								
Similar/Equivalent alloys: <u>USA:</u> AA7475, AMS 4084, 4085, 4089, 4090, 4202; <u>European (CEN):</u> EN573 AW-7475 (<u>ISO:</u> AlZn5.5MgCu(A)); <u>France:</u> AIR 9048-720, -730; <u>Germany:</u> LW3.4384; <u>UK:</u> 7475; <u>Others:</u> Eur. aerospace P-7475; <u>Proprietary:</u> Alcan Dural LE, Dural LT; Otto Fuchs AZ62								
Comments: For comments see: AA series.								
7750	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA7075, UNS A97075, AMS 4045, 4078; <u>European (CEN):</u> EN573 AW-7075; AW-AlZn5.5MgCu (<u>ISO:</u> AlZn5.5MgCu, AlZn6MgCu1.5 (<u>AECMA:</u> AL-P42; <u>Austria:</u> AlZnMgCu1.5; <u>Canada:</u> ZG62; <u>France:</u> A-Z5GU; 7075; AIR 9048-680, -690, -700, -710.; <u>Germany:</u> AlZnMgCu1.5; Wk.3.4365; LW3.4364; <u>Italy:</u> 9007I2; 3735, 3736; FA60-7075; <u>Japan:</u> A7075P; <u>Spain:</u> L-3710; <u>Switzerland:</u> AlZn6MgCu1.5, AlZnMnCu; 10858; <u>UK:</u> 7075; BS 2L95, L96, L160, L161, L162, L170; DTD5074A, DTD5124, DTD5121, DTD5110; <u>Others:</u> (CZ) CSN 42 4222; Eur. aerospace P-7075								
Comments: Hoogovens version of AA 7075.								
7790	Hoogovens (Netherlands)	Wrought						
No composition: -								
Similar/Equivalent alloys: <u>USA:</u> AA7079; <u>Germany:</u> AlZnMgCu0.5; DIN 3.4345; LW3.4344								
Comments: Hoogovens version of AA 7079.								
8001	AA (USA)	Wrought						
Official composition: Si 0.17, Fe 0.45-0.7, Cu 0.15, Zn 0.05, Ni 0.9-1.3, Co 0.001, Li 0.008, Cd 0.003, B 0.001, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730								
8004	AA (USA)	Wrought						
No composition: -								
Comments: Listed by AA as Inactive.								
8005	AA (USA)	Wrought						
Official composition: Si 0.2-0.5, Fe 0.4-0.8, Cu 0.05, Mg 0.05, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
8006	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 1.2-2, Cu 0.3, Mg 0.1, Mn 0.3-1, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740								
Identified Product forms: Foil								
Similar/Equivalent alloys: <u>USA:</u> AA8006; <u>European (CEN):</u> EN573 AW-8006								
Comments: Consumer foil.								
8006	CEN 573 (Europe)	Wrought						
Nominal composition: Si 0.4, Fe 1.2-2, Cu 0.3, Mg 0.1, Mn 0.3-1, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2740								
Similar/Equivalent alloys: <u>USA:</u> AA8006; <u>European (CEN):</u> EN573 AW-8006								
Comments: For comments see: AA series.								
8007	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 1.2-2, Cu 0.1, Mg 0.1, Mn 0.3-1, Zn 0.8-1.8, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2760								
8008	AA (USA)	Wrought						
Official composition: Si 0.6, Fe 0.9-1.6, Cu 0.2, Mn 0.5-1, Zn 0.1, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Foil								
Comments: Container foil.								
8009	AA (USA)	Wrought						
Official composition: Si 1.7-1.9, Fe 8.4-8.9, Mn 0.1, Zn 0.25, Ti 0.1, Cr 0.1, V 1.1-1.5, O ₂ 0.3, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2880								
8010	AA (USA)	Wrought						
Official composition: Si 0.4, Fe 0.35-0.7, Cu 0.1-0.3, Mg 0.1-0.5, Mn 0.1-0.8, Zn 0.4, Ti 0.1, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720								
8011	AA (USA)	Wrought						
Official composition: Si 0.5-0.9, Fe 0.6-1, Cu 0.1, Mg 0.05, Mn 0.2, Zn 0.1, Ti 0.08, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710								
Identified Product forms: Sheet/strip, Foil								
Similar/Equivalent alloys: <u>USA:</u> AA8011; <u>Australia:</u> D8011; <u>France:</u> A-FeS; <u>Spain:</u> L-3611; <u>UK:</u> 8011; <u>Proprietary:</u> LM Star 1084; VAW 98/50								
Comments: Closure capsules.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Soft [Foil (>90 microns)]	-	-	110	16	-	-	UTS max. Elong min. values	(LM Star 1084)
Soft [Foil (41-90 microns)]	-	-	110	10	-	-	UTS max. Elong min. values	(LM Star 1084)
8011A	AA (USA)	Wrought						
Official composition: Si 0.4-0.8, Fe 0.5-1, Cu 0.1, Mg 0.1, Mn 0.1, Zn 0.1, Ti 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.								
Similar/Equivalent alloys: <u>USA:</u> AA8011A; <u>European (CEN):</u> EN573 AW-8011A (<u>ISO:</u> (AlFeSi)); <u>France:</u> A4/L; 8011; <u>Germany:</u> Wk. 3.0915 (AlFeSi); <u>Italy:</u> 8011; <u>Proprietary:</u> VAW 98/50								

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8011A	GEN 573 (Europe)	Wrought																											
Nominal composition: Si 0.4-0.8, Fe 0.5-1, Cu 0.1, Mg 0.1, Mn 0.1, Zn 0.1, Ti 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Similar/Equivalent alloys: <i>USA:</i> AA8011A; <i>European (CEN):</i> EN573 AW-8011A (<i>ISO:</i> (AlFeSi)); <i>France:</i> A4/L; 8011; <i>Germany:</i> Wk. 3.0915 (AlFeSi); <i>Italy:</i> 8011; <i>Proprietary:</i> VAW 98/50																													
8013	AA (USA)	Wrought																											
No composition: - Comments: Listed by AA as Inactive.																													
8014	AA (USA)	Wrought																											
Official composition: Si 0.3, Fe 1.2-1.6, Cu 0.2, Mg 0.1, Mn 0.2-0.6, Zn 0.1, Ti 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2730 Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA8014; <i>Proprietary:</i> LM Star 8101. Comments: House foil, unsupported confectionery foil. <table border="0"> <thead> <tr> <th>Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th>(Source)</th> </tr> </thead> <tbody> <tr> <td>O (soft) [Foil (12 microns)]</td> <td>-</td> <td>-</td> <td>120</td> <td>3</td> <td>-</td> <td>-</td> <td>UTS max, EI min values</td> <td>(LM Star 8101)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	O (soft) [Foil (12 microns)]	-	-	120	3	-	-	UTS max, EI min values	(LM Star 8101)									
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)																					
O (soft) [Foil (12 microns)]	-	-	120	3	-	-	UTS max, EI min values	(LM Star 8101)																					
8015	AA (USA)	Wrought																											
Official composition: Si 0.3, Fe 0.8-1.4, Cu 0.1, Mg 0.1, Mn 0.1-0.4, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720																													
8016	AA (USA)	Wrought																											
Official composition: Si 0.2, Fe 0.7-1.1, Cu 0.1, Mg 0.1, Mn 0.1-0.3, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.																													
8017	AA (USA)	Wrought																											
Official composition: Si 0.1, Fe 0.55-0.8, Cu 0.1-0.2, Mg 0.01-0.05, Zn 0.05, Li 0.003, B 0.04, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2710 Identified Product forms: Rod, Wire																													
8018	AA (USA)	Wrought																											
Official composition: Si 0.5-0.9, Fe 0.6-1, Cu 0.3-0.6, Mn 0.3, Ti 0.006-0.06, Others: Each 0.05 Total 0.15, Aluminium rem.																													
8019	AA (USA)	Wrought																											
Official composition: Si 0.2, Fe 7.3-9.3, Mn 0.05, Zn 0.05, Ti 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2930 Comments: Composition limits revised and 'X' removed from designation since previous issue of AA (USA) register (06/94)																													
8020	AA (USA)	Wrought																											
Official composition: Si 0.1, Fe 0.1, Cu 0.005, Mn 0.005, Zn 0.005, V 0.05, O ₂ 0.05-0.5, Ce 3.5-4.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710																													
8021	AA (USA)	Wrought																											
Official composition: Si 0.15, Fe 1.2-1.7, Cu 0.05, Bi 0.1-0.5, Sn 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.																													
8021A	AA (USA)	Wrought																											
Official composition: Si 0.2, Fe 1.2-1.7, Cu 0.05, Mg 0.2, Mn 0.03, Zn 0.05, Ti 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Foil Similar/Equivalent alloys: <i>USA:</i> AA8021A; <i>Proprietary:</i> LM Star 1085: Comments: Packaging: lidding food stuffs. <table border="0"> <thead> <tr> <th>Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th>(Source)</th> </tr> </thead> <tbody> <tr> <td>O (soft) [Foil (12 microns)]</td> <td>-</td> <td>-</td> <td>105</td> <td>4</td> <td>-</td> <td>-</td> <td>UTS max, EI min. values</td> <td>(LM Star 1085)</td> </tr> <tr> <td>Soft [Foil (>41 microns)]</td> <td>-</td> <td>-</td> <td>110</td> <td>11</td> <td>-</td> <td>-</td> <td>UTS max, EI min. values</td> <td>(LM Star 1085)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	O (soft) [Foil (12 microns)]	-	-	105	4	-	-	UTS max, EI min. values	(LM Star 1085)	Soft [Foil (>41 microns)]	-	-	110	11	-	-	UTS max, EI min. values	(LM Star 1085)
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)																					
O (soft) [Foil (12 microns)]	-	-	105	4	-	-	UTS max, EI min. values	(LM Star 1085)																					
Soft [Foil (>41 microns)]	-	-	110	11	-	-	UTS max, EI min. values	(LM Star 1085)																					
8021B	AA (USA)	Wrought																											
Official composition: Si 0.4, Fe 1.1-1.7, Cu 0.05, Mg 0.01, Mn 0.03, Zn 0.05, Ti 0.05, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)																													
8022	AA (USA)	Wrought																											
Official composition: Si 1.2-1.4, Fe 6.2-6.8, Mn 0.1, Zn 0.25, Ti 0.1, Cr 0.1, V 0.4-0.8, O ₂ 0.05-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2830																													
8030	AA (USA)	Wrought																											
Official composition: Si 0.1, Fe 0.3-0.8, Cu 0.15-0.3, Mg 0.05, Zn 0.05, B 0.001-0.04, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2710 Identified Product forms: Rod, Wire																													
8040	AA (USA)	Wrought																											
Official composition: Cu 0.2, Mn 0.05, Zn 0.2, Zr 0.1-0.3, Si+Fe 1.0, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710																													
8050	AA (USA)	Wrought																											
Official composition: Si 0.15-0.3, Fe 1.1-1.2, Cu 0.05, Mg 0.05, Mn 0.45-0.55, Zn 0.1, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.																													
8076	AA (USA)	Wrought																											
Official composition: Si 0.1, Fe 0.6-0.9, Cu 0.04, Mg 0.08-0.22, Zn 0.05, B 0.04, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2710																													
8077	AA (USA)	Wrought																											
Official composition: Si 0.1, Fe 0.1-0.4, Cu 0.05, Mg 0.1-0.3, Zn 0.05, Zr 0.02-0.08, B 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700																													

Aluminium Alloys (wrought) 209

8079	AA (USA)	Wrought																																				
Official composition: Si 0.05-0.3, Fe 0.7-1.3, Cu 0.05, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Identified Product forms: Foil Similar/Equivalent alloys: <u>USA:</u> AA8079; <u>European (CEN):</u> EN573 AW-8079; <u>UK:</u> 1C, 1200; <u>Proprietary:</u> VAW 99/01 Comments: Closure packaging.																																						
8079	CEN 573 (Europe)	Wrought																																				
Nominal composition: Si 0.05-0.3, Fe 0.7-1.3, Cu 0.05, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720 Similar/Equivalent alloys: <u>USA:</u> AA8079; <u>European (CEN):</u> EN573 AW-8079; <u>UK:</u> 1C, 1200; <u>Proprietary:</u> VAW 99/01 Comments: For comments see AA series.																																						
8081	AA (USA)	Wrought																																				
Official composition: Si 0.7, Fe 0.7, Cu 0.7-1.3, Mn 0.1, Zn 0.05, Ti 0.1, Sn 18-22, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 3120																																						
8090	AA (USA)	Wrought																																				
Official composition: Si 0.2, Fe 0.3, Cu 1-1.6, Mg 0.6-1.3, Mn 0.1, Zn 0.25, Ti 0.1, Li 2.2-2.7, Zr 0.04-0.16, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2540 Identified Product forms: Plate, Sheet/strip, Tube, Extrusion Similar/Equivalent alloys: <u>USA:</u> AA8090; <u>UK:</u> 8090; <u>Others:</u> Eur. aerospace P-8090; <u>Proprietary:</u> Alcan LITAL A; LITAL C; Pechiney CP271 (inactive); Otto Fuchs AL10 Comments: Medium/high strength die and hand forged aerospace components, including precise to form forgings. Superplastic forming - aerospace.																																						
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Condition [Form]</th> <th style="text-align: center;">PS (MPa)</th> <th style="text-align: center;">YS (MPa)</th> <th style="text-align: center;">UTS (MPa)</th> <th style="text-align: center;">EI (%)</th> <th style="text-align: center;">E (GPa)</th> <th style="text-align: center;">Hardness</th> <th style="text-align: left;">Notes</th> <th style="text-align: right;">(Source)</th> </tr> </thead> <tbody> <tr> <td>DT [Hot rolled plate, 50mm]</td> <td style="text-align: center;">360</td> <td style="text-align: center;">-</td> <td style="text-align: center;">470</td> <td style="text-align: center;">8</td> <td style="text-align: center;">-</td> <td></td> <td>Transverse properties (Typ.)</td> <td style="text-align: right;">(BAI Plate)</td> </tr> <tr> <td>MS [Hot rolled plate, 50mm]</td> <td style="text-align: center;">440</td> <td style="text-align: center;">-</td> <td style="text-align: center;">525</td> <td style="text-align: center;">7</td> <td style="text-align: center;">-</td> <td></td> <td>Transverse properties (Typ.)</td> <td style="text-align: right;">(BAI Plate)</td> </tr> <tr> <td>T6 [Superplastic forming]</td> <td style="text-align: center;">320</td> <td style="text-align: center;">-</td> <td style="text-align: center;">410</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td></td> <td>Typical</td> <td style="text-align: right;">(Superform Metals)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	DT [Hot rolled plate, 50mm]	360	-	470	8	-		Transverse properties (Typ.)	(BAI Plate)	MS [Hot rolled plate, 50mm]	440	-	525	7	-		Transverse properties (Typ.)	(BAI Plate)	T6 [Superplastic forming]	320	-	410	-	-		Typical	(Superform Metals)
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)																														
DT [Hot rolled plate, 50mm]	360	-	470	8	-		Transverse properties (Typ.)	(BAI Plate)																														
MS [Hot rolled plate, 50mm]	440	-	525	7	-		Transverse properties (Typ.)	(BAI Plate)																														
T6 [Superplastic forming]	320	-	410	-	-		Typical	(Superform Metals)																														
8091	AA (USA)	Wrought																																				
Official composition: Si 0.3, Fe 0.5, Cu 1.6-2.2, Mg 0.5-1.2, Mn 0.1, Zn 0.25, Ti 0.1, Li 2.4-2.8, Zr 0.08-0.16, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2550 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <u>USA:</u> AA8091; <u>Proprietary:</u> Alcan LITAL B, TC37; Otto Fuchs AL11 Comments: Medium/high strength die and hand forged aerospace components, including precise to form forgings. Closure capsules.																																						
8093	AA (USA)	Wrought																																				
Official composition: Si 0.1, Fe 0.1, Cu 1-1.6, Mg 0.9-1.6, Mn 0.1, Zn 0.25, Ti 0.1, Li 1.9-2.6, Zr 0.04-0.14, Others: Each 0.05 Total 0.15, Aluminium rem.																																						
8101	Lawson Mardon (LM) Star (UK)	Wrought																																				
No composition: - Identified Product forms: Foil Similar/Equivalent alloys: <u>USA:</u> AA8014 Comments: Packaging. Converter foil, thin strip & household LM Star version of AA 8014.																																						
8111	AA (USA)	Wrought																																				
Official composition: Si 0.3-1.1, Fe 0.4-1, Cu 0.1, Mg 0.05, Mn 0.1, Zn 0.1, Ti 0.08, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710																																						
8112	AA (USA)	Wrought																																				
Official composition: Si 1, Fe 1, Cu 0.4, Mg 0.7, Mn 0.6, Zn 1, Ti 0.2, Cr 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2720																																						
8130	AA (USA)	Wrought																																				
Official composition: Si 0.15, Fe 0.4-1, Cu 0.05-0.15, Zn 0.1, (Si+Fe 1.0), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2710																																						
8176	AA (USA)	Wrought																																				
Official composition: Si 0.03-0.15, Fe 0.4-1, Zn 0.1, Ga 0.03, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2710 Identified Product forms: Rod, Wire																																						
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Condition [Form]</th> <th style="text-align: center;">PS (MPa)</th> <th style="text-align: center;">YS (MPa)</th> <th style="text-align: center;">UTS (MPa)</th> <th style="text-align: center;">EI (%)</th> <th style="text-align: center;">E (GPa)</th> <th style="text-align: center;">Hardness</th> <th style="text-align: left;">Notes</th> <th style="text-align: right;">(Source)</th> </tr> </thead> <tbody> <tr> <td>H24 [-]</td> <td style="text-align: center;">-</td> <td style="text-align: center;">97</td> <td style="text-align: center;">117</td> <td style="text-align: center;">15</td> <td style="text-align: center;">69</td> <td></td> <td>Typical</td> <td style="text-align: right;">(#1)</td> </tr> </tbody> </table>			Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	H24 [-]	-	97	117	15	69		Typical	(#1)																		
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)																														
H24 [-]	-	97	117	15	69		Typical	(#1)																														
8177	AA (USA)	Wrought																																				
Official composition: Si 0.1, Fe 0.25-0.45, Cu 0.04, Mg 0.04-0.12, Zn 0.05, B 0.04, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Rod, Wire																																						
8211	AA (USA)	Wrought																																				
Official composition: Si 0.4-0.8, Fe 0.5-1, Cu 0.1, Mg 0.1, Mn 0.05-0.2, Zn 0.1, Ti 0.05, Cr 0.15, Others: Each 0.06 Total 0.15, Aluminium rem.																																						
8212	AA (USA)	Wrought																																				
No composition: - Comments: Listed by AA as Inactive.																																						
8276	AA (USA)	Wrought																																				
No composition: - Comments: Listed by AA as Inactive.																																						
8280	AA (USA)	Wrought																																				
Official composition: Si 1-2, Fe 0.7, Cu 0.7-1.3, Mn 0.1, Zn 0.05, Ni 0.2-0.7, Ti 0.1, Sn 5.5-7, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840																																						

210 Aluminium Alloys (wrought)

A-5	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> AA1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Canada:</i> 995; <i>France:</i> A5; <i>Germany:</i> Wk. 3.0255 (A199.5); <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005								
A-5L	NF (France)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Aluminium rem. Density (kg.m ⁻³) 2700								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Canada:</i> 995; <i>France:</i> A5L; <i>Germany:</i> Wk. 3.0255 (A199.5); <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	20	-	65	23	65		Typical	(Flandria)
A-G3	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> AA5754; <i>European (CEN):</i> EN573 AW-5754; AW-AIMg3 (<i>ISO:</i> AIMg3; <i>France:</i> A-G3, A-G3M; 5754; <i>Germany:</i> AIMg3; 3.3535; <i>Italy:</i> 3575; P-AIMg3.5; <i>Spain:</i> L-3390; <i>Sweden:</i> 14.4125; <i>Switzerland:</i> AIMg3; <i>UK:</i> BS N5; <i>Others:</i> (CZ) CSN 42 4413; AIMg3								
A-G4MC	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> AA5086, UNS A95086; <i>European (CEN):</i> EN573 AW-5086; AW-AIMg4 (<i>ISO:</i> AIMg4Mn; <i>France:</i> A-G4MC; 5086; <i>Germany:</i> AIMg4Mn; Wk. 3.3545; <i>Italy:</i> 5452-64; FA60-5086; 9005/4; <i>Japan:</i> A5086P; <i>Spain:</i> L-3322; <i>Switzerland:</i> AIMg4Mn; <i>UK:</i> 5086; <i>Others:</i> European aerospace P-5086								
AGS	NF (France)	Wrought						
Nominal composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.1, Mg 0.35-0.6, Mn 0.1, Zn 0.15, Ti 0.1, Cr 0.05, Aluminium rem. Density (kg.m ⁻³) 2700								
Similar/Equivalent alloys: <i>USA:</i> AA6060/6063; <i>European (CEN):</i> EN573 AW 6060 (<i>ISO:</i> AIMgSi, AIMgSiFe; <i>France:</i> AGS (A.G.S.); <i>Germany:</i> AIMgSi0.5; Wk.3.3206; <i>Italy:</i> 9006/1; 3569; P-AIMgSi; <i>Japan:</i> A6063; <i>Spain:</i> L-3442; <i>Sweden:</i> 4103; <i>Switzerland:</i> AIMgSi0.5; <i>UK:</i> 6060; 6063; BS H9; <i>Others:</i> (CZ) CSN 42 4401								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T1 [-]	65	-	135	16	70		Typical	(Flandria)
T5 [-]	130	-	180	10	70		Typical	(Flandria)
AI 99	DIN (Germany)	Wrought						
Nominal composition: Cu 0.05, Mn 0.05, Zn 0.1, Ti 0.05, Si + Fe 1.0, Others: Each 0.05 Total 1, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA1200, UNS A91200; <i>European (CEN):</i> EN573: AW-1200; AW-A199.0 (<i>ISO:</i> A199.0; <i>Austria:</i> A199; <i>Canada:</i> 990; <i>France:</i> A4; 1200; <i>Germany:</i> A199; Wk.3.0205; <i>Italy:</i> 9001/1; 3567-66; FA60-1200; P-ALP 99.0; <i>Japan:</i> A1200; A1X3; A1200P; <i>Russia (CIS):</i> GOST A0; <i>Spain:</i> L-3001; <i>Sweden:</i> 14.4010; <i>Switzerland:</i> A199; 10842; <i>UK:</i> 1200; BS 1C; BS 6L16, 6L17, 4L34; <i>Proprietary:</i> Erbsloh alloy number 1100; Alcan 2 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F8 [-]	30	-	75	18	-	22HB		(Erbsloh)
AI 99.5	DIN (Germany)	Wrought						
Nominal composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ti 0.05, Others: Total 0.5, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA1050A; <i>European (CEN):</i> EN573 AW-1050A (<i>ISO:</i> A199.5; <i>Canada:</i> 995; <i>France:</i> A5; <i>Germany:</i> Wk. 3.0255 (A199.5); <i>Italy:</i> 9001/2; 4507; P-ALP 99.5; <i>Japan:</i> A1050; <i>Spain:</i> L-3051; <i>Sweden:</i> 4007; <i>Switzerland:</i> A199.5; <i>UK:</i> BS1470:1050A; BS 1B; BS 5L36; G1B; <i>Others:</i> (CZ) CSN 42 4004, 42 4005; <i>Proprietary:</i> Erbsloh alloy number 1050; Alcan 1 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F7 [-]	20	-	65	25	-	20HB		(Erbsloh)
AI99.5Ti0.6	DIN (Germany)	Wrought						
No composition: -								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>Germany:</i> AI99.5Ti0.6								
AI 99.7	DIN (Germany)	Wrought						
Nominal composition: Si 0.2, Fe 0.25, Cu 0.03, Mg 0.03, Mn 0.03, Zn 0.07, Ti 0.03, Others: Each 0.03 Total 0.3, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>Germany:</i> Wk. 3.0275; <i>Proprietary:</i> Erbsloh alloy number 1030								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F6 [-]	20	-	60	25	-	20HB		(Erbsloh)
AI 99.8	DIN (Germany)	Wrought						
Nominal composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.06, Ti 0.02, Others: Each 0.02 Total 0.2, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA1080A; <i>European (CEN):</i> EN573 AW-1080A (<i>ISO:</i> A199.8(A); <i>France:</i> A8; <i>Germany:</i> A199.7, A199.8; Wk.3.0275, 3.0285; <i>Italy:</i> 4509; 9001/4; P-ALP 99.8; <i>Japan:</i> A1080; <i>Spain:</i> L-3081; <i>Sweden:</i> 4004; <i>Switzerland:</i> A199.8; <i>UK:</i> BS1470:1080A; BS 1A; <i>Others:</i> A199.8; <i>Proprietary:</i> Erbsloh alloy number 1001; Alcan 99.8								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F6 [-]	20	-	60	25	-	18HB		(Erbsloh)
AI 99.8 Mg0.5	DIN (Germany)	Wrought						
Nominal composition: Si 0.15, Fe 0.15, Mg 0.4-0.6, Mn 0.03, Zn 0.06, Ti 0.02, Others: Each 0.02 Total 0.2, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>Proprietary:</i> Erbsloh alloy number 5051								

Al 99.85 DIN (Germany) Wrought**Nominal composition:** Si 0.08, Fe 0.08, Mn 0.01, Zn 0.05, Ti 0.01, Others: Each 0.01 Total 0.15, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** USA: AA1085; European (CEN): EN573 AW-1085; France: A85; Proprietary: Erbsloh alloy number 1002**Al 99.85 Mg Si** DIN (Germany) Wrought**Nominal composition:** Si 0.4-0.7, Fe 0.08, Cu 0.05-0.15, Mg 0.5-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** USA: AA6463; European (ISO): AlMgSi; France: A 85-GS; Germany: E-AlMgSi; Wk. 3.2307; Italy: 3570; Sweden: 14,4102; Switzerland: 10851;UK: BS BTR 6; Proprietary: Erbsloh alloy number 6042/6052

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
(F19) [-]	115	-	190	16	-	60HB	Erbsloh 6042	(Erbsloh)
(F24) [-]	190	-	235	14	-	70HB	Erbsloh 6052	(Erbsloh)
F13 [-]	65	-	130	17	-	45HB	Erbsloh 6042	(Erbsloh)
F16 [-]	80	-	155	17	-	50HB	Erbsloh 6052	(Erbsloh)
F24 [-]	195	-	240	14	-	70HB	Erbsloh 6042	(Erbsloh)
F28 [-]	225	-	275	10	-	80HB	Erbsloh 6052	(Erbsloh)

Al 99.85 Mg Si0.4 DIN (Germany) Wrought**Nominal composition:** Si 0.35-0.6, Fe 0.08, Cu 0.02, Mg 0.35-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** USA: AA6463; European (ISO): AlMgSi; France: A 85-GS; Germany: E-AlMgSi; Wk. 3.2307; Italy: 3570; Sweden: 14,4102; Switzerland: 10851;UK: BS BTR 6; Proprietary: Erbsloh alloy number 6032

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
(F12) [-]	50	-	115	18	-	35HB		(Erbsloh)
(F19) [-]	120	-	185	15	-	60HB		(Erbsloh)

Al 99.85 Mg1 DIN (Germany) Wrought**Nominal composition:** Si 0.08, Fe 0.08, Mg 0.8-1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** USA: AA5657; European (CEN): EN573 AW-5657; France: A 85-G1; Germany: Wk. 3.3317; Italy: P-AlMg0.9; UK: 5657; BS BTR 2 (BT RS2);Others: Al99.85Mg1; Al99.85Mg1Cu; Proprietary: Erbsloh alloy number 5102

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F10 [-]	-	-	100	15	-	30HB		(Erbsloh)

Al 99.9 DIN (Germany) Wrought**Nominal composition:** Si 0.06, Fe 0.05, Zn 0.04, Ti 0.006, Others: Each 0.01 Total 0.1, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** USA: AA1090; European (CEN): EN573 AW-1090; France: A9; Germany: Wk. 3.0305 (Al99.9); Others: Al99.9; Proprietary: Erbsloh alloy number 1003**Al 99.9 Mg Si** DIN (Germany) Wrought**Nominal composition:** Si 0.4-0.7, Fe 0.04, Cu 0.1-0.15, Mg 0.35-0.6, Mn 0.03, Zn 0.05, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** Germany: Wk. 3.3208; Proprietary: Erbsloh alloy number 6043/6053

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
(F21) [-]	140	-	205	16	-	60HB	Erbsloh 6043	(Erbsloh)
(F24) [-]	190	-	235	14	-	70HB	Erbsloh 6053	(Erbsloh)
F13 [-]	65	-	130	17	-	45HB	Erbsloh 6043	(Erbsloh)
F16 [-]	80	-	155	17	-	50HB	Erbsloh 6053	(Erbsloh)
F24 [-]	195	-	240	14	-	70HB	Erbsloh 6043	(Erbsloh)
F28 [-]	225	-	275	10	-	80HB	Erbsloh 6053	(Erbsloh)

Al 99.9 Mg0.5 DIN (Germany) Wrought**Nominal composition:** Si 0.06, Fe 0.04, Mg 0.4-0.6, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** France: A 9-G0.5; Germany: Wk. 3.3308; Proprietary: Erbsloh alloy number 5053; Alcan ES 7 S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F7 [-]	-	-	70	20	-	23HB		(Erbsloh)

Al 99.9 Mg1 DIN (Germany) Wrought**Nominal composition:** Si 0.06, Fe 0.04, Mg 0.8-1, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** France: A 9-G1; Germany: Wk. 3.3318; Proprietary: Erbsloh alloy number 5103; Alcan LS 7 S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F10 [-]	-	-	100	15	-	30HB		(Erbsloh)

Al 99.95 Mg0.5 DIN (Germany) Wrought**Nominal composition:** Si 0.08, Fe 0.08, Mg 0.04-0.06, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.**Identified Product forms:** Extrusion**Similar/Equivalent alloys:** France: A 8-G0.5; Germany: Wk. 3.3307; Proprietary: Erbsloh alloy number 5052

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F7 [-]	-	-	70	20	-	23HB		(Erbsloh)

212 Aluminium Alloys (wrought)

AlFeMg		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>France</i> : A4-G/L; <i>Germany</i> : AlFeMg								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
G12 (H24) [Wire]	-	-	120	12	-	-	Reannealed (Elisental)	
Al Mg0.5		DIN (Germany)						Wrought
Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 0.3-0.6, Mn 0.05, Zn 0.1, Ti 0.03, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>Proprietary</i> : Erbsloh alloy number 5050								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
(F9) [-]	35	-	85	18	-	25HB	(Erbsloh)	
Al Mg1		DIN (Germany)						Wrought
Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 0.8-1, Mn 0.05, Zn 0.1, Ti 0.03, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA5005A; <i>France</i> : A-G0.6; <i>Germany</i> : AlMg1; DIN 3.3315; <i>Italy</i> : 5764 P-AlMg0.2; <i>UK</i> : BS N41; <i>Others</i> : AlMg1; <i>Proprietary</i> : Erbsloh alloy number 5100; Alcan B 57 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
F10 [-]	40	-	100	17	-	30HB	(Erbsloh)	
Al Mg1.8		DIN (Germany)						Wrought
Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 1.7-2, Mn 0.05, Zn 0.1, Ti 0.03, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA5051A; <i>European (CEN)</i> : EN573 AW-5051A; <i>Germany</i> : AlMg1.8, DIN 3.3326; <i>Proprietary</i> : Erbsloh alloy number 5200								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
F15 [-]	50	-	145	15	-	38-40HB	(Erbsloh)	
Al Mg3 EQ		DIN (Germany)						Wrought
Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 2.6-2.9, Mn 0.05, Zn 0.1, Ti 0.03, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA5754; <i>European (CEN)</i> : EN573 AW-5754; AW-AlMg3 (ISO): AlMg3; <i>France</i> : A-G3, A-G3M; 5754; <i>Germany</i> : AlMg3; 3.3535; <i>Italy</i> : 3575; P-AlMg3.5; <i>Spain</i> : L-3390; <i>Sweden</i> : 14.4125; <i>Switzerland</i> : AlMg3; <i>UK</i> : BS N5; <i>Others</i> : (CZ) CSN 42 4413; AlMg3; <i>Proprietary</i> : Erbsloh alloy number 5300; Alcan 53 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
F18 [-]	80	-	180	14	-	45HB	(Erbsloh)	
AlMg3.5		DIN (Germany)						Wrought
No composition: -								
Identified Product forms: Wire								
Similar/Equivalent alloys: <i>USA</i> : AA5154, UNS A95154; <i>European (ISO)</i> : AlMg3.5; <i>Canada</i> : GR40; <i>France</i> : AG3C (A-G3); <i>Germany</i> : AlMg3; Wk.3.3535; <i>Italy</i> : 3574; <i>Russia (CIS)</i> : 1530(Si0.6); <i>Sweden</i> : 14.4133; <i>UK</i> : 5154A; BS N5; NG5								
Al Mg Si0.3		DIN (Germany)						Wrought
Nominal composition: Si 0.3, Fe 0.2, Cu 0.03, Mg 0.4, Mn 0.03, Zn 0.03, Ti 0.02, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA6060; <i>European (CEN)</i> : EN573 AW 6060 (ISO): AlMgSi, AlMgSiFe; <i>France</i> : A-GS; <i>Germany</i> : AlMgSi0.5; Wk.3.3206; <i>Italy</i> : 9006/1; 3569; P-AlMgSi; <i>Japan</i> : A6063; <i>Spain</i> : L-3442; <i>Sweden</i> : 4103; <i>Switzerland</i> : AlMgSi0.5; <i>UK</i> : BS H9; <i>Others</i> : (CZ) CSN 42 4401; <i>Proprietary</i> : Erbsloh alloy number 6030								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
F12 [-]	55	-	115	18	-	35HB	(Erbsloh)	
F19 [-]	120	-	185	14	-	60HB	(Erbsloh)	
Al Mg Si0.5		DIN (Germany)						Wrought
Nominal composition: Si 0.35-0.5, Fe 0.25, Cu 0.05, Mg 0.4-0.5, Mn 0.05, Zn 0.03, Ti 0.03, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA6060/6063; <i>European (CEN)</i> : EN573 AW 6060 (ISO): AlMgSi, AlMgSiFe; <i>France</i> : A-GS; <i>Germany</i> : AlMgSi0.5; Wk.3.3206; <i>Italy</i> : 9006/1; 3569; P-AlMgSi; <i>Japan</i> : A6063; <i>Spain</i> : L-3442; <i>Sweden</i> : 4103; <i>Switzerland</i> : AlMgSi0.5; <i>UK</i> : BS H9; <i>Others</i> : (CZ) CSN 42 4401; <i>Proprietary</i> : Erbsloh alloy number 6040; Alcan 50 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
(F18) [-]	100	-	175	14	-	55HB	(Erbsloh)	
F13 [-]	65	-	130	15	-	40HB	(Erbsloh)	
F22 [-]	160	-	215	12	-	70HB	(Erbsloh)	
Al Mg Si0.5		DIN (Germany)						Wrought
Nominal composition: Si 0.45-0.6, Fe 0.25, Cu 0.05, Mg 0.6-0.7, Mn 0.15, Zn 0.03, Ti 0.05, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA</i> : AA6063, UNS A96063; <i>European (CEN)</i> : EN573 AW-6063 (ISO): AlMg0.7Si, AlMgSi, AlMg0.5Si; <i>Austria</i> : AlMgSi0.5; <i>Canada</i> : GS10; <i>France</i> : A-GS; <i>Germany</i> : AlMgSi0.5; Wk.3.3206; <i>Italy</i> : 3569; P-AISI0.4Mg; P-AlMgSi; <i>Japan</i> : A6063; <i>Spain</i> : L-3441; <i>Sweden</i> : 14.4104; <i>UK</i> : 6063; H9, H19, HE9; DTD 372B; HG9; <i>Proprietary</i> : Erbsloh alloy number 6060; Alcan E 50 S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes (Source)	
(F14) [-]	70	-	140	15	-	40HB	(Erbsloh)	
F25 [-]	195	-	245	10	-	75	(Erbsloh)	

Aluminium Alloys (wrought) 213

Al Mg Si0.7 DIN (Germany) Wrought

Nominal composition: Si 0.5-0.7, Fe 0.25, Cu 0.15-0.2, Mg 0.5-0.6, Mn 0.04-0.08, Zn 0.1, Ti 0.03, Cr 0.08-0.12, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6005A; European (CEN): EN573 AW-6005A (ISO: AISiMg(A); France: A-SG0.5; Germany: AlMgSi0.7; DIN 3.3210; Italy: 9006/6; Switzerland: AlMgSi0.7; Proprietary: Erbsloh alloy number 6070; Alcan 51 S

Al Mg Si0.8 DIN (Germany) Wrought

Nominal composition: Si 0.8-1, Fe 0.25, Cu 0.05, Mg 0.55-0.7, Mn 0.15, Zn 0.1, Ti 0.05, Cr 0.03, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6181; European (ISO): AISi1Mg0.8; France: A-SG; Proprietary: Erbsloh alloy number 6080; Alcan 51 S

Al Mg Si1 DIN (Germany) Wrought

Nominal composition: Si 0.9-1, Fe 0.4, Cu 0.05, Mg 0.8-1, Mn 0.7-0.8, Zn 0.1, Ti 0.03, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AISi1MgMn (ISO: AlMgSi1Mn (AECMA: AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AISi1M8Mn; Spain: L-3453; Sweden: 14,4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082; Proprietary: Erbsloh alloy number 6100; Alcan B 51 S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F21 [-]	110	-	205	14	-	65HB		(Erbsloh)
F28 [-]	225	-	275	12	-	80HB		(Erbsloh)
F31 [-]	250	-	310	10	-	95HB		(Erbsloh)

Al Mn1 DIN (Germany) Wrought

Nominal composition: Si 0.2, Fe 0.6, Cu 0.05, Mg 0.3, Mn 1-1.3, Zn 0.1, Ti 0.03, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA3103, UNS A93103; European (CEN): EN573 AW-3103 (ISO: AlMn1; Canada: M1; France: AM, AM1; Germany: AlMn; AlMn1; Wk.3.0515; Italy: 9003/3; 3568; FA60-3103; P-AIMn1.2; Russia (CIS): 1400; Spain: L-3811; Sweden: 4054; Switzerland: AlMn; 10848; UK: 3103; BS N3, (NS 3); Others: (CZ) CSN 42 4432; Proprietary: Erbsloh alloy number 3100; Alcan 3 S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F10 [-]	40	-	95	17	-	30HB		(Erbsloh)

Al Mn Cu DIN (Germany) Wrought

Nominal composition: Si 0.2, Fe 0.4-0.5, Cu 0.05-0.1, Mg 0.05, Mn 1.1-1.3, Zn 0.1, Ti 0.03, Cr 0.03, Others: Each 0.06 Total 0.25, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: Germany: Wk. 3.0517; Proprietary: Erbsloh alloy number 3110

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F10 [-]	40	-	95	17	-	30HB		(Erbsloh)

Alplan Alusuisse (Switzerland) Wrought

Approximate composition: Mg 4.5, Mn 0.7, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Plate

Similar/Equivalent alloys: USA: AA(5083); European (ISO): (AlMg4.5Mn); Germany: (AlMg4.5Mn); Proprietary: Alusuisse Peraluman 470; Alusuisse Alplan

Comments: Precision plates - milled on both sides. Precision engineering components. **Corrosion resistance:** Good **Weldability:** MIG & TIG **Machinability:** Very good

Finishing: Anodisable (with colour)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate]	158	-	313	17	70	68HB	Typical (EI min.)	(Alusuisse)

Aluman 100 Alusuisse (Switzerland) Wrought

Nominal composition: Si 0.5, Fe 0.7, Cu 0.1, Mg 0.3, Mn 0.9-1.5, Zn 0.2, Ni 0.05, Ti 0.1, Cr 0.1, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: USA: AA3003, UNS A93003, SAE 29; European (CEN): EN573 AW-3003 (ISO: AlMn1Cu; Canada: MC10; France: A-M1; 3003; AlMn1Cu; Germany: AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; Italy: 7788; 9003/1; Japan: A3003; Switzerland: AlMn; UK: NS3; 3103; Others: (CZ) CSN 42 4432; Proprietary: Alusuisse Aluman 100 (Am-100)

Comments: Medium strength, high corrosion resistance, good formability. Roofing, cladding, commercial vehicles, containers, appliances, cans, hard foil containers.

Corrosion resistance: Very good **Weldability:** Very good **Finishing:** Polishing and anodizing

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.5 - 50mm]	35	-	95	17	69		Minimum	(Alusuisse)
H18 [Sheet 0.5 - 1.5mm]	170	-	190	2.5	69		Minimum	(Alusuisse)
H18 [Sheet 1.5 - 3mm]	170	-	190	3	69		Minimum	(Alusuisse)
H24 [Sheet 0.5 - 1.5mm]	115	-	145	4	69		Minimum	(Alusuisse)
H24 [Sheet 1.5 - 3mm]	115	-	145	5	69		Minimum	(Alusuisse)
H24 [Sheet 3 - 6mm]	115	-	145	6	69		Minimum	(Alusuisse)
H24 [Sheet 6 - 12.5mm]	110	-	145	8	69		Minimum	(Alusuisse)
H26 [Sheet 0.5 - 4mm]	140	-	170	3	69		Minimum	(Alusuisse)

214 Aluminium Alloys (wrought)

Alumec 79 British Aluminium (UK) Wrought

No composition: - Density (kg.m⁻³) 2830

Identified Product forms: Plate

Comments: Tooling material for plastics processing. Longitudinal tensile mechanical properties will be approximately 20% higher than the LT values below for equivalent materials. **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate, 100 - 125mm]	400	-	480	8.5	71	149HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 125 - 167mm]	375	-	465	8	71	143HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 167 - 205mm]	340	-	435	7.5	71	131HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 205 - 305mm]	310	-	410	7.5	71	123HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 25 - 50mm]	470	-	535	10	71	163HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 50 - 75mm]	455	-	520	9.5	71	159HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 6.35 - 25mm]	485	-	545	10	71	167HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 75 - 100mm]	430	-	500	9	71	152HB	LT direction (Typ.)	(BAI Plate)

Alumec 89 British Aluminium (UK) Wrought

No composition: - Density (kg.m⁻³) 2830

Identified Product forms: Plate

Comments: Tooling material for plastics processing. Improved strength and deep hardening. Longitudinal tensile mechanical properties will be approximately 20% higher than the LT values below for equivalent materials. **Machinability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate, 100 - 125mm]	515	-	560	7	71	174HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 125 - 167mm]	500	-	550	4.5	71	174HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 167 - 205mm]	450	-	510	5	71	159HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 205 - 305mm]	400	-	460	4	71	146HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 25 - 50mm]	545	-	590	10.5	71	174HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 50 - 75mm]	530	-	580	9.5	71	174HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 6.35 - 25mm]	555	-	600	11.5	71	180HB	LT direction (Typ.)	(BAI Plate)
Not stated [Plate, 75 - 100mm]	520	-	570	8	71	174HB	LT direction (Typ.)	(BAI Plate)

Alustar Hoogovens (Netherlands) Wrought

No composition: -

Identified Product forms: Plate

Comments: Advanced Al-Mg, shipbuilding alloy. 20% stronger than AA 5083 in the H321 temper. Mechanical properties are taken from several production trials. **Corrosion resistance:** Very good **Weldability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	315	435	16	-	-	Maximum values.	(Hoogovens)
Not stated. [-]	-	295	390	12	-	-	Minimum values.	(Hoogovens)

Al Zn4.5 Mg0.8 DIN (Germany) Wrought

Nominal composition: Si 0.1, Fe 0.3, Cu 0.05, Mg 0.7-0.9, Mn 0.05, Zn 4.5-4.9, Ti 0.2, Cr 0.15-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: *Proprietary:* Erbsloh alloy number (711) 7080

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
(F32) [-]	260	-	320	10	-	95HB		(Erbsloh)

Al Zn4.5 Mg1 DIN (Germany) Wrought

Nominal composition: Si 0.3, Fe 0.3, Cu 0.08, Mg 1.1-1.3, Mn 0.2-0.3, Zn 4.5-5, Ti 0.2, Cr 0.15-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* AA7020, SAE 214; *European (CEN):* EN573 AW-7020; AW-AlZn4.5Mg1 (*ISO:* AlZn4.5Mg1; *France:* A-Z5G; 7020; AIR 9048-670;

Germany: AlZn4.5Mg1; 3.4335; *Italy:* 9007/1; 7791; *P-AlZn4.5Mg:* *Japan:* A7020; *Spain:* L-3741; *Sweden:* 14.4425; *Switzerland:* AlZn4.5Mg1; *UK:* 7020; BS H17;

Others: (CZ) CSN 42 4441; Eur. aerospace P-7020; *Proprietary:* Erbsloh alloy number (721) 7120; Alcan D 74 S

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
(F32) [-]	260	-	320	12	-	95HB		(Erbsloh)
F35 [-]	290	-	350	10	-	105HB		(Erbsloh)

AM05 Otto Fuchs (Germany) Wrought

Proprietary composition: Mg 0.5, Aluminium 99.8 min.

AM11 Otto Fuchs (Germany) Wrought

Proprietary composition: Mg 1, Aluminium 99.8 min.

AM62 BOAL (UK) Wrought

No composition: -

Identified Product forms: Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA6060/6063; *European (CEN):* EN573 AW 6060 (*ISO:* AlMgSi, AlMgSiFe; *France:* A-GS; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 9006/1;

3569; P-AlMgSi; *Japan:* A6063; *Spain:* L-3442; *Sweden:* 4103; *Switzerland:* AlMgSi0.5; *UK:* 6060; 6063; BS H9; *Others:* (CZ) CSN 42 4401

Comments: BOAL version of 6060/6063 alloy.

AM65 BOAL (UK) Wrought

No composition: -

Identified Product forms: Tube, Extrusion

Similar/Equivalent alloys: *USA:* AA6063A; *European (ISO):* AlMg0.7Si(A), AlMg0.5Si; *Germany:* DIN 3.3206

Comments: BOAL version of 6063A alloy.

Aluminium Alloys (wrought) 215

AM68	BOAL (UK)						Wrought
No composition: - Identified Product forms: Tube, Extrusion Similar/Equivalent alloys: <i>USA:</i> AA6082, UNS A96082; <i>European (CEN):</i> EN573 AW-6082; AW-AISi1MgMn (<i>ISO:</i> AlMgSi1Mn (<i>AECMA:</i> AL-P21; <i>Canada:</i> GS11R; <i>France:</i> A-SGM, A-SGM0.7; 6082; <i>Germany:</i> AlMgSi1; Wk.3.2315; <i>Italy:</i> 9006/4, 3571; FA60-6082; P-AISi1M8Mn; <i>Spain:</i> L-3453; <i>Sweden:</i> 14.4212; <i>Switzerland:</i> AlMgSi1Mn; 10850; <i>UK:</i> 6082; BS H30 (HE30, HS 30); <i>Others:</i> (CZ) CSN 42 4400; Eur. aerospace P-6082 Comments: BOAL version of 6082 alloy.							
AMC217xe	Aerospace Metal Composites (UK)						Wrought
Proprietary composition: SiC 17 vol%, Aluminium alloy. Density (kg.m ⁻³) 2850 Identified Product forms: Sheet/strip Comments: Aluminium alloy based Metal Matrix Composite. No details of matrix alloy. Ultra-fine Silicon Carbide reinforcement (2 - 3 micron). Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T4 [Sheet] 400 - 600 7 100 Typical (L direction) (AMC)							
AMC225xe	Aerospace Metal Composites (UK)						Wrought
Proprietary composition: Cu 3.8-4, Mg 1.5-1.7, Mn 0.5-0.7, SiC 27.6 - 28%, Aluminium rem. Density (kg.m ⁻³) 2877 Identified Product forms: Plate, Extrusion, Forging stock/Billet Comments: Aluminium alloy based Metal Matrix Composite. Ultra-fine Silicon Carbide reinforcement (2 - 3 micron). Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T1 [Die forged 5 - 50mm] 300 - 470 5 115 Typical (L & T directions) (AMC) T1 [Forging] 300 - 470 5 115 Typical (L direction) (AMC) T4 [Die forged 5 - 50mm] 450 - 680 5 115 Typical (L & T directions) (AMC) T4 [Extruded bar 5 - 30mm] 460 - 680 5 114 at 150°C, Estimate (L direction) (AMC) T4 [Extruded bar 5 - 30mm] 480 - 700 5 115 Typical (L direction) (AMC) T4 [Forging] 450 - 680 5 115 Typical (L direction) (AMC) T4 [Rolled plate 5 - 20mm] 460 - 645 3.5 115 Typical (L & T directions) (AMC)							
AMC225xh	Aerospace Metal Composites (UK)						Wrought
Proprietary composition: SiC 25 vol%, Aluminium alloy. Density (kg.m ⁻³) 2870 Identified Product forms: Extrusion Comments: Aluminium alloy based Metal Matrix Composite. No details of matrix alloy. Ultra-fine Silicon Carbide reinforcement (2 - 3 micron). Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T351 [Extrusion] 575 - 670 5 118 Typical (L direction) (AMC) T4 [Extrusion] 460 - 680 5 118 Typical (L direction) (AMC)							
AMC235xe	Aerospace Metal Composites (UK)						Wrought
Proprietary composition: SiC 35 vol%, Aluminium alloy. Density (kg.m ⁻³) 2920 Identified Product forms: Forging stock/Billet Comments: Aluminium alloy based Metal Matrix Composite. No details of matrix alloy. Ultra-fine Silicon Carbide reinforcement (2 - 3 micron). Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T1 [Forging] 450 - 540 2.5 135 Typical (L direction) (AMC)							
AMC500sa	Aerospace Metal Composites (UK)						Wrought
No composition: - Density (kg.m ⁻³) 2580 Identified Product forms: Forging stock/Billet Comments: Aluminium alloy based Metal Matrix Composite. No details of composition. Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T1 [Forging] 400 - 450 5 77 Typical (L direction) (AMC)							
AMC640xa	Aerospace Metal Composites (UK)						Wrought
Proprietary composition: Si 0.4-0.8, Cu 0.14-0.4, Mg 0.8-1.2, Cr 0.04-0.35, SiC 43.4 - 43.8%, Aluminium rem. Density (kg.m ⁻³) 2900 Identified Product forms: Extrusion Comments: Aluminium alloy based Metal Matrix Composite. Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T1 [Extrusion 3 - 10mm] 420 - 540 3 138 at150°C, L direction, estimate (AMC) T1 [Extrusion 3 - 10mm] 440 - 560 3 140 RT, L direction, typical (AMC)							
AN50	Otto Fuchs (Germany)						Wrought
Proprietary composition: Cu, Mg, Ni, Si, Aluminium rem.							
Anticorodal-041	Aluisse (Switzerland)						Wrought
Proprietary composition: Si 0.3-0.6, Fe 0.1-0.3, Cu 0.05, Mg 0.35-0.6, Mn 0.05, Zn 0.1, Others: Each 0.03, Aluminium rem. Density (kg.m ⁻³) 2700 Identified Product forms: Tube, Extrusion, Rod, Bar Similar/Equivalent alloys: <i>USA:</i> AA6101B; <i>European (CEN):</i> EN573 AW-6101B; <i>Germany:</i> 3.3207; <i>Italy:</i> 3570; <i>Proprietary:</i> Aluisse Anticorodal-041; Menziken code 6041 Condition [Form] PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes (Source) T6 [Extrusion <15mm] 160 - 215 6 - 75HB Minimum (Alu Menziken) T7 [Extrusion <15mm] 120 - 170 10 - 50HB Minimum (Alu Menziken)							

216 Aluminium Alloys (wrought)

Anticorodal 045/050/053 Alusuisse (Switzerland) Wrought

No composition: - Density (kg.m⁻³) 2700

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA*: AA6060 (6063/6106); *European (CEN)*: EN573 AW 6060 (*ISO*): AlMgSi, AlMgSiFe; *France*: A-GS; *Germany*: AlMgSi0.5; Wk.3.3206; *Italy*: 9006/1; 3569; P-AlMgSi; *Japan*: A6063; *Spain*: L-3442; *Sweden*: 4103; *Switzerland*: AlMgSi0.5; *UK*: BS H9; *Others*: (CZ) CSN 42 4401; *Proprietary*: Alusuisse Anticorodal 045/050/053

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F13 (T4) [Extrusion]	65	-	130	15	70	45HB	Strengths minimum	(Alusuisse)
F22 (T5) [Extrusion]	160	-	215	12	70	70HB	Strengths minimum	(Alusuisse)
F25 (T6) [Extrusion up to 10mm]	195	-	245	10	70	75HB	Strengths minimum	(Alusuisse)

Anticorodal 062 Alusuisse (Switzerland) Wrought

No composition: - Density (kg.m⁻³) 2700

Identified Product forms: Tube, Extrusion, Bar

Similar/Equivalent alloys: *USA*: AA6005A; *European (CEN)*: EN573 AW-6005A (*ISO*): AlSiMg(A); *France*: A-SG0.5; *Germany*: AlMgSi0.7; DIN 3.3210; *Italy*: 9006/6; *Switzerland*: AlMgSi0.7; *Proprietary*: Alusuisse Anticorodal 062

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F26 (T5) [Extrusion up to 10mm]	215	-	260	8	70	85HB	Strengths minimum	(Alusuisse)

Anticorodal 080 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ni 0.5, Ti 0.15, Cr 0.04-0.35, Others: Each 0.05, Aluminium rem. Density (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: *USA*: AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161; *European (CEN)*: EN573 AW-6061; AW-AlMg1SiCu (*ISO*): AlMg1SiCu; *Canada*: GS11N; *France*: A-GSUC; 6061; AIR 9048-660; *Germany*: AlMgSi1Cu; AlMgSiCu; Wk.3.3211; LW3.3214; *Italy*: 9006/2; 6170-68; FA60-6061; *Japan*: A6061P; *Spain*: L-3420; *UK*: 6061; BS H20; BS L117, L118; *Others*: USA-WW-T-700/6; Eur. aerospace P-6061; *Proprietary*: Alusuisse Anticorodal 080

Comments: High strength and corrosion resistance, easy to form, good polishability. Easy to weld and suitable for decorative anodising. High mechanical stress, structural engineering components. Shipbuilding, vehicles, appliances, electrical industry and precision parts. Corrosion resistance: Very good Weldability: Very good

Machinability: Good Finishing: Polishing and anodizing

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet 0.4 - 25mm]	85	-	150	14	69	-	Maximum (EI min.)	(Alusuisse)
T4/T451 [Sheet 0.4 - 80mm]	110	-	205	12	69	-	Minimum	(Alusuisse)
T6/T651 [Sheet 0.4 - 100mm]	240	-	290	5	69	-	Minimum	(Alusuisse)
T651 [Sheet 100 - 150mm]	240	-	275	5	69	-	Minimum	(Alusuisse)
T651 [Sheet 150 - 175mm]	230	-	265	4	69	-	Minimum	(Alusuisse)

Anticorodal-082 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.35, Others: Each 0.05, Aluminium rem. Density (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: *USA*: AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161; *European (CEN)*: EN573 AW-6061; AW-AlMg1SiCu (*ISO*): AlMg1SiCu; *Canada*: GS11N; *France*: A-GSUC; 6061; AIR 9048-660; *Germany*: AlMgSi1Cu; AlMgSiCu; Wk.3.3211; LW3.3214; *Italy*: 9006/2; 6170-68; FA60-6061; *Japan*: A6061P; *Spain*: L-3420; *UK*: 6061; BS H20; BS L117, L118; *Others*: USA-WW-T-700/6; Eur. aerospace P-6061; *Proprietary*: Alusuisse Anticorodal-082; Menziken code 6080/6082

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Extr./Drawn <120mm]	50	-	100	14	-	35HB	Minimum	(Alu Menziken)
O/H111 [Flats 0.4-25mm]	85	-	150	14	-	40HB	Maximum (EI. min.)	(Alu Menziken)
T351 [Flats 6-12.5mm]	110	-	205	18	-	58HB	Minimum	(Alu Menziken)
T4 [Drawn <80mm]	110	-	205	14	-	65HB	Minimum	(Alu Menziken)
T4 [Extrusion <120mm]	110	-	180	13	-	65HB	Minimum	(Alu Menziken)
T4 [Flats 0.4-6mm]	110	-	205	12	-	58HB	Minimum	(Alu Menziken)
T6 [Drawn <80mm]	240	-	290	8	-	95HB	Minimum	(Alu Menziken)
T6 [Extrusion <120mm]	240	-	260	6	-	95HB	Minimum	(Alu Menziken)
T6 [Flats 0.4-6mm]	240	-	290	6	-	88HB	Minimum	(Alu Menziken)
T651 [Flats 6-12.5mm]	240	-	290	9	-	80HB	Minimum	(Alu Menziken)

Anticorodal-100/105 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1, Mn 0.4-0.6, Zn 0.2, Ti 0.1, Cr 0.25, Others: Each 0.05, Aluminium rem. Density (kg.m⁻³) 2700

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: *USA*: AA6082, UNS A96082; *European (CEN)*: EN573 AW-6082; AW-AlSi1MgMn (*ISO*): AlMgSi1Mn (*AECMA*): AL-P21; *Canada*: GS11R; *France*: A-SGM, A-SGM0.7; 6082; *Germany*: AlMgSi1; Wk.3.2315; *Italy*: 9006/4, 3571; FA60-6082; P-AlSi1M8Mn; *Spain*: L-3453; *Sweden*: 14.4212; *Switzerland*: AlMgSi1Mn; 10850; *UK*: 6082; BS H30 (HE30, HS 30); *Others*: (CZ) CSN 42 4400; Eur. aerospace P-6082; *Proprietary*: Alusuisse Anticorodal-100/105; Menziken code 6100

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Drawn <80mm]	50	-	100	13	-	35HB	Minimum	(Alu Menziken)
O/H111 [Extrusion <120mm]	50	-	100	12	-	35HB	Minimum	(Alu Menziken)
O/H111 [Flats 0.4-25mm]	85	-	150	14	-	40HB	Maximum (EI. min.)	(Alu Menziken)
T351 [Flats 6-12.5mm]	110	-	205	14	-	58HB	Minimum	(Alu Menziken)
T4 [Extr./Drawn <80mm]	110	-	205	12	-	70HB	Minimum	(Alu Menziken)
T4 [Flats 0.4-6mm]	110	-	205	12	-	58HB	Minimum	(Alu Menziken)
T6 [Drawn <80mm]	255	-	310	9	-	100HB	Minimum	(Alu Menziken)
T6 [Extr./Drawn, all sizes]	260	-	310	9	-	100HB	Minimum	(Alu Menziken)
T6 [Extrusion <20mm]	250	-	295	6	-	100HB	Minimum	(Alu Menziken)
T6 [Extrusion 20-120mm]	260	-	310	8	-	100HB	Minimum	(Alu Menziken)
T6 [Flats 0.4-6mm]	260	-	310	6	-	94HB	Minimum	(Alu Menziken)
T651 [Flats 6-12.5mm]	255	-	300	9	-	91HB	Minimum	(Alu Menziken)

Aluminium Alloys (wrought) 217

Anticorodal 110/112 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.2, Ni 0.5, Ti 0.1, Cr 0.25, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AISi1MgMn (ISO: AlMgSi1Mn (AECMA: AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AISi1M8Mn; Spain: L-3453; Sweden: 14,4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082; Proprietary: Alusuisse Anticorodal 110/112

Comments: High strength and corrosion resistance, easy to form, good polishability. Easy to weld with alloy filler. High mechanical stress, structural engineering components. Shipbuilding, vehicles, appliances, electrical industry and precision parts. Corrosion resistance: Very good Weldability: Very good Machinability: Good

Finishing: Polishing and anodizing

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet 0.4 - 25mm]	85	-	150	14	69		Maximum (EI min.)	(Alusuisse)
T4 [Sheet 0.4 - 1.5mm]	100	-	205	12	69		Minimum	(Alusuisse)
T4/T451 [Sheet 1.5 - 80mm]	110	-	205	12	69		Minimum	(Alusuisse)
T6 [Sheet 0.4 - 6mm]	260	-	310	6	69		Minimum	(Alusuisse)
T651 [Sheet 100 - 150mm]	240	-	275	6	69		Minimum	(Alusuisse)
T651 [Sheet 12.5 - 100mm]	240	-	295	7	69		Minimum	(Alusuisse)
T651 [Sheet 150 - 175mm]	230	-	275	4	69		Minimum	(Alusuisse)
T651 [Sheet 6 - 12.5mm]	255	-	300	9	69		Minimum	(Alusuisse)

Anticorodal 112/114 Alusuisse (Switzerland) Wrought

No composition: - **Density** (kg.m⁻³) 2700

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AISi1MgMn (ISO: AlMgSi1Mn (AECMA: AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AISi1M8Mn; Spain: L-3453; Sweden: 14,4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082; Proprietary: Alusuisse Anticorodal 112/114

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F21 (T4) [Extrusion]	205	-	110	14	70	65HB	Strengths minimum	(Alusuisse)
F28 (T5) [Extrusion up to 10mm]	275	-	200	12	70	80HB	Strengths minimum	(Alusuisse)
F31 (T6) [Extrusion up to 20mm]	310	-	260	10	70	95HB	Strengths minimum	(Alusuisse)

Anticorodal 120 Alusuisse (Switzerland) Wrought

No composition: Cu 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA(6016); Proprietary: Alusuisse Anticorodal 120

Comments: Specially developed for car body sheet. Delivered in T4 temper. **Corrosion resistance:** Very good **Weldability:** Good **Machinability:** Good

Anticorodal Pb-107 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.5-1.4, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.3, Ti 0.2, Cr 0.3, Bi 0.7, Pb 0.4-2, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA6012; European (CEN): EN573 AW-6012; Germany: AlMgSiPb; DIN 3.0615; Proprietary: Alusuisse Anticorodal Pb-107; Menziken code 6107

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Drawn <80mm]	100	-	200	8	-	65HB	Minimum	(Alu Menziken)
T6, T6510, T6511 [Extr./Drawn <120mm]	260	-	310	8	-	100HB	Minimum	(Alu Menziken)

Anticorodal Pb-109 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.5-1.2, Fe 0.7, Cu 0.15-0.4, Mg 0.6-1.2, Mn 0.3-0.8, Zn 0.3, Ti 0.2, Cr 0.3, Bi 0.4-0.7, Pb 0.4-1.2, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA6018; European (CEN): EN573 AW-6018; Germany: 3.0615; Proprietary: Alusuisse Anticorodal Pb-109; Menziken code 6109

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6, T6510, T6511 [Extruded <120mm]	260	-	310	6	-	100HB	Minimum	(Alu Menziken)

ARALL 2 Structural Laminates Co. (USA) Wrought

No composition: - **Density** (kg.m⁻³) 2330

Identified Product forms: Sheet/strip

Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T6 alloy (0.2-0.4mm thick) and unidirectional aramid-reinforced epoxy adhesive (0.21mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Laminate 3/2]	-	365	717	-	66		Tensile: L dir.; Ult. strain 2.5%	(Structural Laminates Co.)
[Laminate 3/2]	-	234	-	-	53		Compressive: LT dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	255	-	-	65		Compressive: L dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	228	317	-	53		Tensile: LT dir.; Ult. strain 12.7%	(Structural Laminates Co.)

ARALL 3 Structural Laminates Co. (USA) Wrought

No composition: - **Density** (kg.m⁻³) 2330

Identified Product forms: Sheet/strip

Comments: Fibre-metal laminate (FML) consisting of alternative layers of 7475-T76 alloy (0.3-0.4mm thick) and unidirectional aramid-reinforced epoxy adhesive (0.21mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Laminate 3/2]	-	365	-	-	50		Compressive: LT dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	324	379	-	49		Tensile: LT dir.; Ult. strain 8.8%	(Structural Laminates Co.)
[Laminate 3/2]	-	345	-	-	66		Compressive: L dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	607	821	-	68		Tensile: L dir.; Ult. strain 2.2%	(Structural Laminates Co.)

218 Aluminium Alloys (wrought)

AS17	Otto Fuchs (Germany)	Wrought						
Proprietary composition: Mg, Si, Be, Aluminium rem.								
A-SG0.5	NF (France)	Wrought						
Nominal composition: Si 0.5-0.9, Fe 0.35, Cu 0.3, Mg 0.4-0.7, Mn 0.5, Zn 0.2, Ti 0.1, Cr 0.3, Aluminium rem. Density (kg.m ⁻³) 2700								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: USA: AA6005A; European (CEN): EN573 AW-6005A (ISO): AlSiMg(A); France: A-SG0.5; Germany: AlMgSi0.7; DIN 3.3210; Italy: 9006/6; Switzerland: AlMgSi0.7								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	235	-	250	8	70		Typical	(Flandria)
A-SGM0.7	NF (France)	Wrought						
Nominal composition: Si 0.7-1.3, Fe 0.5, Cu 0.1, Mg 0.6-1.2, Mn 0.4-1, Zn 0.2, Ti 0.1, Cr 0.25, Aluminium rem. Density (kg.m ⁻³) 2700								
Identified Product forms: Tube, Extrusion								
Similar/Equivalent alloys: USA: AA6082, UNS A96082; European (CEN): EN573 AW-6082; AW-AlSi1MgMn (ISO): AlMgSi1Mn (AECMA): AL-P21; Canada: GS11R; France: A-SGM, A-SGM0.7; 6082; Germany: AlMgSi1; Wk.3.2315; Italy: 9006/4, 3571; FA60-6082; P-AlSi1M8Mn; Spain: L-3453; Sweden: 14.4212; Switzerland: AlMgSi1Mn; 10850; UK: 6082; BS H30 (HE30, HS 30); Others: (CZ) CSN 42 4400; Eur. aerospace P-6082								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	255	-	290	8	70		Typical	(Flandria)
A-U2GN	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: USA: AA2618A; European (CEN): EN573 AW-2618A; France: A-U2GN; AIR 9048-640; 2618A; Germany: LW3.1924; Italy: 9002/6; 3578; 7250; UK: 2618A; H16; DTD717A, 731B, 745A, 5084A, 5014A; Others: European aerospace P-2618A								
A-U4G	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: USA: AA2017A; European (CEN): EN573 AW-2017A; AW-AlCu4MgSi(A) (ISO): AlCu4MgSi(A); France: A-U4G; Germany: AlCuMg1; Wk.3.1325; Italy: 3579; 9002/2; Japan: A2017P; Spain: W3120; UK: 2017A; BS L93, L 94; Others: European aerospace P-2017A								
A-U4G1	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: USA: AA2024, UNS A92024, AMS 4037; European (CEN): EN573 AW-2024; AW-AlCu4Mg1 (ISO): AlCu4Mg1.5 (AECMA): AL-P13; Austria: AlCuMg2; Canada: CG42; France: A-U4G1; 2024; AIR 9048-630; Germany: AlCuMg2; Wk.3.1355; LW3.1354; Italy: P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; Japan: A2024P; Russia (CIS): 1160; Spain: L-3140; Switzerland: AlCu4Mg1.5; UK: 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; Others: USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024								
A-U4PB	NF (France)	Wrought						
No composition: -								
Similar/Equivalent alloys: USA: AA2030; European (ISO): AlCu4PbMg; France: A-U4Pb; 2030; Germany: AlCuMgPb; 3.1645								
Avional 100	Alusuisse (Switzerland)	Wrought						
Proprietary composition: Si 0.2-0.8, Fe 0.7, Cu 3.5-4.5, Mg 0.4-1, Mn 0.4-1, Zn 0.25, Ni 0.05, Ti 0.15, Cr 0.1, Ti+Zr <0.25, Others: Each 0.05, Aluminium rem. Density (kg.m ⁻³) 2780								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet								
Similar/Equivalent alloys: USA: AA2017A; European (CEN): EN573 AW-2017A; AW-AlCu4MgSi(A) (ISO): AlCu4MgSi(A); France: A-U4G; Germany: AlCuMg1; Wk.3.1325; Italy: 3579; 9002/2; Japan: A2017P; Spain: W3120; UK: 2017A; BS L93, L 94; Others: European aerospace P-2017A; Proprietary: Alusuisse Avional 100								
Comments: High strength for aircraft and vehicle structural applications. Good forging characteristics. Corrosion resistance: Moderate Weldability: Medium Finishing: Polishing and anodizing								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet 0.4 - 25mm]	145	-	225	12	72		Maximum (El min.)	(Alusuisse)
T4 [Sheet 0.4 - 1.5mm]	245	-	390	14	72		Minimum	(Alusuisse)
T4 [Sheet 1.5 - 6mm]	245	-	390	15	72		Minimum	(Alusuisse)
T451 [Sheet 100 - 120mm]	240	-	370	8	72		Minimum	(Alusuisse)
T451 [Sheet 12.5 - 40mm]	250	-	390	12	72		Minimum	(Alusuisse)
T451 [Sheet 120 - 150mm]	240	-	350	4	72		Minimum	(Alusuisse)
T451 [Sheet 40 - 100mm]	240	-	385	10	72		Minimum	(Alusuisse)
T451 [Sheet 6 - 12.5mm]	260	-	390	13	72		Minimum	(Alusuisse)
Avional-102	Alusuisse (Switzerland)	Wrought						
Proprietary composition: Si 0.2-0.8, Fe 0.7, Cu 3.5-4.5, Mg 0.4-1, Mn 0.4-1, Zn 0.25, Cr 0.1, Ti+Zr 0.25, Aluminium rem. Density (kg.m ⁻³) 2780								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar								
Similar/Equivalent alloys: USA: AA2017A; European (CEN): EN573 AW-2017A; AW-AlCu4MgSi(A) (ISO): AlCu4MgSi(A); France: A-U4G; Germany: AlCuMg1; Wk.3.1325; Italy: 3579; 9002/2; Japan: A2017P; Spain: W3120; UK: 2017A; BS L93, L 94; Others: European aerospace P-2017A; Proprietary: Alusuisse Avional-102; Menziken code 2102								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Drawn <80mm]	65	-	130	10	-	60HB	Minimum	(Alu Menziken)
O/H111 [Extrusion <120mm]	70	-	140	10	-	60HB	Minimum	(Alu Menziken)
T3 [Drawn <80mm]	250	-	400	6	-	110HB	Minimum	(Alu Menziken)
T4 [Drawn <80mm]	250	-	400	8	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion <25mm]	260	-	380	10	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion 25-75mm]	270	-	400	10	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion 75-120mm]	260	-	390	9	-	110HB	Minimum	(Alu Menziken)

Aluminium Alloys (wrought) 219

Avional 150 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.5, Fe 0.5, Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9, Zn 0.25, Ni 0.05, Ti 0.15, Cr 0.1, Ti+Zr <0.20, Others: Each 0.05, Aluminium rem.

Density (kg.m⁻³) 2780

Identified Product forms: Plate, Sheet/strip, Forging stock/Billet

Similar/Equivalent alloys: USA: AA2024, UNS A9204, AMS 4037; European (CEN): EN573 AW-2024; AW-AlCu4Mg1 (ISO): AlCu4Mg1.5 (AECMA): AL-P13; Austria: AlCuMg2; Canada: CG42; France: A-U4G1; 2024; AIR 9048-630; Germany: AlCuMg2; Wk.3.1355; LW3.1354; Italy: P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; Japan: A2024P; Russia (CIS): 1160; Spain: L-3140; Switzerland: AlCu4Mg1.5; UK: 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; Others: USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024; Proprietary: Alusuisse Avional 150

Comments: Very high strength for aircraft and vehicle structural applications. Good forging characteristics. **Corrosion resistance:** Moderate **Weldability:** Medium

Finishing: Polishing and anodizing

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet 0.4 - 25mm]	140	-	220	11	73		Maximum (EI min.)	(Alusuisse)
T3 [Sheet 0.4 - 1.5mm]	290	-	435	12	73		Minimum	(Alusuisse)
T3 [Sheet 1.5 - 3mm]	290	-	435	14	73		Minimum	(Alusuisse)
T3 [Sheet 3 - 6mm]	290	-	440	14	73		Minimum	(Alusuisse)
T351 [Sheet 100 - 120mm]	270	-	380	5	73		Minimum	(Alusuisse)
T351 [Sheet 12.5 - 40mm]	290	-	430	11	73		Minimum	(Alusuisse)
T351 [Sheet 120 - 150mm]	250	-	360	5	73		Minimum	(Alusuisse)
T351 [Sheet 40 - 80mm]	290	-	420	8	73		Minimum	(Alusuisse)
T351 [Sheet 6 - 12.5mm]	290	-	440	13	73		Minimum	(Alusuisse)
T351 [Sheet 80 - 100mm]	285	-	400	7	73		Minimum	(Alusuisse)

Avional 152 Alusuisse (Switzerland) Wrought

No composition: - **Density** (kg.m⁻³) 2770

Identified Product forms: Tube, Extrusion, Bar

Similar/Equivalent alloys: USA: AA2024, UNS A9204, AMS 4037; European (CEN): EN573 AW-2024; AW-AlCu4Mg1 (ISO): AlCu4Mg1.5 (AECMA): AL-P13; Austria: AlCuMg2; Canada: CG42; France: A-U4G1; 2024; AIR 9048-630; Germany: AlCuMg2; Wk.3.1355; LW3.1354; Italy: P-AlCu4.5MgMn; 9002/4; 3583; FA60-2024; Japan: A2024P; Russia (CIS): 1160; Spain: L-3140; Switzerland: AlCu4Mg1.5; UK: 2024; BS 2L97, 2L98 (now AMD2433); DTD5090, DTD 5100A; Others: USA-WW-T-700/3; (CZ) CSN 42 4203; Eur. aerospace P-2024; Proprietary: Alusuisse Avional 152

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F44 (T4) [Extrusion 2 - 30mm]	315	-	440	10	70	120HB	Strengths minimum	(Alusuisse)

Avional-660/662 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.5-0.9, Fe 0.5, Cu 3.9-5, Mg 0.2-0.8, Mn 0.4-1.2, Zn 0.25, Ti 0.15, Cr 0.1, Ti+Zr 0.2max., Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2790

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA2014, UNS A92014, AMS 4028, 4029; European (CEN): EN573 AW-2014 (2014A); AW-AlCu4SiMg(A) (ISO): AlCu4SiMg (AECMA): AL-P12; Canada: CS41N; France: A-U4SG; 2014; Germany: AlCuSiMn; Wk.3.1255; LW3.1254; Italy: 3581; 9002/3; FA60-2014; Japan: A3X1; A2014; A2014P; Russia (CIS): 1380, 1185; Spain: L-3130; Sweden: 14,4338; UK: 2014A; BS H15 (HS 15); L102, L103, L105, L156-L159, L163-L168, 2L77, 2L87, 2L93, 3L63, 7L37; DTD 5010A, DTD 5030A, DTD 5040A; Others: (CZ) CSN 42 4207; Proprietary: Alusuisse Avional-660/662; Menziken code 2660/2662

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Drawn <80mm]	70	-	140	10	-	60HB	Minimum	(Alu Menziken)
O/H111 [Extrusion <120mm]	80	-	150	10	-	60HB	Minimum	(Alu Menziken)
T3 [Drawn <80mm]	240	-	380	6	-	110HB	Minimum	(Alu Menziken)
T351 [Drawn <80mm]	240	-	380	4	-	110HB	Minimum	(Alu Menziken)
T4 [Drawn <80mm]	220	-	380	10	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion <25mm]	230	-	370	11	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion >75mm]	250	-	390	10	-	110HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion 25-75mm]	270	-	410	12	-	110HB	Minimum	(Alu Menziken)
T451 [Drawn <80mm]	220	-	380	8	-	110HB	Minimum	(Alu Menziken)
T6 [Drawn <80mm]	380	-	450	6	-	130HB	Minimum	(Alu Menziken)
T6, 6510, 6511 [Extrusion <25mm]	370	-	415	5	-	130HB	Minimum	(Alu Menziken)
T6, 6510, 6511 [Extrusion 25-75mm]	415	-	460	7	-	130HB	Minimum	(Alu Menziken)
T6, 6510, 6511 [Extrusion 75-120mm]	250	-	390	10	-	130HB	Minimum	(Alu Menziken)
T651 [Drawn <80mm]	380	-	450	4	-	130HB	Minimum	(Alu Menziken)

Avional Pb-118 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.8, Fe 0.7, Cu 3.3-4.5, Mg 0.5-1.3, Mn 0.2-1, Zn 0.5, Cr 0.1, Bi 0.1, Pb 0.8-1.5, Others: Each 0.1, Aluminium rem. **Density** (kg.m⁻³) 2810

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA2030; European (CEN): EN573 AW-2030 (ISO): AlCu4PbMg; France: A-U4Pb; 2030; Germany: AlCuMgPb; 3.1645; Proprietary: Alusuisse Avional Pb-118; Menziken code 2118

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T3 [Drawn <30mm]	250	-	370	5	-	100HB	Minimum	(Alu Menziken)
T3 [Drawn 30-80mm]	220	-	340	6	-	100HB	Minimum	(Alu Menziken)
T351 [Drawn <80mm]	250	-	370	3	-	100HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion <80mm]	250	-	307	6	-	100HB	Minimum	(Alu Menziken)
T4, 4510, 4511 [Extrusion 80-120mm]	220	-	340	8	-	100HB	Minimum	(Alu Menziken)

AZ24 Otto Fuchs (Germany) Wrought

Proprietary composition: Mg 2, Zn, Aluminium rem.

AZ34 Otto Fuchs (Germany) Wrought

Proprietary composition: Mg 3, Zn, Aluminium rem.

AZ67 Otto Fuchs (Germany) Wrought

Proprietary composition: Cu 1, Zn, Mg, Be, Aluminium rem.

220 Aluminium Alloys (wrought)

C 50S	Alunord (France)							Wrought
Proprietary composition: Si 0.35-0.41, Fe 0.14, Cu 0.11-0.17, Mg 0.45-0.55, Mn 0.03, Zn 0.025, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>France:</i> AGS 85; <i>Proprietary:</i> Alunord C 50S								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	150	-	190	10	-	-	Typical	(Alunord)
Certal	Alusuisse (Switzerland)							Wrought
No composition: -								
Identified Product forms: Plate								
Similar/Equivalent alloys: <i>USA:</i> AA7022; <i>European (CEN):</i> EN573 AW-7022; <i>Germany:</i> AlZnMgCu0.5; <i>DIN:</i> 3.4345; <i>LW3.4344;</i> <i>Spain:</i> L-3751; <i>UK:</i> 7022; <i>Proprietary:</i> Alusuisse Certal								
Comments: Tooling material for plastics processing. Injection, plastic foam, blow forming and blister moulds. Punch guides and holders. Highly stressed machine parts.								
Machinability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate 100 - 120mm]	490	-	545	7	-	165HB	Typical	(Alusuisse)
Not stated [Plate 100 - 200mm]	400	-	490	6	72	145HB	Minimum	(Alusuisse)
Not stated [Plate 120 - 160mm]	440	-	520	7	-	160HB	Typical	(Alusuisse)
Not stated [Plate 15 - 25mm]	495	-	555	9	-	170HB	Typical	(Alusuisse)
Not stated [Plate 160 - 220mm]	420	-	500	7	-	155HB	Typical	(Alusuisse)
Not stated [Plate 25 - 100mm]	495	-	550	8	-	165HB	Typical	(Alusuisse)
Not stated [Plate 25 - 50mm]	460	-	530	8	72	150HB	Minimum	(Alusuisse)
Not stated [Plate 50 - 100mm]	420	-	500	6	72	145HB	Minimum	(Alusuisse)
Not stated [Plate 6 - 25mm]	460	-	540	8	72	150HB	Minimum	(Alusuisse)
Contal	Alusuisse (Switzerland)							Wrought
No composition: -								
Identified Product forms: Plate								
Similar/Equivalent alloys: <i>USA:</i> AA7010, AMS 4204, 4205; <i>European (CEN):</i> EN573 AW-7010 (<i>ISO:</i> AlZn6MgCu; <i>Germany:</i> LW. 3.4394; <i>UK:</i> 7010; DTD 5120, 5130A, 5636; <i>Others:</i> Eur. aerospace P-7010; <i>Proprietary:</i> Alusuisse Contal								
Comments: Tooling and jig material. Very high strength.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate 10 - 25mm]	520	-	580	8	-	170HB	Guaranteed minimum	(Alusuisse)
Not stated [Plate 25 - 50mm]	500	-	560	8	-	165HB	Guaranteed minimum	(Alusuisse)
Not stated [Plate 50 - 112mm]	480	-	550	6	-	165HB	Guaranteed minimum	(Alusuisse)
Decotal 500	Alusuisse (Switzerland)							Wrought
Proprietary composition: Si 0.4, Fe 0.7, Cu 5-6, Zn 0.3, Bi 0.2-0.6, Pb 0.2-0.6, Others: Each 0.05, Aluminium rem. Density (kg.m ⁻³) 2830								
Identified Product forms: Tube, Extrusion, Rod, Bar								
Similar/Equivalent alloys: <i>USA:</i> AA2011, UNS A92011; <i>European (CEN):</i> EN573 AW-2011 (<i>ISO:</i> AlCu6BiPb; <i>Canada:</i> CB60; <i>France:</i> A-U5PbBi; <i>Germany:</i> AlCuBiPb; <i>Wk.3.1655;</i> <i>Italy:</i> 9002/5; 6362; <i>Japan:</i> A2011; <i>Spain:</i> L-3192; <i>Sweden:</i> 4355; <i>UK:</i> 2011; BS FC1; <i>Proprietary:</i> Alusuisse Decotal 500; Menziken code 2500								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T3 [Drawn <40mm]	270	-	320	8	-	100HB	Minimum	(Alu Menziken)
T3 [Drawn 40-50mm]	250	-	300	10	-	100HB	Minimum	(Alu Menziken)
T3 [Drawn 50-80mm]	210	-	280	10	-	100HB	Minimum	(Alu Menziken)
T4 [Extrusion <60mm]	125	-	275	12	-	100HB	Minimum	(Alu Menziken)
T6 [Extrusion <75mm]	230	-	310	6	-	100HB	Minimum	(Alu Menziken)
T6 [Extrusion 75-120mm]	195	-	295	6	-	100HB	Minimum	(Alu Menziken)
T8 [Drawn <80mm]	270	-	370	6	-	110HB	Minimum	(Alu Menziken)
Dural 79	British Alcan (Plate) (UK)							Wrought
Proprietary composition: Cu 0.9, Mg 3.1, Mn 0.2, Zn 4.8, Aluminium rem.								
Identified Product forms: Plate								
Comments: Tooling plate, machined moulds and dies.								
Duralcan 90/10	British Aluminium (UK)							Wrought
Proprietary composition: - 10% Alumina, Aluminium alloy rem.								
Identified Product forms: Wire								
Comments: Metal matrix composite flame-spraying wire. For anti-skid coatings (pre-coated tiles also available).								
E-AI	DIN (Germany)							Wrought
Nominal composition: Si 0.25, Fe 0.35, Cu 0.02, Mg 0.05, Zn 0.05, Cr + Mn + Ti + V < 0.03, Others: Each 0.03 Total 0.5, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA1350A; <i>European (ISO):</i> E-AI99.5; <i>France:</i> A 5/L; <i>Germany:</i> E-AI; 3.0257; <i>Italy:</i> 9001/5; <i>Spain:</i> L3052; <i>UK:</i> BS 1E; <i>Proprietary:</i> Erbsloh alloy number 1057; Alcan C 1/DIS								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F6.5 [-]	25	-	65	23	-	20-30HB	-	(Erbsloh)
E-AI Mg Si0.5	DIN (Germany)							Wrought
Nominal composition: Si 0.35-0.5, Fe 0.16-0.22, Cu 0.05, Mg 0.4-0.55, Mn 0.03, Zn 0.05, Ti 0.03, Cr + Mn + Ti + V < 0.03, Others: Each 0.03 Total 0.1, Aluminium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> AA6101C; <i>France:</i> A-GS/L; <i>Italy:</i> 3570 P-AISi0.5Mg; <i>UK:</i> BS BTRE 6; <i>Proprietary:</i> Erbsloh alloy number 6047; Alcan D 50 S								
ES70	Otto Fuchs (Germany)							Wrought
Proprietary composition: Mg, Si, Cu, Aluminium 99.7 min.								
Identified Product forms: Extrusion, Forging stock/Billet								

Aluminium Alloys (wrought) 221

Extrudal-043 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.3-0.5, Fe 0.1-0.3, Cu 0.1, Mg 0.35-0.55, Mn 0.1, Zn 0.15, Ti 0.1, Cr 0.05, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: *USA:* AA6060; *European (CEN):* EN573 AW-6060 (*ISO:* AlMgSi, AlMgSiFe; *France:* A-GS; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 9006/1; 3569; P-AlMgSi; *Japan:* A6063; *Spain:* L-3442; *Sweden:* 4103; *Switzerland:* AlMgSi0.5; *UK:* BS H9; *Others:* (CZ) CSN 42 4401; *Proprietary:* Alusuisse Extrudal-043; Menziken code 6043

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Drawn <80mm]	65	-	130	13	-	45HB	Minimum	(Alu Menziken)
T4 [Extrusion <120mm]	60	-	120	14	-	45HB	Minimum	(Alu Menziken)
T5 [Extrusion <120mm]	120	-	160	6	-	55HB	Minimum	(Alu Menziken)
T6 [Drawn <80mm]	160	-	215	10	-	70HB	Minimum	(Alu Menziken)
T6 [Extrusion <120mm]	150	-	190	6	-	70HB	Minimum	(Alu Menziken)
T64 [Extrusion <50mm]	120	-	180	10	-	60HB	Minimum	(Alu Menziken)
T66 [Extrusion <120mm]	160	-	215	6	-	70HB	Minimum	(Alu Menziken)

Extrudal-050 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.5-0.6, Fe 0.1-0.3, Cu 0.1, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ti 0.1, Cr 0.05, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: *USA:* AA6060; *European (CEN):* EN573 AW 6060 (*ISO:* AlMgSi, AlMgSiFe; *France:* A-GS; *Germany:* AlMgSi0.5; Wk.3.3206; *Italy:* 9006/1; 3569; P-AlMgSi; *Japan:* A6063; *Spain:* L-3442; *Sweden:* 4103; *Switzerland:* AlMgSi0.5; *UK:* H9; *Others:* (CZ) CSN 42 4401; *Proprietary:* Alusuisse Extrudal-050; Menziken code 6050

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Extrusion <120mm]	50	-	80	16	-	30HB	Minimum	(Alu Menziken)
T4 [Drawn <80mm]	75	-	150	13	-	45HB	Minimum	(Alu Menziken)
T4 [Extrusion <120mm]	65	-	130	12	-	45HB	Minimum	(Alu Menziken)
T5 [Extrusion <120mm]	130	-	175	6	-	70HB	Minimum	(Alu Menziken)
T6 [Drawn <80mm]	190	-	220	8	-	75HB	Minimum	(Alu Menziken)
T6 [Extrusion <120mm]	170	-	215	8	-	75HB	Minimum	(Alu Menziken)
T66 [Drawn <80mm]	195	-	230	8	-	75HB	Minimum	(Alu Menziken)
T66 [Extrusion <120mm]	200	-	245	8	-	75HB	Minimum	(Alu Menziken)

Glare 1 Structural Laminates Co. (USA) Wrought

No composition: - **Density** (kg.m⁻³) 2520

Identified Product forms: Sheet/strip

Comments: Fibre-metal laminate (FML) consisting of alternative layers of 7475-T76 alloy (0.3-0.4mm thick) and unidirectional glass-reinforced epoxy adhesive (0.25mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Laminate 2/1]	-	525	1077	-	66	-	Tensile: L dir.; Ult. strain 4.2%	(Structural Laminates)
[Laminate 2/1]	-	427	-	-	56	-	Compressive: LT dir.	(Structural Laminates)
[Laminate 2/1]	-	342	436	-	54	-	Tensile: LT dir.; Ult. strain 7.7%	(Structural Laminates)
[Laminate 2/1]	-	447	-	-	63	-	Compressive: L dir.	(Structural Laminates)
[Laminate 3/2]	-	333	352	-	50	-	Tensile: LT dir.; Ult. strain 7.7%	(Structural Laminates)
[Laminate 3/2]	-	424	-	-	67	-	Compressive: L dir.	(Structural Laminates)
[Laminate 3/2]	-	403	-	-	51	-	Compressive: LT dir.	(Structural Laminates)
[Laminate 3/2]	-	545	1282	-	65	-	Tensile: L dir.; Ult. strain 4.2%	(Structural Laminates)

Glare 2 Structural Laminates Co. (USA) Wrought

No composition: - **Density** (kg.m⁻³) 2520

Identified Product forms: Sheet/strip

Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy (0.3-0.4mm thick) and unidirectional glass-reinforced epoxy adhesive (0.25mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Laminate 2/1]	-	347	992	-	67	-	Tensile: L dir.; Ult. strain 4.7%	(Structural Laminates Co.)
[Laminate 2/1]	-	244	331	-	55	-	Tensile: LT dir.; Ult. strain 10.8%	(Structural Laminates Co.)
[Laminate 2/1]	-	390	-	-	69	-	Compressive: L dir.	(Structural Laminates Co.)
[Laminate 2/1]	-	253	-	-	56	-	Compressive: LT dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	360	1214	-	65	-	Tensile: L dir.; Ult. strain 4.2%	(Structural Laminates Co.)
[Laminate 3/2]	-	228	317	-	50	-	Tensile: LT dir.; Ult. strain 7.7%	(Structural Laminates Co.)
[Laminate 3/2]	-	414	-	-	67	-	Compressive: L dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	236	-	-	52	-	Compressive: LT dir.	(Structural Laminates Co.)

Glare 3 Structural Laminates Co. (USA) Wrought

No composition: - **Density** (kg.m⁻³) 2520

Identified Product forms: Sheet/strip

Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy (0.3-0.4mm thick) and cross-ply glass-reinforced epoxy adhesive (0.25mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Laminate 2/1]	-	315	662	-	60	-	Tensile: L dir.; Ult. strain 4.7%	(Structural Laminates Co.)
[Laminate 2/1]	-	318	-	-	62	-	Compressive: LT dir.	(Structural Laminates Co.)
[Laminate 2/1]	-	287	653	-	60	-	Tensile: LT dir.; Ult. strain 4.7%	(Structural Laminates Co.)
[Laminate 2/1]	-	319	-	-	63	-	Compressive: L dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	305	717	-	58	-	Tensile: L dir.; Ult. strain 4.7%	(Structural Laminates Co.)
[Laminate 3/2]	-	283	716	-	58	-	Tensile: LT dir.; Ult. strain 4.7%	(Structural Laminates Co.)
[Laminate 3/2]	-	309	-	-	60	-	Compressive: L dir.	(Structural Laminates Co.)
[Laminate 3/2]	-	306	-	-	60	-	Compressive: LT dir.	(Structural Laminates Co.)

222 Aluminium Alloys (wrought)

Glare 4	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Density (kg.m⁻³) 2440 Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy (0.3-0.4mm thick) and cross-ply glass-reinforced epoxy adhesive (0.375mm thick). Surface Condition: bare/clad. Laminate configuration 2/1 to 6/5.</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u>	<u>Notes</u> <u>(Source)</u>
[Laminate 2/1]	- 299 - - 57	Compressive: LT dir. (Structural Laminates Co.)
[Laminate 2/1]	- 349 - - 62	Compressive: L dir. (Structural Laminates Co.)
[Laminate 2/1]	- 250 554 - 54	Tensile: LT dir.; Ult. strain 4.7% (Structural Laminates Co.)
[Laminate 2/1]	- 315 662 - 60	Tensile: L dir.; Ult. strain 4.7% (Structural Laminates Co.)
[Laminate 3/2]	- 285 - - 54	Compressive: LT dir. (Structural Laminates Co.)
[Laminate 3/2]	- 352 1027 - 57	Tensile: L dir.; Ult. strain 4.7% (Structural Laminates Co.)
[Laminate 3/2]	- 255 607 - 50	Tensile: LT dir.; Ult. strain 4.7% (Structural Laminates Co.)
[Laminate 3/2]	- 365 - - 60	Compressive: L dir. (Structural Laminates Co.)
Glare 5	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy (0.51mm thick) and cross-ply glass-reinforced epoxy adhesive (0.51mm thick). Surface Condition: bare/clad. Laminate configuration 2/1, 3/2, 4/3.</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u>	<u>Notes</u> <u>(Source)</u>
[2/1 laminate]	- 282 786 - 54	Tensile LT dir.; Ult. strain 4.4% (Structural Laminates Co.)
[2/1 laminate]	- 317 792 - 54	Tensile L dir.; Ult. strain 4.4% (Structural Laminates Co.)
[3/2 laminate]	- 282 813 - 50	Tensile L dir.; Ult. strain 4.4% (Structural Laminates Co.)
[3/2 laminate]	- 262 806 - 50	Tensile LT dir.; Ult. strain 4.4% (Structural Laminates Co.)
[4/3 laminate]	- 248 813 - 50	Tensile LT dir.; Ult. strain 4.4% (Structural Laminates Co.)
[4/3 laminate]	- 262 827 - 50	Tensile L dir.; Ult. strain 4.4% (Structural Laminates Co.)
Glare 5-F1	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 5052-H34 (outer skin), 7075-T6 alloy and cross-ply glass-reinforced epoxy adhesive. Surface Condition: bare. Laminate configuration 2/1. For aircraft cargo area.</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u>	<u>Notes</u> <u>(Source)</u>
[Laminate]	- 290 662 - -	Typical (Structural Laminates Co.)
Glare 5-F2	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy and cross-ply glass-reinforced epoxy adhesive. Surface Condition: clad. Laminate configuration 2/1. For aircraft cargo area.</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u>	<u>Notes</u> <u>(Source)</u>
[Laminate]	- 296 683 - -	Typical (Structural Laminates Co.)
Glare 5-FW	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 5052-H34 alloy and cross-ply glass-reinforced epoxy adhesive. Surface Condition: bare. Laminate configuration 2/1. For aircraft fire-wall liner (meets FAR 25.855).</p>		
Glare 6	Structural Laminates Co. (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Fibre-metal laminate (FML) consisting of alternative layers of 2024-T3 alloy (0.51mm thick) and cross-ply glass-reinforced epoxy adhesive (0.51mm thick). Surface Condition: bare/clad. Laminate configuration 2/1.</p>		
Kryal Al99.999 - >99.9999	DIN (Germany)	Wrought
<p>No composition: - Identified Product forms: Wire</p>		
MD209	Reynolds (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Non-heat treatable alloy. No details.</p>		
MD276	Reynolds (USA)	Wrought
<p>No composition: - Identified Product forms: Sheet/strip Comments: Non-heat treatable alloy. No details.</p>		
MD355	Reynolds (USA)	Wrought
<p>No composition: - Comments: Long-life brazing alloy.</p>		

Aluminium Alloys (wrought) 223

MD356 Reynolds (USA) Wrought

No composition: -
Comments: Long-life brazing alloy.

Metacs 20 TYK (Japan) Cast Wrought

Proprietary composition: 20% silicon carbide particles in 6061 alloy. **Density** (kg.m⁻³) 2800
Identified Product forms: Extrusion, Forging stock/Billet, Die cast
Comments: Silicon carbide particle reinforced aluminium alloy metal matrix composite. (20 volume % reinforcement in A6061-T6 alloy). High strength, high-temperature strength, high modulus, superior wear characteristics, low thermal expansion (15.4 x 10⁻⁶/deg.C). Processed by extrusion, forging and die casting. For aerospace hot components, automotive engine parts, sports & leisure (ski, racket, golf clubs), Industrial machinery (robot parts).

Peraluman-050 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 0.35-0.6, Mn 0.15, Zn 0.15, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.
Identified Product forms: Sheet/strip
Similar/Equivalent alloys: *Others:* AlMg0.5; *Proprietary:* Alusingen Alloy No. 205; Alusuisse Peraluman-050

Peraluman-100 (101) Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.3, Fe 0.45, Cu 0.05, Mg 0.7-1.1, Mn 0.15, Zn 0.2, Ni 0.05, Ti 0.05, Cr 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2690
Identified Product forms: Sheet/strip, Tube, Extrusion, Bar
Similar/Equivalent alloys: *USA:* AA5005, UNS A95005; *European (CEN):* EN573 AW-5005 *(ISO):* AlMg1, AlMg1(B); *France:* A-G0.6; 5005; *Germany:* AlMg1; Wk.3.3315; *Italy:* 9005/1; 5764-66, 4510; FA60-5005; P-AlMg0.8; P-AlMg0.9; *Japan:* A5005, A2X8; *Russia (CIS):* 1510; *Spain:* L-3350; *Sweden:* 4106; *Switzerland:* Al-1Mg, 10849; *UK:* 5005; BS N41; *Proprietary:* Alusingen Alloy No. 214; Alusuisse Peraluman-100

Comments: Medium strength, high corrosion resistance. Particularly suitable for deep drawing. Vehicles, containers, cans, appliances, architectural. Peraluman-101: sheet and strip. **Corrosion resistance:** Excellent **Weldability:** Excellent **Machinability:** Moderate **Finishing:** Polishing and anodising

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.5 - 50mm]	35	-	100	19	69		Minimum	(Alusuisse)
H18 [Sheet 0.5 - 1.5mm]	165	-	185	2	69		Minimum	(Alusuisse)
H18 [Sheet 1.5 - 3mm]	165	-	185	2	69		Minimum	(Alusuisse)
H22/H32 [Sheet 0.5 - 1.5mm]	80	-	125	5	69		Minimum	(Alusuisse)
H22/H32 [Sheet 1.5 - 3mm]	80	-	125	6	69		Minimum	(Alusuisse)
H22/H32 [Sheet 3 - 6mm]	80	-	125	8	69		Minimum	(Alusuisse)
H22/H32 [Sheet 6 - 12.5mm]	80	-	125	10	69		Minimum	(Alusuisse)
H24/H34 [Sheet 0.5 - 1.5mm]	110	-	145	4	69		Minimum	(Alusuisse)
H24/H34 [Sheet 1.5 - 3mm]	110	-	145	5	69		Minimum	(Alusuisse)
H24/H34 [Sheet 3 - 6mm]	110	-	145	6	69		Minimum	(Alusuisse)
H24/H34 [Sheet 6 - 12.5mm]	110	-	145	8	69		Minimum	(Alusuisse)
H26/H36 [Sheet 0.5 - 1.5mm]	135	-	165	3	69		Minimum	(Alusuisse)
H26/H36 [Sheet 1.5 - 3mm]	135	-	165	4	69		Minimum	(Alusuisse)
H26/H36 [Sheet 3 - 4mm]	135	-	165	4	69		Minimum	(Alusuisse)

Peraluman 150/151 Alusuisse (Switzerland) Wrought

Nominal composition: Si 0.4, Fe 0.7, Cu 0.2, Mg 1.1-1.8, Mn 0.1, Zn 0.25, Ti 0.05, Cr 0.1, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2680
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar
Similar/Equivalent alloys: *USA:* AA5050, UNS A95050; *European (CEN):* EN573 AW-5050 *(ISO):* AlMg1.5, AlMg1.5(C); *France:* A-G1; A-G1.5; *Italy:* 3573; P-AlMg1.5; *Switzerland:* Al1.5Mg; *UK:* 5050; BS 3L44; *Proprietary:* Alusuisse Peraluman 150/151; Menziken code 5150/5151

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Flats 0.2-50mm]	45	-	130	16	-	36HB	Minimum	(Alu Menziken)
(O) [Extr./Drawn, all sizes]	50	-	145	18	-	40HB	Minimum - Pe 150	(Alu Menziken)
(F) [Extrusion >12mm]	50	-	145	15	-	40HB	Minimum (Round bar) - Pe 150	(Alu Menziken)
(H12) [Drawn <30mm]	110	-	155	10	-	55HB	Minimum (Round bar) - Pe 150	(Alu Menziken)
H18 [Flats 0.2-3mm]	190	-	220	1	-	68HB	Minimum	(Alu Menziken)
H24 [Flats 0.2-6mm]	135	-	175	3	-	54HB	Minimum	(Alu Menziken)

Peraluman-226 Alusuisse (Switzerland) Wrought

No composition: -
Similar/Equivalent alloys: *USA:* AA5251, UNS A95251; *European (CEN):* EN573 AW-5251; AW-AlMg2 *(ISO):* AlMg2; *France:* A-G2M; 5251; *Germany:* AlMg2Mn0.3; Wk.3.3525; *Italy:* 4511; *Spain:* L-3361; *Switzerland:* Al-2Mg; *UK:* 5251; BS N4, NS4; BS 3L80, 3L81, 5L44; *Others:* (CZ) CSN 42 4412; *Proprietary:* Alusuisse Peraluman-226

224 Aluminium Alloys (wrought)

Peraluman 253 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.25, Fe 0.4, Cu 0.1, Mg 2.2-2.8, Mn 0.1, Zn 0.1, Ti 0.05, Cr 0.15-0.35, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: *USA:* AA5052, UNS A95052, AMS 4015E, 4016E, 4017E, 4069, 4070F, 4071F, 4114B; *European (CEN):* EN573 AW-5052; AW-AIMg2.5 (*ISO:*

AlMg2.5 (*AECMA:* AL-P31; *Canada:* GR20; *Germany:* AlMg2; AlMg2.5; DIN 3.3523; *Italy:* P-AIMg2.5; 3574; 9005/2; FA60-5052; *Japan:* A2X1; A5052P; *Sweden:*

14,4120; *Switzerland:* 10849; *UK:* 5052; BS N4; BS L80, L81, 2L55, 2L56; *Proprietary:* Alusuisse Peraluman 253; Menziken code 5253

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Drawn, all sizes]	65	-	170	17	-	45HB	Minimum	(Alu Menziken)
O/H111 [Extrusion, all sizes]	70	-	170	15	-	45HB	Minimum	(Alu Menziken)
O/H111 [Flats 0.2-6mm]	65	-	170	12	-	47HB	Minimum	(Alu Menziken)
O/H111 [Flats 6-80mm]	65	-	165	18	-	47HB	Minimum	(Alu Menziken)
F [Extrusion, all sizes]	70	-	170	13	-	45HB	Minimum	(Alu Menziken)
H12/22/32 [Drawn <80mm]	160	-	210	5	-	55HB	Minimum	(Alu Menziken)
H14/24/34 [Drawn <40mm]	180	-	230	4	-	60HB	Minimum	(Alu Menziken)
H16/26/36 [Drawn <25mm]	200	-	250	3	-	65HB	Minimum	(Alu Menziken)
H18 [Flats 0.2-3mm]	240	-	270	1	-	83HB	Minimum	(Alu Menziken)
H18/28/38 [Drawn <10mm]	220	-	270	2	-	70HB	Minimum	(Alu Menziken)
H24/34 [Flats 0.2-25mm]	150	-	230	4	-	67HB	Minimum	(Alu Menziken)

Peraluman-260 Alusuisse (Switzerland) Wrought

No composition: -

Identified Product forms: Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: *USA:* AA5454, UNS A95454; *European (CEN):* EN573 AW-5454; AW-AI3Mn (*ISO:* AlMg2.7Mn; AlMg3Mn; *Canada:* GM31N, GM31; *France:* A-

G2.5MC, A-G3; 5454; *Germany:* AlMg2.7Mn, AlMg3; Wk.3.3537, 3.3585; *Italy:* 9005/3; 7789; *Japan:* A5454P; *Spain:* L-3391; *Switzerland:* AlMg2.7Mn; *UK:* 5454; BS

N51; *Proprietary:* Alusuisse Peraluman-260

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F22 (F) [Extrusion]	100	-	215	13	-	60HB	Strengths minimum	(Alusuisse)

Peraluman-300 (301) Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 2.6-3.6, Mn 0.15-0.5, Zn 0.2, Ni 0.05, Ti 0.15, Cr 0.3, Mn+Cr 0.1 - 0.6, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: *USA:* AA5754; *European (CEN):* EN573 AW-5754; AW-AIMg3 (*ISO:* AlMg3; *France:* A-G3, A-G3M; 5754; *Germany:* AlMg3; 3.3535; *Italy:* 3575;

P-AIMg3.5; *Spain:* L-3390; *Sweden:* 14,4125; *Switzerland:* AlMg3; *UK:* BS N5; *Others:* (CZ) CSN 42 4413; AlMg3; *Proprietary:* Alusingen Alloy No. 234; Alusuisse

Peraluman-300

Comments: Ship building, containers, appliances. Chemical and food industries. Architectural. Good corrosion resistance to seawater. Peraluman-301: flat products.

Corrosion resistance: Excellent **Weldability:** Excellent **Machinability:** Moderate **Finishing:** Anodising

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.5 - 100mm]	80	-	190	14	70		Minimum	(Alusuisse)
H22/H32 [Sheet 0.5 - 40mm]	130	-	220	8	70		Minimum	(Alusuisse)
H24/H34 [Sheet 0.5 - 25mm]	160	-	240	6	70		Minimum	(Alusuisse)
H26/H36 [Sheet 0.5 - 6mm]	190	-	265	2	70		Minimum	(Alusuisse)

Peraluman-302 Alusuisse (Switzerland) Wrought

No composition: -

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* AA5754; *European (CEN):* EN573 AW-5754; AW-AIMg3 (*ISO:* AlMg3; *France:* A-G3, A-G3M; 5754; *Germany:* AlMg3; 3.3535; *Italy:* 3575;

P-AIMg3.5; *Spain:* L-3390; *Sweden:* 14,4125; *Switzerland:* AlMg3; *UK:* BS N5; *Others:* (CZ) CSN 42 4413; AlMg3; *Proprietary:* Alusuisse Peraluman-302

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F18 (F) [Extrusion]	80	-	180	14	-	45HB	Strengths minimum	(Alusuisse)

Peraluman-410/412 Alusuisse (Switzerland) Wrought

Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 3.5-4.5, Mn 0.2-0.7, Zn 0.25, Ni 0.05, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2660

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar

Similar/Equivalent alloys: *USA:* AA5086, UNS A95086; *European (CEN):* EN573 AW-5086; AW-AIMg4 (*ISO:* AlMg4Mn; *France:* A-G4MC; 5086; *Germany:* AlMg4Mn; Wk.

3.3545; *Italy:* 5452-64; FA60-5086; 9005/4; *Japan:* A5086P; *Spain:* L-3322; *Switzerland:* AlMg4Mn; *UK:* 5086; *Others:* European aerospace P-5086; *Proprietary:*

Alusuisse Peraluman 410

Comments: High strength, high corrosion resistance particularly against seawater. Subject to intergranular and stress-corrosion cracking with unsuitable heat treatments.

Highly-stressed welded components in vehicles and containers. Pressure vessels, appliances, cryogenic applications. Shipbuilding (H116). **Corrosion resistance:**

Excellent **Weldability:** Excellent **Machinability:** Moderate **Finishing:** Anodisable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.5 - 150mm]	100	-	240	12	71		Minimum	(Alusuisse)
H116 [Sheet 1.5 - 50mm]	195	-	275	8	71		Minimum	(Alusuisse)
H22/H32 [Sheet 0.5 - 40mm]	185	-	275	6	71		Minimum	(Alusuisse)
H24/H34 [Sheet 0.5 - 25mm]	220	-	300	5	71		Minimum	(Alusuisse)
H26/H36 [Sheet 0.5 - 4mm]	250	-	325	3	71		Minimum	(Alusuisse)

Aluminium Alloys (wrought) 225

Peraluman-460/462	Alusuisse (Switzerland)	Wrought						
<p>Nominal composition: Si 0.4, Fe 0.4, Cu 0.1, Mg 4-4.9, Mn 0.4-1, Zn 0.25, Ni 0.05, Ti 0.15, Cr 0.05-0.25, Others: Each 0.05, Aluminium rem. Density (kg.m⁻³) 2660</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5083, UNS A95083; <i>European (CEN):</i> EN573 AW-5083; AW-<i>AlMg4.5Mn0.7 (ISO):</i> AlMg4.5Mn0.7, AlMg4.5Mn; <i>Canada:</i> GM41, GM50R; <i>France:</i> A-G4.5MC, A-GM4MC; 5083; <i>Germany:</i> AlMg4.5Mn; Wk.3.3547; <i>Italy:</i> 9005/5; 5452-64; FA60-5083; UNI 7790; P-<i>AlMg4.4:</i> <i>Japan:</i> A5083P; <i>Spain:</i> L-3321; <i>Sweden:</i> 14.4140; <i>Switzerland:</i> AlMg4.5Mn; <i>UK:</i> 5083; N8 (NS 8); <i>Proprietary:</i> Alusuisse Peraluman 460</p> <p>Comments: High strength, high corrosion resistance particularly against seawater. Subject to intergranular and stress-corrosion cracking with unsuitable heat treatments. Highly-stressed welded components in vehicles and containers. Pressure vessels, appliances, cryogenic applications. Shipbuilding (H116). Corrosion resistance: Excellent Weldability: Excellent Machinability: Moderate Finishing: Anodisable</p>								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.5 - 6mm]	125	-	275	12	71		Minimum	(Alusuisse)
O/H111 [Sheet 120 - 150mm]	105	-	255	12	71		Minimum	(Alusuisse)
O/H111 [Sheet 6 - 80mm]	115	-	270	14	71		Minimum	(Alusuisse)
O/H111 [Sheet 80 - 120mm]	110	-	260	12	71		Minimum	(Alusuisse)
H116 [Sheet 1.5 - 80mm]	215	-	305	8	71		Minimum	(Alusuisse)
H22/H32 [Sheet 0.5 - 40mm]	215	-	305	6	71		Minimum	(Alusuisse)
H24/H34 [Sheet 0.5 - 25mm]	250	-	340	5	71		Minimum	(Alusuisse)
H26/H36 [Sheet 0.5 - 4mm]	280	-	360	3	71		Minimum	(Alusuisse)
Peraluman-462	Alusuisse (Switzerland)	Wrought						
<p>No composition: -</p> <p>Identified Product forms: Extrusion</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5083, UNS A95083; <i>European (CEN):</i> EN573 AW-5083; AW-<i>AlMg4.5Mn0.7 (ISO):</i> AlMg4.5Mn0.7, AlMg4.5Mn; <i>Canada:</i> GM41, GM50R; <i>France:</i> A-G4.5MC, A-GM4MC; 5083; <i>Germany:</i> AlMg4.5Mn; Wk.3.3547; <i>Italy:</i> 9005/5; 5452-64; FA60-5083; UNI 7790; P-<i>AlMg4.4:</i> <i>Japan:</i> A5083P; <i>Spain:</i> L-3321; <i>Sweden:</i> 14.4140; <i>Switzerland:</i> AlMg4.5Mn; <i>UK:</i> 5083; N8 (NS 8); <i>Proprietary:</i> Alusuisse Peraluman-462</p>								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F27 (F) [Extrusion]	140	-	270	12	-	65HB	Strengths minimum	(Alusuisse)
Peraluman-470	Alusuisse (Switzerland)	Wrought						
<p>Approximate composition: Mg 4.5, Mn 0.7, Aluminium rem. Density (kg.m⁻³) 2700</p> <p>Identified Product forms: Plate</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA(5083); <i>Germany:</i> (AlMg4.5Mn); <i>Proprietary:</i> Alusuisse Peraluman 470; Alusuisse ALPLAN</p> <p>Comments: Precision plates. Precision engineering components. Corrosion resistance: Good Weldability: MIG & TIG Machinability: Very good Finishing: Anodisable (with colour)</p>								
Peraluman-502	Alusuisse (Switzerland)	Wrought						
<p>No composition: -</p> <p>Identified Product forms: Extrusion</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5456A; <i>European (CEN):</i> EN573 AW-5456A; <i>Germany:</i> AlMg5; <i>Proprietary:</i> Alusuisse Peraluman-502</p>								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F25 (F) [Extrusion]	110	-	250	13	-	55HB	Strengths minimum	(Alusuisse)
Peraluman-708	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.2, Fe 0.2, Cu 0.03-0.1, Mg 0.5-1, Mn 0.03, Zn 0.05, Ti 0.03, Others: Each 0.02, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5205; <i>Others:</i> Al99.7Mg0.8Cu; <i>Proprietary:</i> Alusingen Alloy No. 294; Alusuisse Peraluman-708</p>								
Peraluman-843	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.3-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.01, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.5Cu; <i>Proprietary:</i> Alusingen Alloy No. 276; Alusuisse Peraluman-843</p>								
Peraluman-845	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 0.3-0.6, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.5; <i>Proprietary:</i> Alusingen Alloy No. 288; Alusuisse Peraluman-845</p>								
Peraluman-853	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.5-1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>Others:</i> Al99.85Mg0.8Cu; <i>Proprietary:</i> Alusingen Alloy No. 277; Alusuisse Peraluman-853</p>								
Peraluman-860	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 0.7-1.1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.05 Total 0.15, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-<i>AlMg0.9:</i> <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alusingen Alloy No. 289; Alusuisse Peraluman-860</p>								
Peraluman-863	Alusuisse (Switzerland)	Wrought						
<p>Proprietary composition: Si 0.08, Fe 0.08, Cu 0.03-0.1, Mg 0.7-1.1, Mn 0.03, Zn 0.05, Ti 0.02, Others: Each 0.02 Total 0.15, Aluminium rem.</p> <p>Identified Product forms: Sheet/strip</p> <p>Similar/Equivalent alloys: <i>USA:</i> AA5657; <i>European (CEN):</i> EN573 AW-5657; <i>France:</i> A 85-G1; <i>Germany:</i> Wk. 3.3317; <i>Italy:</i> P-<i>AlMg0.9:</i> <i>UK:</i> 5657; BS BTR 2 (BT RS2); <i>Others:</i> Al99.85Mg1; Al99.85Mg1Cu; <i>Proprietary:</i> Alusingen Alloy No. 278; Alusuisse Peraluman-863</p>								

226 Aluminium Alloys (wrought)

Peraluman-875 Aluisse (Switzerland) Wrought

Proprietary composition: Si 0.08, Fe 0.08, Cu 0.02, Mg 2.2-2.8, Mn 0.05, Zn 0.05, Others: Each 0.03 Total 0.15, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA5252, UNS A95252; France: AG-G3; UK: 5252; Others: AI99.85Mg2.5; Proprietary: Alusingen Alloy No. 297; Aluisse Peraluman-875

Perunal 205 Aluisse (Switzerland) Wrought

Proprietary composition: Si 0.5, Fe 0.5, Cu 0.5-1, Mg 2.6-3.7, Mn 0.1-0.4, Zn 4.3-5.2, Cr 0.1-0.3, Ti+Zr 0.2max, Others: Each 0.05, Aluminium rem. **Density** (kg.m⁻³) 2760

Similar/Equivalent alloys: USA: AA7022; European (CEN): EN573 AW-7022; Germany: AlZnMgCu0.5; DIN 3.4345; LW3.4344; Spain: L-3751; UK: 7022; Proprietary:

Aluisse Perunal 205

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Drawn >80mm]	380	-	460	6	-	130HB	Minimum	(Alu Menziken)
T6/6510/6511 [Extrusion <80mm]	420	-	490	5	-	130HB	Minimum	(Alu Menziken)
T6/6510/6511 [Extrusion 80-120mm]	400	-	470	7	-	130HB	Minimum	(Alu Menziken)

Perunal 215 Aluisse (Switzerland) Wrought

Proprietary composition: Si 0.4, Fe 0.5, Cu 1.2-2, Mg 2.1-2.9, Mn 0.3, Zn 5.1-6.1, Ni 0.05, Ti 0.2, Cr 0.18-0.28, Ti+Zr 0.25 max., Others: Each 0.05, Aluminium rem.

Density (kg.m⁻³) 2810

Identified Product forms: Plate, Extrusion

Similar/Equivalent alloys: USA: AA7075, UNS A97075, AMS 4045, 4078; European (CEN): EN573 AW-7075; AW-AlZn5.5MgCu (ISO): AlZn5.5MgCu, AlZn6MgCu1.5

(AECMA): AL-P42; Austria: AlZnMgCu1.5; Canada: ZG62; France: A-Z5GU; 7075; AIR 9048-680, -690, -700, -710.; Germany: AlZnMgCu1.5; Wk.3.4365; LW3.4364;

Italy: 9007/2; 3735, 3736; FA60-7075; Japan: A7075P; Spain: L-3710; Switzerland: AlZn6MgCu1.5, AlZnMnCu; 10858; UK: 7075; BS 2L95, L96, L160, L161, L162,

L170; DTD5074A, DTD5124, DTD5121, DTD5110; Others: (CZ) CSN 42 4222; Eur. aerospace P-7075; Proprietary: Aluisse Perunal 215

Comments: Very high strength, moderate corrosion resistance, easy to forge. Highly stressed components in aerospace and general engineering applications. **Corrosion**

resistance: Moderate **Weldability:** Good (resistance) **Machinability:** Very good **Finishing:** Anodisable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F53 (T6) [Extrusion 2 - 30mm]	460	-	530	7	-	150HB	Strengths minimum	(Aluisse)
O [Sheet 0.4 - 12.5mm]	145	-	275	10	72		Maximum (EI min.)	(Aluisse)
O [Sheet 12.5 - 75mm]	-	-	275	9	72		Maximum (EI min.)	(Aluisse)
T6 [Sheet 0.4 - 0.8mm]	460	-	525	6	72		Minimum	(Aluisse)
T6 [Sheet 0.8 - 1.5mm]	460	-	540	6	72		Minimum	(Aluisse)
T6 [Sheet 1.5 - 3mm]	470	-	540	7	72		Minimum	(Aluisse)
T6 [Sheet 3 - 6mm]	475	-	545	8	72		Minimum	(Aluisse)
T651 [Sheet 100 - 120mm]	300	-	410	2	72		Minimum	(Aluisse)
T651 [Sheet 12.5 - 25mm]	470	-	540	6	72		Minimum	(Aluisse)
T651 [Sheet 120 - 150mm]	260	-	360	2	72		Minimum	(Aluisse)
T651 [Sheet 25 - 50mm]	460	-	530	5	72		Minimum	(Aluisse)
T651 [Sheet 50 - 60mm]	440	-	525	4	72		Minimum	(Aluisse)
T651 [Sheet 6 - 12.5mm]	460	-	540	8	72		Minimum	(Aluisse)
T651 [Sheet 60 - 80mm]	420	-	495	4	72		Minimum	(Aluisse)
T651 [Sheet 80 - 90mm]	390	-	490	4	72		Minimum	(Aluisse)
T651 [Sheet 90 - 100mm]	360	-	460	3	72		Minimum	(Aluisse)

Perunal 232 Aluisse (Switzerland) Wrought

No composition: - **Density** (kg.m⁻³) 2840

Identified Product forms: Extrusion

Similar/Equivalent alloys: Germany: (AlZn7MgCu); Proprietary: Aluisse Perunal 232

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F70 (T6) [Extrusion up to 40mm]	600	-	700	6	-	190HB	Strengths minimum	(Aluisse)

Perunal 249 Aluisse (Switzerland) Wrought

No composition: - **Density** (kg.m⁻³) 2840

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: AA7049A; European (CEN): EN573 AW-7049A (ISO): AlZn8MgCu; Germany: (AlZn8MgCu1.5); UK: 7049A; Proprietary: Aluisse Perunal 249

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F61 (T6) [Extrusion up to 50mm]	530	-	610	5	-	150HB	Strengths minimum	(Aluisse)

Pure Aluminium 99.0 Aluisse (Switzerland) Wrought

No composition: - **Density** (kg.m⁻³) 2710

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA1200, UNS A91200; European (CEN): EN573; AW-1200; AW-AI99.0 (ISO): AI99.0; Austria: AI99; Canada: 990; France: A4; 1200;

Germany: AI99; Wk.3.0205; Italy: 9001/1; 3567-66; FA60-1200; P-ALP 99.0; Japan: A1200; A1X3; A1200P; Russia (CIS): GOST A0; Spain: L-3001; Sweden: 14,4010;

Switzerland: AI99; 10842; UK: 1200; BS 1C; BS 6L16, 6L17, 4L34; Proprietary: Aluisse Pure Aluminium 99.0; Menziken code 1100

Pure Aluminium 99.5 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.25, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.07, Ni 0.05, Ti 0.05, Cr 0.05, Others: Each 0.03, Aluminium rem. **Density** (kg.m⁻³) 2710

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar

Similar/Equivalent alloys: USA: AA1050A; European (CEN): EN573 AW-1050A (ISO: AI99.5; France: A5; Germany: Wk. 3.0255 (AI99.5); Italy: 9001/2; 4507; P-ALP 99.5; Japan: A1050; Spain: L-3051; Sweden: 4007; Switzerland: AI99.5; UK: BS1470:1050A; BS 1B; BS 5L36; G1B; Others: (CZ) CSN 42 4004, 42 4005; Proprietary: Alusingen Alloy No. 134; Alusuisse Pure Aluminium 99.5

Comments: Chemical, pharmaceutical and food industry. Electrical, signs, plates cans, etc. **Corrosion resistance:** Excellent **Weldability:** Excellent **Finishing:** Polishing and anodizing

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
O/H111 [Sheet 0.2 - 50mm]	20	-	65	2	69		Minimum	(Alusuisse)
H18 [Sheet 0.5 - 3mm]	120	-	140	2	69		Minimum	(Alusuisse)
H22 [Sheet 0.5 - 12.5mm]	55	-	85	5	69		Minimum	(Alusuisse)
H24 [Sheet 0.5 - 12.5mm]	75	-	105	4	69		Minimum	(Alusuisse)
H26 [Sheet 0.5 - 4mm]	90	-	120	3	69		Minimum	(Alusuisse)

Pure Aluminium 99.5 E Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.25, Fe 0.4, Cu 0.02, Mg 0.05, Mn 0.015, Zn 0.05, Ni 0.05, Ti 0.02, Cr 0.015, Ti+Cr+V <0.03, Mn+Ti+V <0.03, Mn+Cr+V <0.03, Others: Each 0.03, Aluminium rem. **Density** (kg.m⁻³) 2710

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA1350, UNS A91350; European (CEN): EN573 AW-EAL99.5 (A), AW-1350 (ISO: E-AI99.5; Austria: E0AI; France: A 5L, A 5B; Germany: AI99.5; E-AI, E-AI995; Wk.3.0255; Italy: 9001/5; Spain: AI99.5E; Sweden: 14,4022; UK: 1350; BS 1E; G1E; Proprietary: Alusuisse Pure Aluminium 99.5 E

Comments: Chemical, pharmaceutical and food industry. Electrical, signs, plates cans, etc. **Corrosion resistance:** Excellent **Weldability:** Excellent

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Alusuisse 01/02 [Sheet 8 - 150mm]	55	-	95	20	69		Maximum	(Alusuisse)
Alusuisse 18 [Sheet 1 - 2mm]	140	-	160	3	69		Minimum	(Alusuisse)
Alusuisse 22 [Sheet 1 - 6mm]	60	-	90	9	69		Minimum	(Alusuisse)
Alusuisse 24 [Sheet 1 - 6mm]	80	-	100	7	69		Minimum	(Alusuisse)
Alusuisse 26 [Sheet 1 - 3mm]	110	-	130	4	69		Minimum	(Alusuisse)
Alusuisse 95 [Sheet 8 - 100mm]	20	-	65	20	69		Minimum	(Alusuisse)

Pure Aluminium 99.8 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.15, Fe 0.15, Cu 0.03, Mg 0.02, Mn 0.02, Zn 0.06, Ti 0.02, Others: Each 0.02 Total 0.2, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA1080A; European (CEN): EN573 AW-1080A (ISO: AI99.8(A); France: A8; Germany: AI99.7, AI99.8; Wk.3.0275, 3.0285; Italy: 4509; 9001/4; P-ALP 99.8; Japan: A1080; Spain: L-3081; Sweden: 4004; Switzerland: AI99.8; UK: BS1470:1080A; BS 1A; Others: AI99.8; Proprietary: Alusingen Alloy No. 111; Alusuisse Pure Aluminium 99.8

Pure Aluminium 99.85 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.1, Fe 0.1, Cu 0.02, Mg 0.05, Mn 0.02, Zn 0.05, Ti 0.02, Others: Each 0.01 Total 0.15, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA1085; European (CEN): EN573 AW-1085; France: A85; Proprietary: Alusingen Alloy No. 184; Alusuisse Pure Aluminium 99.85

Pure Aluminium 99.9 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.06, Fe 0.05, Cu 0.01, Mg 0.01, Mn 0.01, Zn 0.04, Ti 0.025, Others: Each 0.01 Total 0.1, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: USA: AA1090; European (CEN): EN573 AW-1090; France: A9; Germany: Wk. 3.0305 (AI99.9); Others: AI99.9; Proprietary: Alusingen Alloy No. 119; Alusuisse Pure Aluminium 99.9

R-2000 Reynolds (USA) Wrought

No composition: -

Identified Product forms: Plate

Similar/Equivalent alloys: USA: AA6061, UNS A96061, AMS 4025D, 4026D, 4027E, 4043, 4053, 4079, 4080E, 4081A, 4082E, 4083D, 4115, 4116A, 4117A, 4127B, 4146, 4150C, 4160, 4161; European (CEN): EN573 AW-6061; AW-AIMg1SiCu (ISO: AIMg1SiCu; Canada: GS11N; France: A-GSUC; 6061; AIR 9048-660; Germany: AIMgSi1Cu; AIMgSiCu; Wk.3.3211; LW3.3214; Italy: 9006/2; 6170-68; FA60-6061; Japan: A6061P; Spain: L-3420; UK: 6061; BS H20; BS L117, L118; Others: USA-WW-T-700/6; Eur. aerospace P-6061

Comments: Tooling plate. See: AA6061

Reflectal-050 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.01, Mg 0.35-0.6, Zn 0.01, Fe+Ti 0.008, Others: Each 0.003 Total 0.02, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: Others: AIRMg0.5; Proprietary: Alusingen Alloy No. 281; Alusuisse Reflectal-050

Reflectal-100 Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.01, Mg 0.8-1.1, Zn 0.01, Fe+Ti 0.008, Others: Each 0.003 Total 0.02, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: Others: AIRMg1; Proprietary: Alusingen Alloy No. 282; Alusuisse Reflectal-100

Relital Alusuisse (Switzerland) Wrought

Proprietary composition: Si 0.05, Fe 0.03, Mg 0.01, Zn 0.02, Ti 0.025, Others: Each 0.02 Total 0.15, Aluminium rem.

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: Proprietary: Alusingen Alloy No. 183; Alusuisse Relital

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Remiral-050	Alusuisse (Switzerland)	Wrought						
Proprietary composition: Si 0.06, Fe 0.04, Mg 0.35-0.6, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.9Mg0.5; <i>Proprietary:</i> Alusingen Alloy No. 285; Alusuisse Remiral-050								
Remiral-100	Alusuisse (Switzerland)	Wrought						
Proprietary composition: Si 0.06, Fe 0.04, Mg 0.8-1.1, Mn 0.03, Zn 0.04, Ti 0.01, Others: Each 0.01 Total 0.1, Aluminium rem. Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>Others:</i> Al99.9Mg1; <i>Proprietary:</i> Alusingen Alloy No. 286; Alusuisse Remiral-100								
Reynobond	Reynolds (USA)	Wrought						
No composition: - Comments: Aluminium composite material consisting of a thermoplastic core laminated between aluminium skins. Customised with different alloy skins and various cores. Offers high stiffness:weight ratio; weight savings of ~40% compared with solid aluminium products. Good sound & vibration damping, fatigue resistance. Formable and paintable. Intended applications: automotive, truck and trailers (floorpans, decklids, trailer sidewalls).								
Supral 100	Superform Metals (UK)	Wrought						
Proprietary composition: Si 0.2, Fe 0.2, Cu 5.5-6.5, Mg 0.5, Mn 0.1, Zn 0.1, Ti 0.05, Zr 0.3-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2840 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA2004; <i>Proprietary:</i> Superform Supral 100 Comments: Medium strength, heat-treatable alloy processed to give excellent superplastic forming (SPF) properties. Properties similar to 2014 after suitable heat-treatment. Corrosion resistance: As per Al-Cu alloys; improved by cladding. Weldability: Successful (TIG, with 4043 filler). Finishing: Anodic films, chromated, paint, powder-coat, nylon								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	130	-	220	12	-	-	Typical	(Superform Metals)
T6 [-]	300	-	420	9	-	-	Typical	(Superform Metals)
Supral 150	Superform Metals (UK)	Wrought						
Proprietary composition: Si 0.2, Fe 0.2, Cu 5.5-6.5, Mg 0.5, Mn 0.1, Zn 0.1, Ti 0.05, Zr 0.3-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2770 Identified Product forms: Sheet/strip Similar/Equivalent alloys: <i>USA:</i> AA2004; <i>Proprietary:</i> Superform Supral 150 Comments: Clad version of Supral 100. Cladding composition: Al 99.7, Si 0.20 max., Fe 0.20 max., Cu 0.07 max., Others: each 0.05, total 0.15. Corrosion resistance: As for 99.8%Al Weldability: Successful (TIG, with 4043 filler). Finishing: Anodic films, chromated, paint, powder-coat, nylon								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	120	-	195	9	-	-	Typical	(Superform Metals)
T6 [-]	270	-	390	9	-	-	Typical	(Superform Metals)
Titanal	AMAG (Germany)	Wrought						
No composition: - Comments: Very high strength.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Strip/sheet <2mm]	600	-	630	10	-	174HB	Minimum	(AMAG)
T6 [Strip/sheet >2mm]	570	-	620	8	-	170HB	Minimum	(AMAG)
Tread-Brite	Reynolds (USA)	Wrought						
No composition: - Identified Product forms: Sheet/strip, Plate Similar/Equivalent alloys: <i>USA:</i> AA3003, UNS A93003, SAE 29; <i>European (CEN):</i> EN573 AW-3003 (<i>ISO:</i> AlMn1Cu; <i>Canada:</i> MC10; <i>France:</i> A-M1; 3003; AlMn1Cu; <i>Germany:</i> AlMnCu; AlMn1Cu; AlMn; Wk.3.0515; DIN 3.0517; <i>Italy:</i> 7788; 9003/1; <i>Japan:</i> A3003; <i>Switzerland:</i> AlMn; <i>UK:</i> NS3; 3103; <i>Others:</i> (CZ) CSN 42 4432 Comments: Diamond pattern, tread-plate for vehicles, body trim, etc. See: AA3003								
Unidal	Alusuisse (Switzerland)	Wrought						
No composition: - Density (kg.m ⁻³) 2700 Identified Product forms: Plate Similar/Equivalent alloys: <i>USA:</i> AA(7019); <i>European (CEN):</i> (EN573 AW-7019); <i>Germany:</i> AlZn4Mg2; <i>Proprietary:</i> Alusuisse Unidal Comments: Precision plates - milled on both sides. Precision engineering components. Corrosion resistance: Good Machinability: Very good Finishing: Anodisable								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate]	375	-	435	8	70	125HB	Typical (EI min.)	(Alusuisse)

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Unidur 091	Alusuisse (Switzerland)	Wrought
<p>No composition: - Density (kg.m⁻³) 2770 Identified Product forms: Extrusion Similar/Equivalent alloys: <u>USA:</u> AA7027; <u>Germany:</u> (AlZn4Mg0.8); <u>Proprietary:</u> Alusuisse Unidur 091</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u> <u>Notes</u>	<u>(Source)</u>
F31 (T5) [Extrusion 2 - 8mm]	260 - 310 10 70 95HB Strengths minimum	(Alusuisse)
Unidur 102	Alusuisse (Switzerland)	Wrought
<p>Proprietary composition: Si 0.35, Fe 0.4, Cu 0.2, Mg 1-1.4, Mn 0.05-0.5, Zn 4-5, Ni 0.05, Ti 0.2, Cr 0.1-0.35, Zr 0.08-0.2, Ti+Zr 0.25 max., Others: Each 0.05, Aluminium rem. Density (kg.m⁻³) 2770 Identified Product forms: Plate, Sheet/strip Similar/Equivalent alloys: <u>USA:</u> AA7020, SAE 214; <u>European (CEN):</u> EN573 AW-7020; AW-AlZn4.5Mg1 (<u>ISO:</u> AlZn4.5Mg1; <u>France:</u> A-Z5G; 7020; AIR 9048-670; <u>Germany:</u> AlZn4.5Mg1; 3.4335; <u>Italy:</u> 9007/1; 7791; P-AlZn4.5Mg; <u>Japan:</u> A7020; <u>Spain:</u> L-3741; <u>Sweden:</u> 14.4425; <u>Switzerland:</u> AlZn4.5Mg1; <u>UK:</u> 7020; BS H17; <u>Others:</u> (CZ) CSN 42 4441; Eur. aerospace P-7020; <u>Proprietary:</u> Alusuisse Unidur 102</p>		
<p>Comments: High strength, easy to weld. Tends to exfoliation and stress corrosion in unsuitable tempers. Highly stressed welded structures: bridges, cranes, etc. Corrosion resistance: Medium Weldability: Very good Machinability: Very good Finishing: Anodisable</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u> <u>Notes</u>	<u>(Source)</u>
F35 (T5) [Extrusion 3 - 30mm]	290 - 350 10 71 105HB Strengths minimum	(Alusuisse)
O [Sheet 0.4 - 12.5mm]	140 - 220 12 71 Maximum (EI min.)	(Alusuisse)
T4 [Sheet 0.4 - 12.5mm]	210 - 320 11 71 Minimum	(Alusuisse)
T6 [Sheet 0.4 - 6mm]	280 - 350 7 71 Minimum	(Alusuisse)
T651 [Sheet 100 - 175mm]	260 - 330 6 71 Minimum	(Alusuisse)
T651 [Sheet 40 - 100mm]	270 - 340 8 71 Minimum	(Alusuisse)
T651 [Sheet 6 - 40mm]	280 - 350 9 71 Minimum	(Alusuisse)
Unidur 120	Alusuisse (Switzerland)	Wrought
<p>No composition: - Density (kg.m⁻³) 2770 Identified Product forms: Extrusion Similar/Equivalent alloys: <u>USA:</u> AA7018; <u>Germany:</u> (AlZn5Mg1.5); <u>Proprietary:</u> Alusuisse Unidur 120</p>		
<u>Condition [Form]</u>	<u>PS (MPa)</u> <u>YS (MPa)</u> <u>UTS (MPa)</u> <u>EI (%)</u> <u>E (GPa)</u> <u>Hardness</u> <u>Notes</u>	<u>(Source)</u>
F41 (T5) [Extrusion 3 - 50mm]	350 - 410 8 70 120HB Strengths minimum	(Alusuisse)
Weldalite 049	Reynolds (USA)	Wrought
<p>No composition: - Identified Product forms: Plate Similar/Equivalent alloys: <u>USA:</u> AA2095; <u>Proprietary:</u> Weldalite 049 Comments: Aluminium-Lithium alloy: See: AA2095. Combination of high strength, fracture toughness and corrosion resistance that exceeds many conventional alloys. Low density and weldable. Applications: aircraft, aerospace, cryogenic tanks and vessels. Weldalite is a registered trademark of Martin Marietta Corp.</p>		
X2096	AA (USA)	Wrought
<p>Official composition: Si 0.12, Fe 0.15, Cu 2.3-3, Mg 0.25-0.89, Mn 0.25, Zn 0.25, Ti 0.1, Li 1.3-1.9, Zr 0.04-0.18, Ag 0.25-0.6, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m⁻³) 2630</p>		
X2119	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X2316	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X3030	AA (USA)	Wrought
<p>Official composition: Si 0.15, Fe 0.35, Cu 0.1, Mg 0.05, Mn 0.1-0.7, Zn 0.05-0.5, Ti 0.05-0.35, Cr 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)</p>		
X4003	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X4005	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X5002	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X5012	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		
X5015	AA (USA)	Wrought
<p>No composition: - Comments: Listed by AA as Inactive.</p>		

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X5020	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5055	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5058	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5080	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5084	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5090	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5153	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5184	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X5452	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X6030	AA (USA)	Wrought
Official composition: Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mg 0.8-1.2, Mn 0.15, Zn 0.25, Ti 0.15, Cr 0.04-0.35, Sn 0.05-0.5, Indium 0.05-0.5, Others: Each 0.05 Total 0.15, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (06/94)		
X6064	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X6067	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X6161	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X6163	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X6251	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7006	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7007	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7038	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		

Aluminium Alloys (wrought) 231

X7040	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7046	AMMCO (USA)	Wrought
No composition: - Comments: See AA 7046.		
X7080	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7106	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7272	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7275	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X7279	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X8002	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X8003	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X8090A	AA (USA)	Wrought
No composition: - Similar/Equivalent alloys: <u>USA</u> : AA8090AX; <u>Proprietary</u> : Alcoa ALITHALITE X8090A Comments: Listed by AA as Inactive.		
X8092	AA (USA)	Wrought
No composition: - Similar/Equivalent alloys: <u>USA</u> : AA8092X; <u>Proprietary</u> : Alcoa ALITHALITE X8092 Comments: Listed by AA as Inactive.		
X8192	AA (USA)	Wrought
No composition: - Similar/Equivalent alloys: <u>USA</u> : AA8192X; <u>Proprietary</u> : Alcoa ALITHALITE X8192 Comments: Listed by AA as Inactive.		
X8380	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		
X8480	AA (USA)	Wrought
No composition: - Comments: Listed by AA as Inactive.		

Aluminium Alloys (Cast)

2L99	BS (UK)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, (Mg 0.20-0.45, Fe 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
100.1	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.6-0.8, Cu 0.1, Zn 0.05, Mn+Cr+Ti+V 0.025, Others: Each 0.03 Total 0.1, Aluminium 99 min.		
Identified Product forms: Ingot		
130.1	AA (USA)	Cast
Official composition: Cu 0.1, Zn 0.05, Fe:Si ratio 2.5 min, Mn+Cr+Ti+V 0.025, Others: Each 0.03 Total 0.1, Aluminium 99.3 min.		
Identified Product forms: Ingot		
150.1	AA (USA)	Cast
Official composition: Cu 0.05, Zn 0.05, Fe:Si ratio 2.0 min, Mn+Cr+Ti+V 0.025, Others: Each 0.03 Total 0.1, Aluminium 99.5 min.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA150.1; <i>France:</i> A5; <i>UK:</i> LM0; <i>Proprietary:</i> VAW Veral 99.5		
160.1	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.25, Zn 0.05, Fe:Si ratio 2.0 min, Mn+Cr+Ti+V 0.025, Others: Each 0.03 Total 0.1, Aluminium 99.6 min.		
Identified Product forms: Ingot		
170.1	AA (USA)	Cast
Official composition: Zn 0.05, Fe:Si ratio 1.5 min, Mn+Cr+Ti+V 0.025, Others: Each 0.03 Total 0.1, Aluminium 99.7 min.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA170.1; <i>France:</i> A7; <i>UK:</i> LM0; <i>Proprietary:</i> VAW Veral 99.7		
201.1	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.15, Cu 4.5-5.2, Mg 0.15-0.55, Mn 0.2-0.5, Ti 0.15-0.35, Ag 0.4-1, Others: Each 0.05 Total 0.1, Aluminium rem.		
Identified Product forms: Sand cast		
201.2	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.1, Cu 4.5-5.2, Mg 0.2-0.55, Mn 0.2-0.5, Ti 0.15-0.35, Ag 0.4-1, Others: Each 0.05 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
202.0	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1988. Listed by AA as Inactive.		
202.2	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1988. Listed by AA as Inactive.		
203.0	AA (USA)	Cast
Official composition: Si 0.3, Fe 0.5, Cu 4.5-5.5, Mg 0.1, Mn 0.2-0.3, Zn 0.1, Ni 1.3-1.7, Ti 0.15-0.25, Co 0.2-0.3, Zr 0.1-0.3, Ti+Zr 0.5, Sb 0.2-0.3, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <i>USA:</i> AA203.0 (Old AA - Hiduminium 350); <i>Proprietary:</i> Hiduminium 350		
203.2	AA (USA)	Cast
Official composition: Si 0.2, Fe 0.35, Cu 4.8-5.2, Mg 0.1, Mn 0.2-0.3, Zn 0.1, Ni 1.3-1.7, Ti 0.15-0.25, Co 0.2-0.3, Zr 0.1-0.3, Ti+Zr 0.5, Sb 0.2-0.3, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA203.2 (Old AA - Hiduminium 350); <i>Proprietary:</i> Hiduminium 350		

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204.0	AA (USA)	Cast														
Official composition: Si 0.2, Fe 0.35, Cu 4.2-5, Mg 0.15-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.15-0.3, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA204.0 (Old AA - A-U5GT); <u>France:</u> A-U5GT; <u>Proprietary:</u> A-U5GT																
204.2	AA (USA)	Cast														
Official composition: Si 0.15, Fe 0.1-0.2, Cu 4.2-4.9, Mg 0.2-0.35, Mn 0.05, Zn 0.05, Ni 0.03, Ti 0.15-0.25, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA204.2 (Old AA - A-U5GT); <u>European (ISO):</u> AlCu4MgTi; <u>France:</u> A-U5GT; <u>Germany:</u> G-AlCu4TiMg; 3.1371; 3.1372; <u>Switzerland:</u> G-AlCu5MgTi; <u>UK:</u> LM5; <u>Proprietary:</u> A-U5GT; VAW Veral Cu4TiMg																
206.0	AA (USA)	Cast														
Official composition: Si 0.1, Fe 0.15, Cu 4.2-5, Mg 0.15-0.35, Mn 0.2-0.5, Zn 0.1, Ni 0.05, Ti 0.15-0.3, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast																
206.2	AA (USA)	Cast														
Official composition: Si 0.1, Fe 0.1, Cu 4.2-5, Mg 0.2-0.35, Mn 0.2-0.5, Zn 0.05, Ni 0.03, Ti 0.15-0.25, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot																
208.0	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
208.1	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
208.2	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
213.0	AA (USA)	Cast														
No composition: - Identified Product forms: Permanent mould cast Comments: Reclassified in 1995. Listed by AA as Inactive.																
<table border="1"> <thead> <tr> <th>Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)E (GPa)</th> <th>Hardness</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>T533 [Permanent Mould Cast]</td> <td>-</td> <td>186</td> <td>228</td> <td>0.5</td> <td>-</td> <td>(Source) (#1)</td> </tr> </tbody> </table>		Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	T533 [Permanent Mould Cast]	-	186	228	0.5	-	(Source) (#1)	
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes										
T533 [Permanent Mould Cast]	-	186	228	0.5	-	(Source) (#1)										
213.1	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
222.0	AA (USA)	Cast														
No composition: - Identified Product forms: Permanent mould cast Comments: Reclassified in 1995. Listed by AA as Inactive.																
<table border="1"> <thead> <tr> <th>Condition [Form]</th> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)E (GPa)</th> <th>Hardness</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>T52 [-]</td> <td>-</td> <td>214</td> <td>241</td> <td>1</td> <td>-</td> <td>(Source) (#1)</td> </tr> </tbody> </table>		Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	T52 [-]	-	214	241	1	-	(Source) (#1)	
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes										
T52 [-]	-	214	241	1	-	(Source) (#1)										
222.1	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
224.0	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1988. Listed by AA as Inactive.																
224.2	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1988. Listed by AA as Inactive.																
238.0	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1988. Listed by AA as Inactive.																
238.1	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																
238.2	AA (USA)	Cast														
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.																

240.0	AA (USA)	Cast					
Official composition: Si 0.5, Fe 0.5, Cu 7-9, Mg 5.5-6.5, Mn 0.3-0.7, Zn 0.1, Ni 0.3-0.7, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA240.0 (Old AA - A240.0, A140)							
240.1	AA (USA)	Cast					
Official composition: Si 0.5, Fe 0.4, Cu 7-9, Mg 5.6-6.5, Mn 0.3-0.7, Zn 0.1, Ni 0.3-0.7, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA240.1 (Old AA - A240.1, A140)							
242.0	AA (USA)	Cast					
Official composition: Si 0.7, Fe 1, Cu 3.5-4.5, Mg 1.2-1.8, Mn 0.35, Zn 0.35, Ni 1.7-2.3, Ti 0.25, Cr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA242.0 (Old AA - 142)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T61 [-]	-	221	255	0.5	-		(#1)
242.1	AA (USA)	Cast					
Official composition: Si 0.7, Fe 0.8, Cu 3.5-4.5, Mg 1.3-1.8, Mn 0.35, Zn 0.35, Ni 1.7-2.3, Ti 0.25, Cr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA242.1 (Old AA - 142)							
242.2	AA (USA)	Cast					
Official composition: Si 0.6, Fe 0.6, Cu 3.5-4.5, Mg 1.3-1.8, Mn 0.1, Zn 0.1, Ni 1.7-2.3, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA242.2 (Old AA - 142)							
243.0	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1988. Listed by AA as Inactive.							
243.1	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1988. Listed by AA as Inactive.							
249.0	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.							
249.2	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.							
295.0	AA (USA)	Cast					
Official composition: Si 0.7-1.5, Fe 1, Cu 4-5, Mg 0.03, Mn 0.35, Zn 0.35, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA295.0 (Old AA - 195, B295.0), UNS A02950; <u>France:</u> A-USG7; <u>Germany:</u> AlCu4TiMg; Wk.3.1371; <u>UK:</u> LM 11; BS L154, L155							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T61 [-]	-	193	262	4	-		(#1)
295.1	AA (USA)	Cast					
Official composition: Si 0.7-1.5, Fe 0.8, Cu 4-5, Mg 0.03, Mn 0.35, Zn 0.35, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA295.1 (Old AA - 195)							
295.2	AA (USA)	Cast					
Official composition: Si 0.7-1.2, Fe 0.8, Cu 4-5, Mg 0.03, Mn 0.3, Zn 0.3, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA295.2 (Old AA - 195)							
296.0	AA (USA)	Cast					
Official composition: Si 2-3, Fe 1.2, Cu 4-5, Mg 0.05, Mn 0.35, Zn 0.5, Ni 0.35, Ti 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA296.0 (Old AA - B295.0, B195)							
296.1	AA (USA)	Cast					
Official composition: Si 2-3, Fe 0.9, Cu 4-5, Mg 0.05, Mn 0.35, Zn 0.5, Ni 0.35, Ti 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA296.1 (Old AA - B295.1, B195)							

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296.2	AA (USA)	Cast
Official composition: Si 2-3, Fe 0.8, Cu 4-5, Mg 0.03, Mn 0.3, Zn 0.3, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA296.2 (Old AA - B295.2, B195)		
301.0	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.8-1.5, Cu 3-3.5, Mg 0.25-0.5, Mn 0.5-0.8, Zn 0.05, Ni 1-1.5, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (01/89)		
301.1	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.8-1.2, Cu 3-3.5, Mg 0.3-0.5, Mn 0.5-0.8, Zn 0.05, Ni 1-1.5, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89). Primarily used for making metal-matrix composites.		
302.0	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.25, Cu 2.8-3.2, Mg 0.7-1.2, Zn 0.05, Ni 1-1.5, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (01/89)		
302.1	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.2, Cu 2.8-3.2, Mg 0.8-1.2, Zn 0.05, Ni 1-1.5, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89). Primarily used for making metal-matrix composites.		
303.0	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.8-1.5, Cu 0.2, Mg 0.45-0.7, Mn 0.5-0.8, Zn 0.05, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (01/89)		
303.1	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.8-1.2, Cu 0.2, Mg 0.5-0.7, Mn 0.5-0.8, Zn 0.05, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89). Primarily used for making metal-matrix composites.		
305.0	AA (USA)	Cast
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.		
305.2	AA (USA)	Cast
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.		
308.0	AA (USA)	Cast
Official composition: Si 5-6, Fe 1, Cu 4-5, Mg 0.1, Mn 0.5, Zn 1, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA308.0 (Old AA - A108)		
308.1	AA (USA)	Cast
Official composition: Si 5-6, Fe 0.8, Cu 4-5, Mg 0.1, Mn 0.5, Zn 1, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA308.1 (Old AA - A180)		
308.2	AA (USA)	Cast
Official composition: Si 5-6, Fe 0.8, Cu 4-5, Mg 0.1, Mn 0.3, Zn 0.5, Ti 0.2, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA308.2 (Old AA - A180)		
318.0	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 1, Cu 3-4, Mg 0.1-0.6, Mn 0.5, Zn 1, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Comments: Designation added to AA (USA) register since previous issue (01/89)		
318.1	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 0.8, Cu 3-4, Mg 0.15-0.6, Mn 0.5, Zn 0.9, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89)		

319.0	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 1, Cu 3-4, Mg 0.1, Mn 0.5, Zn 1, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA319.0 (Old AA - 319, A319.0, All Cast); <u>European (ISO):</u> Al-Si5Cu3; <u>France:</u> A-S5U, A-S5U3; <u>Germany:</u> AlSi6Cu4; Wk.3.2151; <u>UK:</u> LM4, LM22		
Condition [Form]	PS (MPa)	YS (MPa)
O (T21) [-]	-	90
T61 [-]	-	241
T71 [-]	-	234
	UTS (MPa)	EI (%)E (GPa)
	152	2
	262	0.5
	255	1
	Hardness	Notes
		(Source)
		(#1)
		(#1)
		(#1)
319.1	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 0.8, Cu 3-4, Mg 0.1, Mn 0.5, Zn 1, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA319.1 (Old AA - 319, All Cast)		
319.2	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 0.6, Cu 3-4, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA319.2 (Old AA - 319, All Cast)		
320.0	AA (USA)	Cast
Official composition: Si 5-8, Fe 1.2, Cu 2-4, Mg 0.05-0.6, Mn 0.8, Zn 3, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
320.1	AA (USA)	Cast
Official composition: Si 5-8, Fe 0.9, Cu 2-4, Mg 0.1-0.6, Mn 0.8, Zn 3, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
324.0	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
324.1	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
324.2	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
328.0	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
328.1	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
332.0	AA (USA)	Cast
Official composition: Si 8.5-10.5, Fe 1.2, Cu 2-4, Mg 0.5-1.5, Mn 0.5, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA332.0 (Old AA - F332.0, F132)		
332.1	AA (USA)	Cast
Official composition: Si 8.5-10.5, Fe 0.9, Cu 2-4, Mg 0.6-1.5, Mn 0.5, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA332.1 (Old AA - F332.1, F132)		
332.2	AA (USA)	Cast
Official composition: Si 8.5-10, Fe 0.6, Cu 2-4, Mg 0.9-1.3, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA332.2 (Old AA - F332.2, F132)		
333.0	AA (USA)	Cast
Official composition: Si 8-10, Fe 1, Cu 3-4, Mg 0.05-0.5, Mn 0.5, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA333.0 (Old AA - 333, A333.0), UNS A03330; <u>European (ISO):</u> Al-Si8Cu3Fe; <u>France:</u> A-S9U3Y4, A-S10U4; <u>Germany:</u> AlSi8Cu3; Wk.3.2161; <u>UK:</u> LM24		
Condition [Form]	PS (MPa)	YS (MPa)
T61 [-]	-	276
	UTS (MPa)	EI (%)E (GPa)
	317	1
	Hardness	Notes
		(Source)
		(#1)

238 Aluminium Alloys (cast)

333.1	AA (USA)	Cast					
Official composition: Si 8-10, Fe 0.8, Cu 3-4, Mg 0.1-0.5, Mn 0.5, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA333.1 (Old AA - 333); <u>France:</u> A-S9U3; <u>Germany:</u> GD-AISI9Cu3, 3.2163, 3.2165; <u>Italy:</u> 5075-79; <u>Japan:</u> C4BS; <u>Switzerland:</u> G-AISI8Cu3; <u>UK:</u> LM24; <u>Proprietary:</u> VAW Veral 226A							
336.0	AA (USA)	Cast					
Official composition: Si 11-13, Fe 1.2, Cu 0.5-1.5, Mg 0.7-1.3, Mn 0.35, Zn 0.35, Ni 2-3, Ti 0.25, Others: Each 0.05, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA336.0 (Old AA - A332.0, A132)							
336.1	AA (USA)	Cast					
Official composition: Si 11-13, Fe 0.9, Cu 0.5-1.5, Mg 0.8-1.3, Mn 0.35, Zn 0.35, Ni 2-3, Ti 0.25, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA336.1 (Old AA - A332.1, A132); <u>France:</u> A-S11UNG; <u>Italy:</u> 6250-68; <u>Japan:</u> C8AS; <u>UK:</u> LM13; <u>Proprietary:</u> VAW Veral Si12CuNiMg							
336.2	AA (USA)	Cast					
Official composition: Si 11-13, Fe 0.9, Cu 0.5-1.5, Mg 0.9-1.3, Mn 0.1, Zn 0.1, Ni 2-3, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA336.2 (Old AA - A332.2, A132); <u>France:</u> A-S11UNG; <u>Italy:</u> 6250-68; <u>Japan:</u> C8AV; <u>UK:</u> LM13; <u>Proprietary:</u> VAW Veral Si12CuNiMg(H)							
339.0	AA (USA)	Cast					
Official composition: Si 11-13, Fe 1.2, Cu 1.5-3, Mg 0.5-1.5, Mn 0.5, Zn 1, Ni 0.5-1.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA339.0 (Old AA - Z332.0, Z132)							
339.1	AA (USA)	Cast					
Official composition: Si 11-13, Fe 0.9, Cu 1.5-3, Mg 0.6-1.5, Mn 0.5, Zn 1, Ni 0.5-1.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA339.1 (Old AA - Z332.1, Z132)							
343.0	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.							
343.1	AA (USA)	Cast					
No composition: - Comments: Reclassified in 1995. Listed by AA as Inactive.							
354.0	AA (USA)	Cast					
Official composition: Si 8.6-9.4, Fe 0.2, Cu 1.6-2, Mg 0.4-0.6, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA354.0 (Old AA - 354), MIL -A-21180							
354.1	AA (USA)	Cast					
Official composition: Si 8.6-9.4, Fe 0.15, Cu 1.6-2, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA354.1 (Old AA - 354)							
355.0	AA (USA)	Cast					
Official composition: Si 4.5-5.5, Fe 0.6, Cu 1-1.5, Mg 0.4-0.6, Mn 0.5, Zn 0.35, Ti 0.25, Cr 0.25, If Fe>0.45 then Mn not less than 0.5xFe, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA355.0 (Old AA - 355, C355.0), UNS A03550, AMS 4281; <u>European (ISO):</u> Al-Si5Cu1Mg; <u>France:</u> A-S4UG; <u>Germany:</u> Alloy No. 234; <u>UK:</u> LM16							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T59 [-]	-	131	172	1.5	-		(#1)
T61 [-]	-	241	269	1	-		(#1)
T72 [-]	-	165	207	2.5	-	Permanent mould cast	(#1)
T72 [-]	-	-	241	3.6	-	Sand cast	(#1)
355.1	AA (USA)	Cast					
Official composition: Si 4.5-5.5, Fe 0.5, Cu 1-1.5, Mg 0.45-0.6, Mn 0.5, Zn 0.35, Ti 0.25, Cr 0.25, If Fe>0.45 then Mn not less than 0.5xFe, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA355.1 (Old AA - 355)							
355.2	AA (USA)	Cast					
Official composition: Si 4.5-5.5, Fe 0.14-0.25, Cu 1-1.5, Mg 0.5-0.6, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA355.2 (Old AA - 355)							

356.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.6, Cu 0.25, Mg 0.2-0.45, Mn 0.35, Zn 0.35, Ti 0.25, If Fe>0.45 then Mn not less than 0.5xFe, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA356.0 (Old AA - 356, A356.0), UNS A03560, AMS 4284, 4217, 4260; <u>European (ISO):</u> Al-Si7Mg; <u>France:</u> A-S7G; <u>Germany:</u> AlSi7Mg; <u>Wk.3.2371;</u> <u>UK:</u> LM25; BS 2L99, L173, L174		
356.1	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.5, Cu 0.25, Mg 0.25-0.45, Mn 0.35, Zn 0.35, Ti 0.25, If Fe>0.45 then Mn not less than 0.5xFe, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA356.1 (Old AA - 356)		
356.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.13-0.25, Cu 0.1, Mg 0.3-0.45, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA356.2 (Old AA - 356)		
357.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.15, Cu 0.05, Mg 0.45-0.6, Mn 0.03, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA357.0 (Old AA - 357), UNS A03570; <u>France:</u> A-S7G; <u>Germany:</u> AlSi7Mg; <u>Wk.3.2371;</u> <u>UK:</u> BS L169		
357.1	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.12, Cu 0.05, Mg 0.45-0.6, Mn 0.03, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA357.1 (Old AA - 357)		
358.0	AA (USA)	Cast
Official composition: Si 7.6-8.6, Fe 0.3, Cu 0.2, Mg 0.4-0.6, Mn 0.2, Zn 0.2, Ti 0.1-0.2, Cr 0.2, Be 0.1-0.3, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA358.0 (Old AA - B358.0, Tens-50)		
358.2	AA (USA)	Cast
Official composition: Si 7.6-8.6, Fe 0.2, Cu 0.1, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ti 0.12-0.2, Cr 0.05, Be 0.15-0.3, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA358.2 (Old AA - B358.2, Tens-50)		
359.0	AA (USA)	Cast
Official composition: Si 8.5-9.5, Fe 0.2, Cu 0.2, Mg 0.5-0.7, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA359.0 (Old AA - 359), UNS A03590, MIL -A-21180		
359.2	AA (USA)	Cast
Official composition: Si 8.5-9.5, Fe 0.12, Cu 0.1, Mg 0.55-0.7, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA359.2 (Old AA - 359); <u>European (ISO):</u> AlSi10Mg; <u>France:</u> A-S10G; <u>Germany:</u> G-AlSi9Mg; 3.2373; 3.2333; <u>Italy:</u> 3051; <u>Japan:</u> C4AV; <u>Switzerland:</u> G-AlSi9Mg; <u>UK:</u> LM9; <u>Proprietary:</u> VAW Siluminal-Beta		
360.0	AA (USA)	Cast
Official composition: Si 9-10, Fe 2, Cu 0.6, Mg 0.4-0.6, Mn 0.35, Zn 0.5, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA360.0 (Old AA - 360)		
360.2	AA (USA)	Cast
Official composition: Si 9-10, Fe 0.7-1.1, Cu 0.1, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ni 0.1, Sn 0.1, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA360.2 (Old AA - 360); <u>France:</u> A-S9G; <u>Germany:</u> GD-AlSi10Mg, 3.2382, 3.2336; <u>Japan:</u> D3V; <u>Proprietary:</u> VAW Veral Si10Mg(D)		
361.0	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 1.1, Cu 0.5, Mg 0.4-0.6, Mn 0.25, Zn 0.5, Ni 0.2-0.3, Ti 0.2, Cr 0.2-0.3, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Die cast		
361.1	AA (USA)	Cast
Official composition: Si 9.5-10.5, Fe 0.8, Cu 0.5, Mg 0.45-0.6, Mn 0.25, Zn 0.4, Ni 0.2-0.3, Ti 0.2, Cr 0.2-0.3, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA361.1; <u>France:</u> A-S9G; <u>Germany:</u> G-AlSi10Mg(Cu), 3.2383, 3.2332; <u>Italy:</u> 5074-74; <u>Japan:</u> D3S; <u>Proprietary:</u> VAW Veral 233		
363.0	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 1.1, Cu 2.5-3.5, Mg 0.15-0.4, Zn 3-4.5, Ni 0.25, Ti 0.2, Pb 0.25, Sn 0.25, Mn+Cr 0.8, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA363.0 (Old AA - 363)		

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363.1	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.8, Cu 2.5-3.5, Mg 0.2-0.4, Zn 3-4.5, Ni 0.25, Ti 0.2, Pb 0.25, Sn 0.25, Mn+Cr 0.8, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA363.1 (Old AA - 363)		
364.0	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1.5, Cu 0.2, Mg 0.2-0.4, Mn 0.1, Zn 0.15, Ni 0.15, Cr 0.25-0.5, Sn 0.15, Be 0.02-0.04, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA364.0 (Old AA - 364)		
364.2	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 0.7-1.1, Cu 0.2, Mg 0.25-0.4, Mn 0.1, Zn 0.15, Ni 0.15, Cr 0.25-0.5, Sn 0.15, Be 0.02-0.04, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA364.2 (Old AA - 364)		
369.0	AA (USA)	Cast
Official composition: Si 11-12, Fe 1.3, Cu 0.5, Mg 0.25-0.45, Mn 0.35, Zn 1, Ni 0.05, Cr 0.3-0.4, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA369.0 (Old AA - Special K-9); <u>Proprietary:</u> Special K-9		
369.1	AA (USA)	Cast
Official composition: Si 11-12, Fe 1, Cu 0.5, Mg 0.3-0.45, Mn 0.35, Zn 0.9, Ni 0.05, Cr 0.3-0.4, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA369.1 (Old AA - Special K-9); <u>Germany:</u> G-AISI11; 3.2211; 3.2212; <u>Italy:</u> 3049; <u>Switzerland:</u> G-AISI13Mg; <u>UK:</u> LM9; <u>Proprietary:</u> Special K-9; VAW Siluman-Kappa		
380.0	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 2, Cu 3-4, Mg 0.1, Mn 0.5, Zn 3, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA380.0 (Old AA - 380, A380.0), UNS A03800; <u>European (ISO):</u> Al-Si8Cu3Fe; <u>France:</u> A-S9U3Y4, A-S10U4; <u>Germany:</u> AISi8Cu3; Wk.3.2161; <u>UK:</u> LM24		
380.2	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 0.7-1.1, Cu 3-4, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Sn 0.1, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA380.2 (Old AA - 380)		
383.0	AA (USA)	Cast
Official composition: Si 9.5-11.5, Fe 1.3, Cu 2-3, Mg 0.1, Mn 0.5, Zn 3, Ni 0.3, Sn 0.15, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Die cast		
383.1	AA (USA)	Cast
Official composition: Si 9.5-11.5, Fe 1, Cu 2-3, Mg 0.1, Mn 0.5, Zn 2.9, Ni 0.3, Sn 0.15, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
383.2	AA (USA)	Cast
Official composition: Si 9.5-11.5, Fe 0.6-1, Cu 2-3, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Sn 0.1, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
384.0	AA (USA)	Cast
Official composition: Si 10.5-12, Fe 1.3, Cu 3-4.5, Mg 0.1, Mn 0.5, Zn 3, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA384.0 (Old AA - 384)		
384.1	AA (USA)	Cast
Official composition: Si 10.5-12, Fe 1, Cu 3-4.5, Mg 0.1, Mn 0.5, Zn 2.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA384.1 (Old AA - 384)		
384.2	AA (USA)	Cast
Official composition: Si 10.5-12, Fe 0.6-1, Cu 3-4.5, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Sn 0.1, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA384.2 (Old AA - 384)		
385.0	AA (USA)	Cast
Official composition: Si 11-13, Fe 2, Cu 2-4, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.3, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA385.0 (Old AA - B384.0, 384)		

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385.1	AA (USA)	Cast
Official composition: Si 11-13, Fe 1.1, Cu 2-4, Mg 0.3, Mn 0.5, Zn 2.9, Ni 0.5, Sn 0.3, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA385.1 (Old AA - B384.1, 384)		
390.0	AA (USA)	Cast
Official composition: Si 16-18, Fe 1.3, Cu 4-5, Mg 0.45-0.65, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA390.0 (Old AA - 390) Comments: See AA documentation for method of expressing Mg content.		
390.2	AA (USA)	Cast
Official composition: Si 16-18, Fe 0.6-1, Cu 4-5, Mg 0.5-0.65, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA390.2 (Old AA - 390) Comments: See AA documentation for method of expressing Mg content.		
392.0	AA (USA)	Cast
Official composition: Si 18-20, Fe 1.5, Cu 0.4-0.8, Mg 0.8-1.2, Mn 0.2-0.6, Zn 0.5, Ni 0.5, Ti 0.2, Sn 0.3, Others: Each 0.15 Total 0.5, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA392.0 (Old AA - 392)		
392.2	AA (USA)	Cast
Official composition: Si 18-20, Fe 1.1, Cu 0.4-0.8, Mg 0.9-1.2, Mn 0.2-0.6, Zn 0.4, Ni 0.5, Ti 0.2, Sn 0.3, Others: Each 0.15 Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA392.2 (Old AA - 392)		
393.0	AA (USA)	Cast
Official composition: Si 21-23, Fe 1.3, Cu 0.7-1.1, Mg 0.7-1.3, Mn 0.1, Zn 0.1, Ni 2-2.5, Ti 0.1-0.2, V 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast, Die cast Similar/Equivalent alloys: <u>USA:</u> AA393.0 (Old AA - Vanasil); <u>Proprietary:</u> Vanasil		
393.1	AA (USA)	Cast
Official composition: Si 21-23, Fe 1, Cu 0.7-1.1, Mg 0.8-1.3, Mn 0.1, Zn 0.1, Ni 2-2.5, Ti 0.1-0.2, V 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA393.1 (Old AA - Vanasil); <u>Proprietary:</u> Vanasil		
393.2	AA (USA)	Cast
Official composition: Si 21-23, Fe 0.8, Cu 0.7-1.1, Mg 0.8-1.3, Mn 0.1, Zn 0.1, Ni 2-2.5, Ti 0.1-0.2, V 0.08-0.15, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA393.2 (Old AA - Vanasil); <u>France:</u> A-S18UNG; <u>Italy:</u> 6251-68; <u>UK:</u> LM28; <u>Proprietary:</u> Vanasil; VAW Veral Si18CuNiMg(H)		
408.2	AA (USA)	Cast
Official composition: Si 8.5-9.5, Fe 0.6-1.3, Cu 0.1, Mn 0.1, Zn 0.1, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Used to coat steel.		
409.2	AA (USA)	Cast
Official composition: Si 9-10, Fe 0.6-1.3, Cu 0.1, Mn 0.1, Zn 0.1, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA409.2; <u>France:</u> A-S9; <u>Germany:</u> GD-ALSi10(H); <u>Proprietary:</u> VAW Siluman-Delta Comments: Used to coat steel.		
411.2	AA (USA)	Cast
Official composition: Si 10-12, Fe 0.6-1.3, Cu 0.2, Mn 0.1, Zn 0.1, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Used to coat steel.		
413.0	AA (USA)	Cast
Official composition: Si 11-13, Fe 2, Cu 1, Mg 0.1, Mn 0.35, Zn 0.5, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA413.0 (Old AA - 13)		
413.1	AA (USA)	Cast
Official composition: Si 11-13, Fe 0.7-1.1, Cu 0.1, Mg 0.07, Mn 0.1, Zn 0.1, Ni 0.1, Sn 0.1, Others: Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA413.1 (Old AA - 13)		
420	Timminco (Canada)	Cast Wrought
Approximate composition: Others: Total 0.01, Aluminium rem. Identified Product forms: Extrusion, Ingot Comments: High purity alloy for cathodic protection & anodes in water with low pH & high dissolved salt content.		

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435.2	AA (USA)	Cast
Official composition: Si 3.3-3.9, Fe 0.4, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.1, Others: Each 0.05 Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Used with zinc to coat steel.		
443.0	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.8, Cu 0.6, Mg 0.05, Mn 0.5, Zn 0.5, Ti 0.25, Cr 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA443.0 (Old AA - 43)		
443.1	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.6, Cu 0.6, Mg 0.05, Mn 0.5, Zn 0.5, Ti 0.25, Cr 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA443.1 (Old AA - 43)		
443.2	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.6, Cu 0.1, Mg 0.05, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA443.2 (Old AA - 43)		
444.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.6, Cu 0.25, Mg 0.1, Mn 0.35, Zn 0.35, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast		
444.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.13-0.25, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot		
445.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.6-1.3, Cu 0.1, Mn 0.1, Zn 0.1, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA445.2 (Old AA - B444.2) Comments: Used to coat steel.		
511.0	AA (USA)	Cast
Official composition: Si 0.3-0.7, Fe 0.5, Cu 0.15, Mg 3.5-4.5, Mn 0.35, Zn 0.15, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA511.0 (Old AA - F514.0, F214)		
511.1	AA (USA)	Cast
Official composition: Si 0.3-0.7, Fe 0.4, Cu 0.15, Mg 3.6-4.5, Mn 0.35, Zn 0.15, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA511.1 (Old AA - F514.1, F214); <u>European (ISO):</u> AlMg3; <u>France:</u> A-G3T; <u>UK:</u> LM5; <u>Proprietary:</u> VAW Veral 241		
511.2	AA (USA)	Cast
Official composition: Si 0.3-0.7, Fe 0.3, Cu 0.1, Mg 3.6-4.5, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA511.2 (Old AA - F514.2, F214)		
512.0	AA (USA)	Cast
Official composition: Si 1.4-2.2, Fe 0.6, Cu 0.35, Mg 3.5-4.5, Mn 0.8, Zn 0.35, Ti 0.25, Cr 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA512.0 (Old AA - B514.0, B214)		
512.2	AA (USA)	Cast
Official composition: Si 1.4-2.2, Fe 0.3, Cu 0.1, Mg 3.6-4.5, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA512.2 (Old AA - B514.2, B214); <u>European (ISO):</u> AlMg3Si2; <u>Germany:</u> G-AlMg3Si; 3.3241; 3.3242; <u>Switzerland:</u> G-AlMg3Si1; <u>Proprietary:</u> VAW Veral MgSi3(H)		
513.0	AA (USA)	Cast
Official composition: Si 0.3, Fe 0.4, Cu 0.1, Mg 3.5-4.5, Mn 0.3, Zn 1.4-2.2, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA513.0 (Old AA - A514.0, A214)		
513.2	AA (USA)	Cast
Official composition: Si 0.3, Fe 0.3, Cu 0.1, Mg 3.6-4.5, Mn 0.1, Zn 1.4-2.2, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA513.2 (Old AA - A514.2, A214)		

514.0	AA (USA)	Cast
Official composition: Si 0.35, Fe 0.5, Cu 0.15, Mg 3.5-4.5, Mn 0.35, Zn 0.15, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <u>USA:</u> AA514.0 (Old AA - 214), UNS A05140; <u>European (ISO):</u> Al-Mg5Si1, Al-Mg6; <u>France:</u> A-G3T, A-G6; <u>Germany:</u> AlMg3, AlMg5; <u>UK:</u> LM5		
514.1	AA (USA)	Cast
Official composition: Si 0.35, Fe 0.4, Cu 0.15, Mg 3.6-4.5, Mn 0.35, Zn 0.15, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA514.1 (Old AA - 214)		
514.2	AA (USA)	Cast
Official composition: Si 0.3, Fe 0.3, Cu 0.1, Mg 3.6-4.5, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA514.2 (Old AA - 214); <u>European (ISO):</u> AlMg3; <u>France:</u> A-G3T; <u>Germany:</u> G-AlMg3; 3.3541; 3.3542; <u>Italy:</u> 3059; <u>Switzerland:</u> G-AlMg3Ti; <u>UK:</u> LM5; <u>Proprietary:</u> VAW Veral Mg3(H), Veral Mg3		
515.0	AA (USA)	Cast
Official composition: Si 0.5-1, Fe 1.3, Cu 0.2, Mg 2.5-4, Mn 0.4-0.6, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA515.0 (Old AA - L514.0, L214)		
515.2	AA (USA)	Cast
Official composition: Si 0.5-1, Fe 0.6-1, Cu 0.1, Mg 2.7-4, Mn 0.4-0.6, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA515.2 (Old AA - L514.0, L214)		
516.0	AA (USA)	Cast
Official composition: Si 0.3-1.5, Fe 0.35-1, Cu 0.3, Mg 2.5-4.5, Mn 0.15-0.4, Zn 0.2, Ni 0.25-0.4, Ti 0.1-0.2, Pb 0.1, Sn 0.1, Others: Each 0.05, Aluminium rem.		
Identified Product forms: Die cast		
516.1	AA (USA)	Cast
Official composition: Si 0.3-1.5, Fe 0.35-1, Cu 0.3, Mg 2.5-4.5, Mn 0.15-0.4, Zn 0.2, Ni 0.25-0.4, Ti 0.1-0.2, Pb 0.1, Sn 0.1, Others: Each 0.05, Aluminium rem.		
Identified Product forms: Ingot		
518.0	AA (USA)	Cast
Official composition: Si 0.35, Fe 1.8, Cu 0.25, Mg 7.5-8.5, Mn 0.35, Zn 0.15, Ni 0.15, Sn 0.15, Others: Total 0.25, Aluminium rem.		
Identified Product forms: Die cast		
Similar/Equivalent alloys: <u>USA:</u> AA518.0 (Old AA - 218), UNS A05180; <u>Germany:</u> AlMg9; Wk.3.3292		
518.1	AA (USA)	Cast
Official composition: Si 0.35, Fe 1.1, Cu 0.25, Mg 7.6-8.5, Mn 0.35, Zn 0.15, Ni 0.15, Sn 0.15, Others: Total 0.25, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA518.1 (Old AA - 218); <u>France:</u> A-G10S; <u>Germany:</u> G-AlMg9, 3.3292, 3.3293; <u>Italy:</u> 5080-74; <u>UK:</u> LM10; <u>Proprietary:</u> VAW Veral Mg9		
518.2	AA (USA)	Cast
Official composition: Si 0.25, Fe 0.7, Cu 0.1, Mg 7.6-8.5, Mn 0.1, Ni 0.05, Sn 0.05, Others: Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA518.2 (Old AA - 218); <u>European (ISO):</u> AlMg10; <u>Germany:</u> G-AlMg9; 3.3292, 3.3293; <u>Proprietary:</u> VAW Veral Mg9(H)		
520.0	AA (USA)	Cast
Official composition: Si 0.25, Fe 0.3, Cu 0.25, Mg 9.5-10.6, Mn 0.15, Zn 0.15, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <u>USA:</u> AA520.0 (Old AA - 220), UNS A05200, AMS 4240; <u>France:</u> A-G10, A-G10Y4; <u>Germany:</u> AlMg10; Wk.3.3591; <u>UK:</u> LM10; <u>Proprietary:</u> Hiduminium 90		
520.2	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.2, Cu 0.2, Mg 9.6-10.6, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA520.2 (Old AA - 220); <u>European (ISO):</u> AlMg10; <u>Italy:</u> 3056; <u>Japan:</u> C7BV; <u>UK:</u> LM10; <u>Proprietary:</u> VAW Veral Mg10(H)		
535.0	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.15, Cu 0.05, Mg 6.2-7.5, Mn 0.1-0.25, Ti 0.1-0.25, B 0.005, Be 0.003-0.007, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <u>USA:</u> AA535.0 (Old AA - Almag 35), UNS A05350; <u>Germany:</u> AlMg9; Wk.3.3292; <u>UK:</u> DTD5018A; <u>Proprietary:</u> Almag 35		
535.2	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.15, Cu 0.05, Mg 6.2-7.5, Mn 0.1-0.25, Ti 0.1-0.25, B 0.002, Be 0.003-0.007, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA535.2 (Old AA - Almag 35); <u>European (ISO):</u> AlMg6; <u>France:</u> A-G6T; <u>Germany:</u> G-AlMg5; 3.3561; 3.3562; <u>Italy:</u> 3058; <u>Japan:</u> C7AV; <u>UK:</u> LM5; <u>Proprietary:</u> Almag 35; VAW VeralMg5(H)		

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705.0	AA (USA)	Cast						
Official composition: Si 0.2, Fe 0.8, Cu 0.2, Mg 1.4-1.8, Mn 0.4-0.6, Zn 2.7-3.3, Ti 0.25, Cr 0.2-0.4, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA705.0 (Old AA - 603, Temalloy 5); <u>Proprietary:</u> Temalloy 5								
705.1	AA (USA)	Cast						
Official composition: Si 0.2, Fe 0.6, Cu 0.2, Mg 1.5-1.8, Mn 0.4-0.6, Zn 2.7-3.3, Ti 0.25, Cr 0.2-0.4, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA705.1 (Old AA - 603, Temalloy 5); <u>Proprietary:</u> Temalloy 5								
707.0	AA (USA)	Cast						
Official composition: Si 0.2, Fe 0.8, Cu 0.2, Mg 1.8-2.4, Mn 0.4-0.6, Zn 4-4.5, Ti 0.25, Cr 0.2-0.4, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA707.0 (Old AA - 607, Temalloy 7), UNS A07070; <u>Proprietary:</u> Ternalloy 7								
707.1	AA (USA)	Cast						
Official composition: Si 0.2, Fe 0.6, Cu 0.2, Mg 1.9-2.4, Mn 0.4-0.6, Zn 4-4.5, Ti 0.25, Cr 0.2-0.4, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA707.1 (Old AA - 607, Temalloy 7); <u>Proprietary:</u> Temalloy 7								
710.0	AA (USA)	Cast						
Official composition: Si 0.15, Fe 0.5, Cu 0.35-0.6, Mg 0.6-0.8, Mn 0.05, Zn 6-7, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA710.0 (Old AA - A712.0, A612)								
710.1	AA (USA)	Cast						
Official composition: Si 0.15, Fe 0.4, Cu 0.35-0.6, Mg 0.65-0.8, Mn 0.05, Zn 6-7, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA710.1 (Old AA - A712.1, A612)								
711.0	AA (USA)	Cast						
Official composition: Si 0.3, Fe 0.7-1.4, Cu 0.35-0.6, Mg 0.25-0.45, Mn 0.05, Zn 6-7, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA711.0 (Old AA - C712.0, A612)								
711.1	AA (USA)	Cast						
Official composition: Si 0.3, Fe 0.7-1.1, Cu 0.35-0.6, Mg 0.3-0.45, Mn 0.05, Zn 6-7, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA711.1 (Old AA - C712.1, C612)								
712.0	AA (USA)	Cast						
Official composition: Si 0.3, Fe 0.5, Cu 0.25, Mg 0.5-0.65, Mn 0.1, Zn 5-6.5, Ti 0.15-0.25, Cr 0.4-0.6, Others: Each 0.05 Total 0.2, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA712.0 (Old AA - C712.0, D712.0, D612, 40E), UNS A07120; <u>France:</u> A-Z5G; <u>UK:</u> LM31; DTD5008B Comments: See AA documentation for method of expressing Mg content.								
712.2	AA (USA)	Cast						
Official composition: Si 0.15, Fe 0.4, Cu 0.25, Mg 0.5-0.65, Mn 0.1, Zn 5-6.5, Ti 0.15-0.25, Cr 0.4-0.6, Others: Each 0.05 Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA712.2 (Old AA - D712.2, D612, 40E) Comments: See AA documentation for method of expressing Mg content.								
713.0	AA (USA)	Cast						
Official composition: Si 0.25, Fe 1.1, Cu 0.4-1, Mg 0.2-0.5, Mn 0.6, Zn 7-8, Ni 0.15, Ti 0.25, Cr 0.35, Others: Each 0.1 Total 0.25, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA713.0 (Old AA - 613, Tenzaloy); <u>Proprietary:</u> Tenzaloy								
713.1	AA (USA)	Cast						
Official composition: Si 0.25, Fe 0.8, Cu 0.4-1, Mg 0.2-0.5, Mn 0.6, Zn 7-8, Ni 0.15, Ti 0.25, Cr 0.35, Others: Each 0.1 Total 0.25, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA713.1 (Old AA - 613, Tenzaloy); <u>Proprietary:</u> Tenzaloy								
716B	BS DTD (UK)	Cast						
Nominal composition: Si 3.5-6, Fe 0.6, Cu 0.1, Mg 0.3-0.8, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.25, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <u>UK:</u> DTD716B; DTD722B; DTD727B; DTD735B.								
771.0	AA (USA)	Cast						
Official composition: Si 0.15, Fe 0.15, Cu 0.1, Mg 0.8-1, Mn 0.1, Zn 6.5-7.5, Ti 0.1-0.2, Cr 0.06-0.2, Others: Each 0.05 Total 0.2, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA771.0 (Old AA - Precedent 71A); <u>Proprietary:</u> Precedent 71A								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T51 [-]	-	221	248	5	-	-	-	(#1)
T52 [-]	-	234	262	2	-	-	-	(#1)

771.2	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.1, Cu 0.1, Mg 0.85-1, Mn 0.1, Zn 6.5-7.5, Ti 0.1-0.2, Cr 0.06-0.2, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA771.2 (Old AA - Precedent 71A); <u>Proprietary:</u> Precedent 71A		
772.0	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.15, Cu 0.1, Mg 0.6-0.8, Mn 0.1, Zn 6-7, Ti 0.1-0.2, Cr 0.06-0.2, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <u>USA:</u> AA772.0 (Old AA - B771.0, Precedent 71B); <u>Proprietary:</u> Precedent 71B		
772.2	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.1, Cu 0.1, Mg 0.65-0.8, Mn 0.1, Zn 6-7, Ti 0.1-0.2, Cr 0.06-0.2, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA772.2 (Old AA - B771.2, Precedent 71B); <u>Proprietary:</u> Precedent 71B		
850.0	AA (USA)	Cast
Official composition: Si 0.7, Fe 0.7, Cu 0.7-1.3, Mg 0.1, Mn 0.1, Ni 0.7-1.3, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA850.0 (Old AA - 750)		
850.1	AA (USA)	Cast
Official composition: Si 0.7, Fe 0.5, Cu 0.7-1.3, Mg 0.1, Mn 0.1, Ni 0.7-1.3, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA850.1 (Old AA - 750)		
851.0	AA (USA)	Cast
Official composition: Si 2-3, Fe 0.7, Cu 0.7-1.3, Mg 0.1, Mn 0.1, Ni 0.3-0.7, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA851.0 (Old AA - A850.0, A750)		
851.1	AA (USA)	Cast
Official composition: Si 2-3, Fe 0.5, Cu 0.7-1.3, Mg 0.1, Mn 0.1, Ni 0.3-0.7, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA851.1 (Old AA - A850.1, A750)		
852.0	AA (USA)	Cast
Official composition: Si 0.4, Fe 0.7, Cu 1.7-2.3, Mg 0.6-0.9, Mn 0.1, Ni 0.9-1.5, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA852.0 (Old AA - B850.0, B750)		
852.1	AA (USA)	Cast
Official composition: Si 0.4, Fe 0.7, Cu 1.7-2.3, Mg 0.6-0.9, Mn 0.1, Ni 0.9-1.5, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA852.1 (Old AA - B850.1, B750)		
853.0	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 0.7, Cu 3-4, Mn 0.5, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA853.0 (Old AA - XC850.0, XC750)		
853.2	AA (USA)	Cast
Official composition: Si 5.5-6.5, Fe 0.7, Cu 3-4, Mn 0.5, Ti 0.2, Sn 5.5-7, Others: Total 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA853.2 (Old AA - XC850.2, XC750)		
2564	SFS (Finland)	Cast
Nominal composition: Si 0.35, Fe 0.35, Cu 4-5, Mg 0.05, Mn 0.1, Zn 0.2, Ni 0.1, Ti 0.05-0.35, Pb 0.05, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
3040	UNI (Italy)	Cast
Nominal composition: Si 0.05, Fe 1, Cu 11-12.5, Mg 0.05, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Others Total excludes Fe+Si+Ti, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition.		
3041	UNI (Italy)	Cast
Nominal composition: Si 0.8, Fe 0.5-1.3, Cu 9.3-10.7, Mg 0.2-0.4, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.1, Others Total excludes Fe+Si+Ti, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition.		
3042	UNI (Italy)	Cast
Nominal composition: Si 0.8-1.2, Fe 0.5, Cu 9.5-10.5, Mg 0.2-0.3, Mn 0.1, Zn 0.05, Ni 1.3-1.7, Ti 0.1-0.2, Others Total excludes Fe, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition.		

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3043	UNI (Italy)	Cast
<p>Nominal composition: Si 0.5, Fe 0.6, Cu 7-8.5, Mg 0.05, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Others Total excludes Fe+Si+Ti, Others: Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3044	UNI (Italy)	Cast
<p>Nominal composition: Si 1, Fe 0.8, Cu 4-5, Mg 0.03, Mn 0.05, Zn 0.1, Ni 0.05, Ti 0.2, Others Total excludes Fe+Si+Ti, Others: Total 0.15, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3045	UNI (Italy)	Cast
<p>Nominal composition: Si 0.5, Fe 0.3, Cu 3.8-4.2, Mg 1.3-1.7, Mn 0.05, Zn 0.05, Ni 1.8-2.3, Ti 0.2, Others Total excludes Fe+Si+Ti, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3046	UNI (Italy)	Cast
<p>Nominal composition: Si 0.6-0.8, Fe 1.4-1.6, Cu 2.9-3.2, Mg 0.5-0.7, Mn 0.05, Zn 0.05, Ni 0.5-0.7, Ti 0.1-0.2, Others: Total 0.06, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3048	UNI (Italy)	Cast
<p>Nominal composition: Si 12-13.3, Fe 0.6, Cu 0.7-0.9, Mg 0.01, Mn 0.2-0.4, Zn 0.05, Ni 0.01, Ti 0.05, Others Total excludes Fe, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3049	UNI (Italy)	Cast
<p>Nominal composition: Si 11.5-13, Fe 0.6, Cu 0.05, Mg 0.27-0.4, Mn 0.35-0.65, Zn 0.05, Ni 0.01, Ti 0.05, Others Total excludes Fe, Others: Total 0.15, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3050	UNI (Italy)	Cast
<p>Nominal composition: Si 9.5-10.5, Fe 0.6, Cu 2-2.5, Mg 1.2-1.5, Mn 0.05, Zn 0.05, Ni 0.8-1.2, Ti 0.05, Others Total excludes Fe, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3051	UNI (Italy)	Cast
<p>Nominal composition: Si 8.5-9.5, Fe 0.5, Cu 0.05, Mg 0.3-0.45, Mn 0.4-0.6, Zn 0.05, Ni 0.1, Ti 0.15, Others Total excludes Fe, Others: Total 0.15, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3052	UNI (Italy)	Cast
<p>Nominal composition: Si 5-6, Fe 0.6, Cu 3.5-4.5, Mg 0.01, Mn 0.3, Zn 0.05, Ni 0.05, Ti 0.05, Others Total excludes Fe+Mn, Others: Total 0.15, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3054	UNI (Italy)	Cast
<p>Nominal composition: Si 4.2-5.2, Fe 0.5, Cu 0.05, Mg 0.55-0.75, Mn 0.6-0.8, Zn 0.05, Ni 0.01, Ti 0.15, Others Total excludes Fe+Ti, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3055	UNI (Italy)	Cast
<p>Nominal composition: Si 1.8-2.3, Fe 0.5, Cu 0.05, Mg 0.55-0.75, Mn 0.6-0.8, Zn 0.05, Ni 0.01, Ti 0.15, Others Total excludes Fe+Ti, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3056	UNI (Italy)	Cast
<p>Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 8.5-10.5, Mn 0.2-0.5, Zn 0.1, Ni 0.01, Ti 0.2, Others Total excludes Fe+Si, Mn substitution by Cr to +/-0.1, Others: Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3057	UNI (Italy)	Cast
<p>Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 6.4-7.6, Mn 0.2-0.5, Zn 0.1, Ni 0.01, Ti 0.2, Others Total excludes Fe+Si, Mn substitution by Cr to +/-0.1, Others: Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		
3058	UNI (Italy)	Cast
<p>Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 4.5-5.5, Mn 0.2-0.5, Zn 0.1, Ni 0.01, Ti 0.2, Others Total excludes Fe+Si, Mn substitution by Cr to +/-0.1, Others: Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.</p>		

3059	UNI (Italy)	Cast						
Nominal composition: Si 0.3, Fe 0.4, Cu 0.05, Mg 2.8-3.2, Mn 0.25-0.35, Zn 0.1, Ni 0.01, Ti 0.2, Others Total excludes Fe+Si, Mn substitution by Cr to +/-0.1, Others: Total 0.2, Aluminium rem.								
Identified Product forms: Ingot								
Comments: Ingot composition.								
3599	UNI (Italy)	Cast						
Nominal composition: Si 6.5-7.5, Fe 0.5, Cu 0.05, Mg 0.3-0.45, Mn 0.4, Zn 0.05, Ni 0.05, Ti 0.2, Others Total excludes Fe, Others: Each 0.1 Total 0.15, Aluminium rem.								
Identified Product forms: Ingot								
Comments: Ingot composition.								
3600	UNI (Italy)	Cast						
Nominal composition: Si 4.5-5.5, Fe 0.5, Mg 0.45-0.65, Mn 0.1, Zn 0.05, Ni 0.1, Ti 0.15, Cr 0.15Al 1.1-1.5, Others excludes Fe+Ti+Cr (Mg 0.40-0.6, Fe 0.7, Mn 0.2, Ni 0.2, Zn 0.10 in finished castings), Others: Each 0.15 Total 0.4, Aluminium rem.								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45300; AC-AISi5Cu1Mg; <i>Italy:</i> 3600; <i>UK:</i> LM16								
Comments: Ingot composition.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Chill cast]	140	-	230	3	-	85HB	Min. values	(VAW-IMCO)
T4 [Sand cast]	120	-	170	2	-	80HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	210	-	280	-	-	110HB	Min. values, EI%<1	(VAW-IMCO)
T6 [Sand cast]	200	-	230	-	-	100HB	Min. values, EI%<1	(VAW-IMCO)
3601	UNI (Italy)	Cast						
Nominal composition: Si 7.5-9.5, Fe 0.6, Cu 3-4, Mg 0.01, Mn 0.3, Zn 0.05, Ni 0.05, Ti 0.05, Others Total excludes Fe+Mn, Others: Total 0.15, Aluminium rem.								
Identified Product forms: Ingot								
Comments: Ingot composition.								
3602	UNI (Italy)	Cast						
Nominal composition: Si 0.3, Fe 0.9-1.2, Cu 0.1, Mg 0.55-0.75, Mn 0.05, Zn 4.8-5.3, Ni 0.05, Ti 0.15-0.25, Others Total excludes Si, Others: Total 0.1, Aluminium rem.								
Identified Product forms: Ingot								
Comments: Ingot composition.								
4020	SIS 1440 20 (Sweden)	Cast						
Nominal composition: Si 0.15, Fe 0.15, Cu 0.02, Zn 0.06, Others: Each 0.03 Total 0.2, Aluminium 99.8 min.								
Identified Product forms: Ingot								
4021	SIS 1440 20 (Sweden)	Cast						
Nominal composition: Si 0.2, Fe 0.25, Cu 0.02, Zn 0.06, Others: Each 0.03 Total 0.3, Aluminium 99.7 min.								
Identified Product forms: Ingot								
4022	SIS 1440 22 (Sweden)	Cast						
Nominal composition: Si 0.3, Fe 0.4, Cu 0.03, Zn 0.07, Others: Each 0.03 Total 0.5, Aluminium 99.5 min.								
Identified Product forms: Ingot								
4024	SIS 1440 24 (Sweden)	Cast						
Nominal composition: Si 0.5, Fe 0.8, Cu 0.03, Zn 0.08, Others: Each 0.03 Total 1, Aluminium 99 min.								
Identified Product forms: Ingot								
4162	DS 3002 (Denmark)	Cast						
Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 4-6, Mn 0.4, Zn 0.2, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.								
Identified Product forms: Ingot								
4163	DS 3002 (Denmark)	Cast						
Nominal composition: Si 0.5-1.5, Fe 0.5, Cu 0.1, Mg 4-6, Mn 0.5, Zn 0.2, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.								
Identified Product forms: Ingot								
4244	DS 3002 (Denmark)	Cast						
Nominal composition: Si 6.5-7.5, Fe 0.5, Cu 0.2, Mg 0.2-0.4, Mn 0.5, Zn 0.3, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.								
Identified Product forms: Ingot								
4251	DS 3002 (Denmark)	Cast						
Nominal composition: Si 6-8, Fe 0.7, Cu 2-3, Mg 0.3, Mn 0.5, Zn 2, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Aluminium rem.								
Identified Product forms: Ingot								
4253	DS 3002 (Denmark)	Cast						
Nominal composition: Si 9-11, Fe 0.5, Cu 0.2, Mg 0.2-0.4, Mn 0.5, Zn 0.3, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.								
Identified Product forms: Ingot								
4254	DS 3002 (Denmark)	Cast						
Nominal composition: Si 7.5-10, Fe 1.1, Cu 2-4, Mg 0.3, Mn 0.5, Zn 3, Ni 0.3, Ti 0.2, Pb 0.3, Sn 0.2, Fe 1.3 die cast., Aluminium rem.								
Identified Product forms: Die cast, Ingot								

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4260	DS 3002 (Denmark)	Cast
Nominal composition: Si 11-13.5, Fe 0.7, Cu 0.6, Mg 0.3, Mn 0.5, Zn 0.5, Ni 0.2, Ti 0.2, Pb 0.1, Sn 0.1, Fe 1.3 die cast., Aluminium rem. Identified Product forms: Die cast, Ingot		
4261	DS 3002 (Denmark)	Cast
Nominal composition: Si 11-13.5, Fe 0.6, Cu 0.2, Mg 0.1, Mn 0.5, Zn 0.3, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem. Identified Product forms: Ingot		
4438	DS 3002 (Denmark)	Cast
Nominal composition: Si 0.3, Fe 0.7, Cu 0.2-0.5, Mg 0.6-0.8, Mn 0.4, Zn 5-6, Ni 0.05, Ti 0.15-0.25, Cr 0.3-0.6, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot		
4513	UNI (Italy)	Cast
Nominal composition: Si 11.5-13.5, Fe 0.5, Cu 1.75-2.25, Mg 0.01, Mn 0.2-0.4, Zn 0.05, Ni 0.01, Ti 0.05, Others Total excludes Fe, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
4514	UNI (Italy)	Cast
Nominal composition: Si 12-13.5, Fe 0.6, Cu 0.05, Mg 0.05, Mn 0.4, Zn 0.08, Ni 0.01, Sn 0.1, Others Total excludes Fe+Mn+Ti; if Fe >0.3, Mn 0.2-0.4, Others: Total 0.15, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5008B	BS DTD (UK)	Cast
Nominal composition: Si 0.25, Fe 0.5, Cu 0.1, Mg 0.5-0.75, Mn 0.1, Zn 4.8-5.7, Ni 0.1, Ti 0.25, Cr 0.4-0.6, Pb 0.05, Sn 0.05, Aluminium rem.		
5018A	BS DTD (UK)	Cast
Nominal composition: Si 0.25, Fe 0.35, Cu 0.2, Mg 7.4-7.9, Mn 0.1-0.3, Zn 0.9-1.4, Ni 0.1, Ti 0.25, Pb 0.05, Sn 0.05, Aluminium rem.		
5074-74	UNI (Italy)	Cast
Nominal composition: Si 9-10, Fe 0.7-1.2, Cu 0.5, Mg 0.4-0.6, Mn 0.35, Zn 0.4, Ni 0.5, Ti 0.15, Others Total excludes Ti, Others: Each 0.1 Total 1.6, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5075-74	UNI (Italy)	Cast
Nominal composition: Si 8-9.5, Fe 0.7-1, Cu 3-4, Mg 0.3, Mn 0.5, Zn 0.9, Ni 0.3, Ti 0.2, Zn 1.4 in ingot, 1.5 in casting by agreement. Others Total excludes Ti, Others: Each 0.1 Total 1.4, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5076-74	UNI (Italy)	Cast
Nominal composition: Si 11-12.5, Fe 0.7-1, Cu 1.75-2.5, Mg 0.3, Mn 0.5, Zn 0.8, Ni 0.3, Ti 0.15, Pb 0.15, Sn 0.1, Others Total excludes Ti, Others: Each 0.1 Total 1.7, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5077-74	UNI (Italy)	Cast
Nominal composition: Si 4.5-6, Fe 0.7-1, Cu 0.4, Mg 0.2, Mn 0.3, Zn 0.5, Ni 0.3, Ti 0.15, Pb 0.1, Sn 0.1, Others Total excludes Ti, Others: Each 0.1 Total 1.6, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5079-74	UNI (Italy)	Cast
Nominal composition: Si 11.5-13, Fe 0.7-1, Cu 0.8, Mg 0.3, Mn 0.3, Zn 0.5, Ni 0.2, Ti 0.15, Pb 0.15, Sn 0.1, Others Total excludes Ti, Others: Each 0.1 Total 2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
5080-74	UNI (Italy)	Cast
Nominal composition: Si 0.3, Fe 0.7-1, Cu 0.05, Mg 7-8, Mn 0.4, Zn 0.1, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Be 0.005, Others Total excludes Ti+Mn+Si, Others: Each 0.05 Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		
6250-68	UNI (Italy)	Cast
Nominal composition: Si 12-13, Fe 0.6, Cu 0.5-1.1, Mg 0.8-1.2, Mn 0.05, Zn 0.1, Ni 2-2.4, Ti 0.2, Others Total excludes Fe+Ti, Others: Each 0.05 Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition.		

6251-68	UNI (Italy)	Cast					
Nominal composition: Si 20-22, Fe 0.7, Cu 1.4-1.8, Mg 0.4-0.8, Mn 0.6-0.8, Zn 0.1, Ni 1.4-1.6, Ti 0.2, Co 0.5-1.2, Others Total excludes Fe+Ti, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
6252-68	UNI (Italy)	Cast					
Nominal composition: Si 1-1.4, Fe 0.4, Cu 0.8-1.2, Mg 0.03, Mn 0.05, Zn 0.05, Ni 0.8-1.2, Ti 0.09-0.15, Sn 5-7, Others Total excludes Fe, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
6253-68	UNI (Italy)	Cast					
Nominal composition: Si 0.7, Fe 0.5, Cu 0.7, Mg 0.03, Mn 1.9-2.1, Zn 0.1, Ni 1.9-2.1, Ti 0.1-0.2, Si+Cu < 1.0. Others Total excludes Fe+Si+Cu, Others: Each 0.05 Total 0.3, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7257	UNI (Italy)	Cast					
Nominal composition: Si 6.5-7.5, Fe 0.2, Cu 0.1, Mg 0.2-0.5, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05-0.25, Others: Total 0.15, Aluminium rem.							
Comments: Composition for finished casting.							
7363	UNI (Italy)	Cast					
Nominal composition: Si 11-12.5, Fe 0.7-1, Cu 1.75-2.5, Mg 0.3, Mn 0.5, Zn 1.4, Ni 0.3, Ti 0.2, Pb 0.15, Sn 0.1, Others Total excludes Mn+Ti, Others: Each 0.1 Total 2.2, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7369-74 Part 1	UNI (Italy)	Cast					
Nominal composition: Si 11-12.5, Fe 0.8, Cu 1.75-2.5, Mg 0.3, Mn 0.2-0.4, Zn 0.8, Ni 0.3, Ti 0.15, Others Total excludes Fe+Ti, Others: Each 0.1 Total 1.5, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7369-74 Part 2	UNI (Italy)	Cast					
Nominal composition: Si 11.5-13.5, Fe 0.8, Cu 0.8, Mg 0.3, Mn 0.2-0.4, Zn 0.5, Ni 0.3, Ti 0.15, Pb 0.15, Sn 0.1, Others Total excludes Fe+Ti, Others: Each 0.1 Total 1.2, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7369-74 Part 3	UNI (Italy)	Cast					
Nominal composition: Si 8.3-9.7, Fe 0.7, Cu 0.8-1.3, Mg 0.3-0.6, Mn 0.2-0.5, Zn 0.7, Ni 0.2, Ti 0.1-0.2, Pb 0.1, Sn 0.1, Others total excludes Fe (Fe 0.8, Zn 0.8, Others: Total 0.9 in finished castings), Others: Each 0.1 Total 0.8, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46400: AC-Al-Si9Cu1Mg; <i>Italy:</i> 7639/3, SG-AISI9Cu							
Comments: Ingot composition.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	100	-	170	1	75HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	135	1	60HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	235	-	275	1.5	105HB	Min. values	(VAW-IMCO)
7369-74 Part 4	UNI (Italy)	Cast					
Nominal composition: Si 5-7, Fe 1, Cu 3-5, Mg 0.3, Mn 0.5, Zn 2, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.15, Others Total excludes Fe+Ti, Others: Each 0.15 Total 3.3, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7369-74 Part 5	UNI (Italy)	Cast					
Nominal composition: Si 5-7, Fe 1.1, Cu 3-5, Mg 0.3, Mn 0.5, Zn 2.5-4, Ni 0.5, Ti 0.2, Pb 0.3, Sn 0.2, Others Total excludes Fe+Ti, Others: Each 0.2 Total 1.6, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7369-74 Part 6	UNI (Italy)	Cast					
Nominal composition: Si 5.5-6.5, Fe 1, Cu 1.75-2.25, Mg 0.3-0.5, Mn 0.5, Zn 1, Ni 0.2, Ti 0.1-0.2, Others Total excludes Fe, Others: Each 0.15 Total 2.1, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
7963	UNI (Italy)	Cast					
Nominal composition: Si 4.7-5.7, Fe 0.5, Cu 3-3.7, Mg 0.2-0.35, Mn 0.1, Zn 0.05, Ni 0.05, Others Total excludes Fe, Others: Each 0.1 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							

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8024	UNI (Italy)						Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.25-0.4, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.15-0.2, Others Total excludes Fe, Others: Each 0.1 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Comments: Ingot composition.							
21000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.15, Fe 0.3, Cu 4.2-5, Mg 0.2-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.15-0.25, Pb 0.05, Sn 0.05, (Mg 0.15-0.35, Si 0.2, Fe 0.35 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-21000; AC-AlCu4MgTi (<i>ISO:</i> Al-Cu4MgTi							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T4 [Chill cast]	200	-	320	8	- 95HB	Min. values	(VAW-IMCO)
T4 [Sand cast]	200	-	300	5	- 90HB	Min. values	(VAW-IMCO)
21100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.15, Fe 0.15, Cu 4.2-5.2, Mn 0.55, Zn 0.07, Ti 0.15-0.25, (Si 0.18, Fe 0.19, Ti 0.15-0.3 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-21100; AC-AlCu4Ti (<i>ISO:</i> Al-Cu4Ti							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T6 [Chill cast]	220	-	330	7	- 95HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	200	-	300	3	- 95HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	180	-	320	8	- 90HB	Min. values	(VAW-IMCO)
T64 [Sand cast]	180	-	280	5	- 85HB	Min. values	(VAW-IMCO)
41000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 1.6-2.4, Fe 0.5, Cu 0.08, Mg 0.5-0.65, Mn 0.3-0.5, Zn 0.1, Ni 0.05, Ti 0.07-0.15, Pb 0.05, Sn 0.05, (Cu 0.1; Mg 0.45-0.65; Fe 0.6; Ti 0.05-0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-41000; AC-Al-Si2MgTi; <i>France:</i> A-S2GT							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	70	-	170	5	- 50HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	70	-	140	3	- 50HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	180	-	260	5	- 85HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	240	3	- 85HB	Min. values	(VAW-IMCO)
42000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 6.5-7.5, Fe 0.45, Cu 0.15, Mg 0.25-0.65, Mn 0.35, Zn 0.15, Ni 0.15, Ti 0.05-0.2, Pb 0.15, Sn 0.05, (Cu 0.20; Mg 0.20-0.65; Fe 0.55; Ti 0.05-0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-42000; AC-Al-Si7Mg; <i>UK:</i> LM 25							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	90	-	170	2.5	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	140	2	- 50HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	220	-	260	1	- 90HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	220	1	- 75HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	200	-	240	2	- 80HB	Min. values	(VAW-IMCO)
42100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.03, Mg 0.3-0.45, Mn 0.1, Zn 0.07, Ti 0.1-0.18, (Cu 0.05; Mg 0.25-0.45; Fe 0.19; Ti 0.08-0.25 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-42100; AC-AlSi7Mg0.3							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T6 [Chill cast]	210	-	290	4	- 90HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	190	-	230	2	- 75HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	180	-	250	8	- 80HB	Min. values	(VAW-IMCO)
42200	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.03, Mg 0.5-0.7, Mn 0.1, Zn 0.07, Ti 0.1-0.18, (Cu 0.05; Mg 0.45-0.70; Fe 0.19; Ti 0.08-0.25 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-42200; AC-AlSi7Mg0.6							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T6 [Chill cast]	240	-	320	3	- 100HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	210	-	250	1	- 85HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	210	-	290	6	- 90HB	Min. values	(VAW-IMCO)

43000 CEN EN 1706 (Europe) Cast

Nominal composition: Si 9-11, Fe 0.4, Cu 0.03, Mg 0.25-0.45, Mn 0.45, Zn 0.1, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, (Cu 0.05; Mg 0.20-0.45; Fe 0.55 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-43000; AC-Al-Si10Mg(a); *Germany:* VDS 239

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	90	-	180	2.5	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	150	2	- 50HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	220	-	260	1	- 90HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	220	1	- 75HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	200	-	240	2	- 80HB	Min. values	(VAW-IMCO)

43100 CEN EN 1706 (Europe) Cast

Nominal composition: Si 9-11, Fe 0.45, Cu 0.08, Mg 0.25-0.45, Mn 0.45, Zn 0.1, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, (Cu 0.10; Mg 0.20-0.45; Fe 0.55 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-43100; AC-Al-Si10Mg(b); *Germany:* VDS 239

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	90	-	180	2.5	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	150	2	- 50HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	220	-	260	1	- 90HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	220	1	- 75HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	200	-	240	2	- 80HB	Min. values	(VAW-IMCO)

43200 CEN EN 1706 (Europe) Cast

Nominal composition: Si 9-11, Fe 0.55, Cu 0.3, Mg 0.25-0.45, Mn 0.55, Zn 0.35, Ni 0.15, Ti 0.15, Pb 0.1, (Cu 0.35; Mg 0.20-0.45; Fe 0.65; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-43200; AC-Al-Si10Mg(Cu); *Germany:* VDS 233

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	90	-	180	1	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	160	1	- 50HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	200	-	240	1	- 80HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	220	1	- 75HB	Min. values	(VAW-IMCO)

43300 CEN EN 1706 (Europe) Cast

Nominal composition: Si 9-10, Fe 0.15, Cu 0.03, Mg 0.3-0.45, Mn 0.1, Zn 0.07, Ti 0.15, (Cu 0.05; Mg 0.25-0.45; Fe 0.19 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *European (CEN):* AC-43300; AC-AISi9Mg

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T6 [Chill cast]	210	-	290	4	- 90HB	Min. values	(VAW-IMCO)
T6 [Sand cast]	190	-	230	2	- 75HB	Min. values	(VAW-IMCO)
T64 [Chill cast]	180	-	250	6	- 80HB	Min. values	(VAW-IMCO)

43400 CEN EN 1706 (Europe) Cast

Nominal composition: Si 9-11, Fe 0.45-0.9, Cu 0.08, Mg 0.25-0.5, Mn 0.55, Zn 0.15, Ni 0.15, Ti 0.15, Pb 0.15, Sn 0.05, (Cu 0.10; Mg 0.20-0.50; Fe 1.0; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-43400; AC-Al-Si10Mg(Fe); *Germany:* VDS 239D

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Die-cast]	140	-	240	1	- 70HB	Min. values	(VAW-IMCO)

44000 CEN EN 1706 (Europe) Cast

Nominal composition: Si 10-11.8, Fe 0.15, Cu 0.03, Mg 0.45, Mn 0.1, Zn 0.07, Ti 0.15, (Cu 0.05; Fe 0.19 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-44000; AC-AISi11

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	80	-	170	7	- 45HB	Min. values	(VAW-IMCO)

44100 CEN EN 1706 (Europe) Cast

Nominal composition: Si 10.3-13.5, Fe 0.55, Cu 0.1, Mg 0.1, Mn 0.55, Zn 0.15, Ni 0.1, Ti 0.15, Pb 0.1, (Cu 0.15; Fe 0.65; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-44100; AC-Al-Si12(b); *Germany:* VDS 230

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	80	-	170	5	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	70	-	150	4	- 50HB	Min. values	(VAW-IMCO)

44200 CEN EN 1706 (Europe) Cast

Nominal composition: Si 10.5-13.5, Fe 0.4, Cu 0.3, Mn 0.35, Zn 0.1, Ti 0.15, (Cu 0.05; Fe 0.55 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-44200; AC-Al-Si12(a); *Germany:* VDS 230

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	80	-	170	6	- 55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	70	-	150	5	- 50HB	Min. values	(VAW-IMCO)

252 Aluminium Alloys (cast)

44300	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 10.5-13.5, Fe 0.45-0.9, Cu 0.08, Mn 0.55, Zn 0.15, Ti 0.15, (Cu 0.10; Fe 1.0 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-44300; AC-Al-Si12(Fe); <i>Germany:</i> VDS 230D							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
As cast [Die-cast]	130	-	240	1	- 60HB	Min. values (Source) (VAW-IMCO)	
44400	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 8-11, Fe 0.55, Cu 0.08, Mg 0.1, Mn 0.5, Zn 0.15, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, (Cu 0.10; Fe 0.65 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-44400; AC-Al-Si9							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
As cast [Die-cast]	120	-	220	2	- 55HB	Min. values (Source) (VAW-IMCO)	
45000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 5-7, Fe 0.9, Cu 3-5, Mg 0.55, Mn 0.2-0.65, Zn 2, Ni 0.45, Ti 0.2, Cr 0.15, Pb 0.3, Sn 0.15, (Fe 1.0; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.35, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45000; AC-Al-Si6Cu4; <i>Germany:</i> VDS 225							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
As cast [Chill cast]	100	-	170	1	- 75HB	Min. values (Source) (VAW-IMCO)	
As cast [Sand cast]	90	-	150	1	- 60HB	Min. values (Source) (VAW-IMCO)	
45100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 4.5-6, Fe 0.5, Cu 2.6-3.6, Mg 0.2-0.45, Mn 0.55, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, (Mg 0.15-0.45; Fe 0.60; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45100; AC-Al-Si5Cu3Mg; <i>France:</i> A-S5U3G							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
T4 [Chill cast]	180	-	270	2.5	- 85HB	Min. values (Source) (VAW-IMCO)	
T6 [Chill cast]	280	-	320	-	- 110HB	Min. values, EI% <1 (Source) (VAW-IMCO)	
45200	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 4.5-6, Fe 0.7, Cu 2.5-4, Mg 0.4, Mn 0.2-0.55, Zn 0.55, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, (Fe 0.8; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45200; AC-Al-Si5Cu3Mn; <i>UK:</i> LM4							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
As cast [Chill cast]	80	-	160	1	- 70HB	Min. values (Source) (VAW-IMCO)	
As cast [Sand cast]	70	-	140	1	- 60HB	Min. values (Source) (VAW-IMCO)	
T6 [Chill cast]	230	-	280	-	- 90HB	Min. values; EI% <1 (Source) (VAW-IMCO)	
T6 [Sand cast]	200	-	230	-	- 90HB	Min. values; EI% <1 (Source) (VAW-IMCO)	
45300	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 4.5-5.5, Fe 0.55, Cu 1-1.5, Mg 0.4-0.65, Mn 0.55, Zn 0.15, Ni 0.25, Ti 0.05-0.2, Pb 0.15, Sn 0.05, (Mg 0.35-0.65; Fe 0.65; Ti 0.05-0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45300; AC-Al-Si5Cu1Mg; <i>Italy:</i> 3600; <i>UK:</i> LM16							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
T4 [Chill cast]	140	-	230	3	- 85HB	Min. values (Source) (VAW-IMCO)	
T4 [Sand cast]	120	-	170	2	- 80HB	Min. values (Source) (VAW-IMCO)	
T6 [Chill cast]	210	-	280	-	- 110HB	Min. values, EI% <1 (Source) (VAW-IMCO)	
T6 [Sand cast]	200	-	230	-	- 100HB	Min. values, EI% <1 (Source) (VAW-IMCO)	
45400	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 4.5-6, Fe 0.5, Cu 2.6-3.6, Mg 0.05, Mn 0.55, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, (Fe 0.60; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45400; AC-Al-Si5Cu3; <i>UK:</i> LM22							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
T4 [Chill cast]	110	-	230	6	- 75HB	Min. values (Source) (VAW-IMCO)	
46000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 8-11, Fe 0.6-1.1, Cu 2-4, Mg 0.15-0.55, Mn 0.55, Zn 1.2, Ni 0.55, Ti 0.2, Cr 0.15, Pb 0.35, Sn 0.25, (Mg 0.05-0.55; Fe 1.3; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46000; AC-Al-Si9Cu3(Fe); <i>Germany:</i> VDS 226D							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	
As cast [Die-cast]	140	-	240	-	- 80HB	Min. values EI% <1 (Source) (VAW-IMCO)	

46100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 10-12, Fe 0.45-1, Cu 1.5-2.5, Mg 0.55, Mn 0.55, Zn 1.7, Ni 0.45, Ti 0.2, Cr 0.15, Pb 0.25, Sn 0.25, (Fe 1.1; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46100; AC-Al-Si11Cu2(Fe); <i>Spain:</i> L-2640							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Die-cast]	140	-	240	-	80HB	Min. values; EI%<1	(VAW-IMCO)
46200	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 7.5-9.5, Fe 0.7, Cu 2-3.5, Mg 15-0.55, Mn 0.15-0.65, Zn 1.2, Ni 0.35, Ti 0.2, Pb 0.25, Sn 0.15, (Mg 0.05-0.55; Fe 0.8; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46200; AC-Al-Si8Cu3; <i>Germany:</i> VDS 226							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	100	-	170	1	75HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	150	1	60HB	Min. values	(VAW-IMCO)
46300	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 6.5-8, Fe 0.7, Cu 3-4, Mg 0.35-0.6, Mn 0.2-0.65, Zn 0.65, Ni 0.3, Ti 0.2, Pb 0.15, Sn 0.1, (Mg 0.30-0.60; Fe 0.8; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46300; AC-Al-Si7Cu3Mg							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	100	-	180	1	80HB	Min. values	(VAW-IMCO)
46400	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 8.3-9.7, Fe 0.7, Cu 0.8-1.3, Mg 0.3-0.65, Mn 0.15-0.55, Zn 0.8, Ni 0.2, Ti 0.1-0.18, Pb 0.1, Sn 0.1, (Mg 0.25-0.65; Fe 0.8; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46400; AC-Al-Si9Cu1Mg; <i>Italy:</i> 7369/3, SG-ALSi9Cu1							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	100	-	170	1	75HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	135	1	60HB	Min. values	(VAW-IMCO)
T6 [Chill cast]	235	-	275	1.5	105HB	Min. values	(VAW-IMCO)
46500	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 8-11, Fe 0.6-1.2, Cu 2-4, Mg 0.15-0.55, Mn 0.55, Zn 3, Ni 0.55, Ti 0.2, Cr 0.15, Pb 0.35, Sn 0.25, (Mg 0.05-0.55; Fe 1.3; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> EN 46500; Al-Si9Cu3(Fe)(Zn); <i>Germany:</i> VDS 226/3							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Die-cast]	140	-	240	-	80HB	Min. values, EI% <1	(VAW-IMCO)
46600	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 6-8, Fe 0.7, Cu 1.5-2.5, Mg 0.35, Mn 0.15-0.65, Zn 1, Ni 0.35, Ti 0.2, Pb 0.25, Sn 0.15, (Fe 0.8; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46600; AC-Al-Si7Cu2; <i>UK:</i> LM27							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	130	-	210	4	65HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	150	1	60HB	Min. values	(VAW-IMCO)
47000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 10.5-13.5, Fe 0.7, Cu 0.9, Mg 0.35, Mn 0.05-0.55, Zn 0.55, Ni 0.3, Ti 0.15, Cr 0.1, Pb 0.2, Sn 0.1, (Cu1; Fe 0.8; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-47000; AC-Al-Si12Cu; <i>Germany:</i> VDS 231							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	90	-	170	2	55HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	150	1	50HB	Min. values	(VAW-IMCO)
47100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 10.5-13.5, Fe 0.6-1.1, Cu 0.7-1.2, Mg 0.35, Mn 0.55, Zn 0.55, Ni 0.3, Ti 0.15, Cr 0.1, Pb 0.2, Sn 0.1, (Fe 1.3; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.25, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-47100; AC-Al-Si12Cu1(Fe); <i>Germany:</i> VDS 231D							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Die-cast]	140	-	240	1	-	Min. values	(VAW-IMCO)

254 Aluminium Alloys (cast)

48000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 10.5-13.5, Fe 0.6, Cu 0.8-1.5, Mg 0.9-1.5, Mn 0.35, Zn 0.35, Ni 0.7-1.3, Ti 0.2, (Mg 1.5; Fe 0.7; Ti 0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-48000; AC-Al-Si12CuNiMg; <i>Germany:</i> VDS 260							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T5 [Chill cast]	185	-	200	-	90HB	Min. values, EI%<1	(VAW-IMCO)
T6 [Chill cast]	240	-	280	-	100HB	Min. values, EI%<1	(VAW-IMCO)
51000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.45, Fe 0.45, Cu 0.08, Mg 2.7-3.5, Mn 0.45, Zn 0.1, Ti 0.15, (Cu 0.10; Mg 3.5; Si 0.55; Fe 0.55; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51000; AC-Al-Mg3(b); <i>Germany:</i> VDS 242							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	70	-	150	5	50HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	70	-	140	3	50HB	Min. values	(VAW-IMCO)
51100	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.45, Fe 0.4, Cu 0.03, Mg 2.7-3.5, Mn 0.45, Zn 0.1, Ti 0.15, (Cu 0.05; Mg 3.5; Si 0.55; Fe 0.55; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51100; AC-Al-Mg3(a); <i>Germany:</i> VDS 242							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	70	-	150	5	50HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	70	-	140	3	50HB	Min. values	(VAW-IMCO)
51200	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 2.5, Fe 0.9, Cu 0.08, Mg 8.5-10.5, Mn 0.55, Zn 0.25, Ni 0.1, Ti 0.15, Pb 0.1, Sn 0.1, (Cu 0.10; Mg 10.5; Fe 1.0; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51200; AC-Al-Mg9; <i>Germany:</i> VDS 349							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Die-cast]	130	-	200	1	70HB		(VAW-IMCO)
51300	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.35, Fe 0.45, Cu 0.05, Mg 4.8-6.5, Mn 0.45, Zn 0.1, Ti 0.15, (Cu 0.10; Mg 4.5-6.5; Si 0.55; Fe 0.55; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51300; AC-Al-Mg5; <i>Germany:</i> VDS 244							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	100	-	180	4	60HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	160	3	55HB	Min. values	(VAW-IMCO)
51400	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 1.3, Fe 0.45, Cu 0.03, Mg 4.8-6.5, Mn 0.45, Zn 0.1, Ti 0.15, (Cu 0.05; Mg 4.5-6.5; Si 1.5; Fe 0.55; Ti 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51400; AC-Al-Mg5(Si); <i>Germany:</i> VDS 245							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	110	-	180	3	65HB	Min. values	(VAW-IMCO)
As cast [Sand cast]	100	-	160	3	60HB	Min. values	(VAW-IMCO)
71000	CEN EN 1706 (Europe)						Cast
Nominal composition: Si 0.25, Fe 0.7, Cu 0.15-0.35, Mg 0.45-0.7, Mn 0.4, Zn 4.5-6, Ni 0.05, Ti 0.12-0.2, Cr 0.15-0.6, Pb 0.05, Sn 0.05, (Mg 0.4-0.7; Si 0.30; Fe 0.80; Ti 0.10-0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-71000; AC-Al-Zn5Mg; <i>France:</i> A-Z5G							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T1 [Chill cast]	130	-	210	4	65HB	Min. values	(VAW-IMCO)
T1 [Sand cast]	120	-	190	4	60HB	Min. values	(VAW-IMCO)
A-4	NF A 57-105 (France)						Cast
Nominal composition: Cu 0.1, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, Fe+Si+Cu <= 1.0, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
A-5	NF A 57-105 (France)						Cast
Nominal composition: Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.1, Ni 0.05, Ti 0.1, Pb 0.05, Sn 0.05, Fe+Si+Cu <= 0.5, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	29.4	-	78.5	30	66.2	HB17	(Est-alu)
Y30 [-]	34.3	-	78.5	35	66.2	HB17	(Est-alu)

A-5 Y4 NF A 57-703 (France) Cast

Nominal composition: Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.1, Ni 0.05, Ti 0.1, Pb 0.05, Sn 0.05, Fe+Si+Cu <= 0.5, Aluminium rem.

Identified Product forms: Ingot

A-5 Y4 NF A 57-105 (France) Cast

Nominal composition: Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.1, Ni 0.05, Ti 0.1, Pb 0.05, Sn 0.05, Fe+Si+Cu <= 0.5, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

A-5/LR NF A 57-702, A 57-703 (France) Cast

Nominal composition: Si 0.7, Fe 0.17-0.28, Cu 0.02, Mg 0.02, Mn 0.005, Zn 0.04, Ni 0.02, Cr 0.004, Pb+Sn 0.02; Ti+V 0.003, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Ingot

Corrosion resistance: Excellent **Weldability:** Good (arc, TIG/MIG) **Machinability:** Poor **Finishing:** Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test bar]	25	-	75	40	67.5	25HB	Typical properties (Pechiney/Affimet)

A-6GBe NF A 57-702, A 57-703 (France) Cast

Nominal composition: Si 0.22, Fe 0.23, Cu 0.04, Mg 5.5-6.5, Mn 0.09, Zn 0.09, Ni 0.04, Ti 0.09, Be 0.005-0.01, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2640

Identified Product forms: Ingot

Corrosion resistance: Excellent **Weldability:** Excellent (oxy-acet., arc TIG/MIG) **Machinability:** Excellent **Finishing:** Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [Sand cast test bar]	115	-	195	6	69	65HB	Typical (Pechiney/Affimet)
Y30 [Chill cast test bar]	120	-	220	9	69	70HB	Typical (Pechiney/Affimet)

A-7/LR NF A 57-702, A 57-703 (France) Cast

Nominal composition: Si 0.07, Fe 0.18, Cu 0.01, Mg 0.02, Mn 0.005, Zn 0.04, Ni 0.015, Cr 0.004, Pb+Sn 0.02; Ti+V 0.003, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Ingot

Corrosion resistance: Excellent **Weldability:** Good (arc, TIG/MIG) **Machinability:** Poor **Finishing:** Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test bar]	25	-	75	40	67.5	25HB	Typical properties (Pechiney/Affimet)

A-G10 NF (France) Cast

Nominal composition: Si 0.25, Fe 0.8, Cu 0.1, Mg 9-11, Mn 0.4, Zn 0.3, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Be 0.2, Aluminium rem.

Identified Product forms: Die cast

Similar/Equivalent alloys: *European* (ISO): Al-Mg10; *France:* A-G10

A-G10S Y4 NF A 57-703 (France) Cast

Nominal composition: Si 1.2, Fe 1.3, Cu 0.2, Mg 8.5-11, Mn 0.6, Zn 0.4, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Be 0.2, Aluminium rem.

A-G10SBe NF A 57-702, A 57-703 (France) Cast

Nominal composition: Si 0.7-1, Fe 0.3-0.5, Cu 0.08, Mg 9.3-10.7, Mn 0.09, Zn 0.09, Ni 0.04, Ti 0.09, Be 0.005-0.01, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2550

Identified Product forms: Ingot

Corrosion resistance: Excellent **Weldability:** Poor **Machinability:** Excellent **Finishing:** Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y40 [Diecast test piece]	-	-	200	1	69	70HB	NF A 57-703 Min. values (Pechiney/Affimet)

A-G3T NF A 57-702 (France) Cast

Nominal composition: Si 0.5, Fe 0.5, Cu 0.1, Mg 2.5-3.5, Mn 0.5, Zn 0.2, Ni 0.05, Ti 0.05-0.25, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Ingot

Similar/Equivalent alloys: *European* (ISO): Al-Mg3; *France:* A-G3T

Comments: Also NF A 57-105 (Sr <=0.20) **Corrosion resistance:** Excellent **Weldability:** Excellent (arc, TIG/MIG) **Machinability:** Excellent **Finishing:** Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	58.8	-	157	6	67.7	50HB	Typical (Est-alu)
Y20 [Cast test piece]	85	-	180	12	69	60HB	Pechiney alloy (Pechiney)
Y20 [Cast test piece]	60	-	160	7	69	50HB	NF A 57-702 Min. values (Pechiney)
Y30 [-]	68.6	-	177	8	67.7	60HB	Typical (Est-alu)
Y30 [Cast test piece]	70	-	170	7	69	60HB	NF A 57-702 Min. values (Pechiney)
Y30 [Cast test piece]	85	-	180	16	69	65HB	Pechiney alloy (Pechiney)

A-G4Z NF (France) Cast

Approximate composition: Mg 4, Zn, Aluminium rem.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	58.8	-	157	4	67.7	50HB	(Est-alu)
Y30 [-]	58.8	-	177	5	67.7	60HB	(Est-alu)

A-G6 NF A 57-702 (France) Cast

Nominal composition: Si 0.4, Fe 0.5, Cu 0.1, Mg 5-7, Mn 0.5, Zn 0.2, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Be 0.04, Others: Each 0.05 Total 0.25, Aluminium rem. **Density** (kg.m⁻³) 2640

Similar/Equivalent alloys: *European* (ISO): Al-Mg6; *France:* A-G6

Comments: Also NF A 57-105 (No Be content; Sr <=0.20; Use of A-G6 with >5%Mg for pressure applications is not permitted.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	88.3	-	157	3	64.7	50HB	(Est-alu)
Y20 [Cast test piece]	90	-	160	4	69	60HB	NF A 57-702 Min.values (Pechiney)
Y30 [-]	98.1	-	186	4	64.7	60HB	(Est-alu)
Y30 [Cast test piece]	100	-	180	4	69	65HB	NF A 57-702 Min. values (Pechiney)

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A-G6Y4 NF A 57-105 (France) Cast

Nominal composition: Si 0.4, Fe 1, Cu 0.1, Mg 5-7, Mn 0.3-0.6, Zn 0.2, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Sr <=0.20, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Comments: Also NF A 57-703 (Be<=0.20).

A-M4 NF (France) Cast

Approximate composition: Mn 4, Aluminium rem.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	68.6	-	83.4	1.5	68.6	HB35	(Est- <i>alu</i>)
Y30 [-]	78.5	-	107.9	2	68.6	HB40	(Est- <i>alu</i>)

A-S2GT NF A 57-105 (France) Cast

Nominal composition: Si 1.6-2.4, Fe 0.6, Cu 0.1, Mg 0.45-0.65, Mn 0.3-0.5, Zn 0.1, Ni 0.05, Ti 0.05-0.2, Pb 0.05, Sn 0.05, Sr <=0.20, Others: Each 0.05 Total 0.15,

Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-41000; AC-Al-Si2MgTi (*ISO:* Al-Si2MgTi; *France:* A-S2GT

Comments: Also NF A 57-702; A-S2GT (no Sr content indicated). **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Good

Finishing: Anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
As cast [Chill cast]	70	-	170	5	-	50HB	Min. values (VAW-IMCO)
As cast [Sand cast]	70	-	140	3	-	50HB	Min. values (VAW-IMCO)
T6 [Chill cast]	180	-	260	5	-	85HB	Min. values (VAW-IMCO)
T6 [Sand cast]	180	-	240	3	-	85HB	Min. values (VAW-IMCO)
Y23 [Cast test piece]	180	-	240	4	70	85HB	NF A 57-702 Min. values (Pechiney)
Y30 [Cast test piece]	70	-	170	5	70	55HB	NF A 57-702 Min. values (Pechiney)
Y30 [Chill cast test piece]	90	-	180	9	70	55HB	Typical (Pechiney/Affimet)
Y33 [Cast test piece]	180	-	260	6	70	85HB	NF A 57-702 Min. values (Pechiney)
Y33 [Chill cast test piece]	240	-	300	12	70	90HB	Typical (Pechiney/Affimet)

A-S2U NF (France) Cast

Approximate composition: Si 2, Cu, Aluminium rem.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	98	-	137	3	70.6	60HB	Typical (Est- <i>alu</i>)
Y25 [-]	118	-	167	2	70.6	70HB	Typical (Est- <i>alu</i>)
Y30 [-]	118	-	157	3	70.6	70HB	Typical (Est- <i>alu</i>)
Y35 [-]	137	-	196	2	70.6	80HB	Typical (Est- <i>alu</i>)

A-S4G NF (France) Cast

Approximate composition: Si 4, Mg, Aluminium rem.

Similar/Equivalent alloys: *European (ISO):* AISi5Mg; *Germany:* G-AISi5Mg; 3.2341; 3.2343; *Italy:* 3054; *Proprietary:* VAW Pantal 5

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	78.5	-	137	1	70.6	50HB	Typical (Est- <i>alu</i>)
Y23 [-]	177	-	226	1	70.6	85HB	Typical (Est- <i>alu</i>)
Y30 [-]	98.3	-	167	1.5	70.6	60HB	Typical (Est- <i>alu</i>)
Y33 [-]	177	-	245	1.5	70.6	85HB	Typical (Est- <i>alu</i>)

A-S5U3 NF A 57-702 (France) Cast

Nominal composition: Si 4.5-6, Fe 0.8, Cu 2.8-3.8, Mg 0.05-0.25, Mn 0.2-0.6, Zn 0.5, Ni 0.3, Ti 0.25, Pb 0.1, Sn 0.05, Pb+Sn <= 0.10, Aluminium rem. **Density** (kg.m⁻³)

2750

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si5Cu3; *France:* A-S5U3; F300

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	98.3	-	147	1	74.5	65HB	Typical (Est- <i>alu</i>)
Y20 [Sand cast test piece]	150	-	180	0.5	72	75HB	Na-modified alloy (Pechiney/Affimet)
Y30 [-]	108	-	196	2	74.5	70HB	Typical (Est- <i>alu</i>)
Y30 [Chill cast test piece]	150	-	220	1.5	72	75HB	Na-modified alloy (Pechiney/Affimet)

A-S5U3G NF A 57-702 (France) Cast

Nominal composition: Si 4.5-6, Fe 0.6, Cu 2.6-3.6, Mg 0.15-0.4, Mn 0.45, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.03 Total 0.1, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (CEN):* AC-45100; AC-Al-Si5Cu3Mg (*ISO:* Al-Si5Cu3Mg; *France:* A-S5U3G

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
T4 [Chill cast]	180	-	270	2.5	-	85HB	Min. values (VAW-IMCO)
T6 [Chill cast]	280	-	320	-	-	110HB	Min. values, El % <1 (VAW-IMCO)

A-S5UZ NF A 57-702 (France) Cast

Nominal composition: Si 5-7, Fe 1, Cu 3-5, Mg 0.3, Mn 0.2-0.6, Zn 2, Ni 0.3, Ti 0.25, Pb 0.25, Sn 0.2, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si6Cu4; *France:* A-S5UZ

A-S7G NF A 57-105 (France) Cast

Nominal composition: Si 6.5-7.5, Fe 0.55, Cu 0.15, Mg 0.2-0.4, Mn 0.5, Zn 0.1, Ni 0.05, Ti 0.05-0.25, Pb 0.05, Sn 0.05, Sr <=0.20, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si7Mg; *France:* A-S7G

Comments: Also NF A 57-702 (Sb, Sr <=0.20).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	78.5	-	137	1.5	72.6	55HB	Typical (Est-alu)
Y23 [-]	157	-	226	1.5	72.6	75HB	Typical (Est-alu)
Y30 [-]	88.3	-	167	4	72.6	60HB	Typical (Est-alu)
Y33 [-]	177	-	255	4	72.6	80HB	Typical (Est-alu)

A-S7G03 NF A 57-702 (France) Cast

Nominal composition: Si 6.5-7.5, Fe 0.2, Cu 0.1, Mg 0.25-0.4, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.08-0.25, Pb 0.05, Sn 0.05, Sb, Sr <=0.20, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2690

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAA356.0; *European (ISO):* AISiMg0.3, Al-Si7Mg; *France:* A-S7G03; *Germany:* G-AISi7Mg; *Japan:* AC4C; *UK:* LM25; *Proprietary:* Pech.Affimet Calypso 67N, 67B, 67R, 67S, 67XB

Comments: Also NF A 57-105 (Sr <=0.20) Al-Si Mg hypoeutectic alloy. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., MIG/TIG) **Machinability:** Good **Finishing:** Good (anodized)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [-]	186	-	255	4	72.6	75HB	Typical (Est-alu)
Y23 [Cast test piece]	180	-	240	2	74	75HB	NF A 57-702 (Pechiney)
Y23 [Cast test piece]	200	-	275	6	74	90HB	Pechiney alloy (Pechiney)
Y23 [Sand cast test piece]	200	-	270	5	74	90HB	Na-modified alloy (Pechiney/Affimet)
Y30 [Cast test piece]	90	-	200	16	74	55HB	Pechiney alloy (Pechiney)
Y30 [Chill cast test piece]	90	-	190	14	74	55HB	Na-modified alloy (Pechiney/Affimet)
Y33 [Cast test piece]	200	-	290	18	74	90HB	Pechiney alloy (Pechiney)
Y33 [Cast test piece]	180	-	250	4	74	80HB	NF A 57-702 (Pechiney)
Y33 [Chill cast test piece]	200	-	280	16	74	90HB	Na-modified alloy (Pechiney/Affimet)
Y90 [Machined test bar (8mm D)]	130	-	200	15	74.4	65HB	Indirect squeeze cast. El% 10-20 (Valfond)
Y93 (T6) [As cast test bar (8mm D)]	240	-	330	17.5	74.4	110HB	Indirect squeeze cast. El% 15-20 (Valfond)
Y93 (T6) [Machined test bar (8mm D)]	230	-	290	11	74.4	100HB	Indirect squeeze cast. El% 10-12 (Valfond)

A-S7G06 NF A 57-702 (France) Cast

Nominal composition: Si 6.5-7.5, Fe 0.2, Cu 0.1, Mg 0.45-0.7, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.08-0.25, Pb 0.05, Sn 0.05, Sb, Sr <=0.20, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* AAA357.0; *European (ISO):* AISi7Mg0.6, Al-Si7Mg; *France:* A-S7G06; *Germany:* G-AISi7Mg; *Japan:* AC4C; *UK:* LM25; *Proprietary:* Pech.Affimet Calypso 67N1, 67B1, 67R1, 67XB1

Comments: Also NF A 57-105 (Sr <=0.20) Al-Si Mg hypoeutectic alloy. **Corrosion resistance:** Good **Weldability:** Good (MIG/TIG) **Machinability:** Good **Finishing:** Good (anodized)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [-]	255	-	333	5	72.6	100HB	Typical (Est-alu)
Y23 [Cast test piece]	250	-	285	2	74	100HB	Pechiney alloy (Pechiney)
Y23 [Cast test piece]	210	-	250	1	74	90HB	NF A 57-702 (Pechiney)
Y23 [Sand cast test piece]	250	-	275	1.5	74	100HB	Na-modified alloy (Pechiney/Affimet)
Y33 [Cast test piece]	210	-	290	4	74	90HB	NF A 57-702 (Pechiney)
Y33 [Cast test piece]	250	-	325	14	74	100HB	Pechiney alloy (Pechiney)
Y33 [Chill cast test piece]	290	-	330	9	74	110HB	Na-modified alloy (Pechiney/Affimet)
Y90 [Machined test bar (8mm D)]	120	-	230	7.5	74.4	75HB	Indirect squeeze cast. El% 5-10 (Valfond)
Y93 (T6) [Machined test bar (2mm t)]	290	-	350	5	74.4	123HB	Investment cast. El%: 4 - 6 (Valfond)
Y93 (T6) [Machined test bar (8mm D)]	270	-	310	7.5	74.4	115HB	Indirect squeeze cast. El% 5-10 (Valfond)

A-S7U3G NF A 57-702 (France) Cast

Nominal composition: Si 6.5-8, Fe 0.8, Cu 2.8-3.8, Mg 0.25-0.6, Mn 0.2-0.6, Zn 0.5, Ni 0.3, Ti 0.25, Pb 0.1, Sn 0.1, Aluminium rem. **Density** (kg.m⁻³) 2750

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si7Cu3Mg; *France:* A-S7U3G

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y20 [Sand cast test piece]	180	-	185	-	74	85HB	Na-modified alloy (Pechiney/Affimet)
Y30 [Chill cast test piece]	180	-	225	1	74	85HB	Na-modified alloy (Pechiney/Affimet)

A-S9 Y4 NF A 57-703 (France) Cast

Nominal composition: Si 8-10, Fe 0.6, Cu 0.1, Mg 0.1, Mn 0.3, Zn 0.15, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, Sb <=0.50, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* (AlSi9); *France:* A-S9 Y4; *Proprietary:* Pech.Affimet Calypso 49R

A-S9G NF A 57-702 (France) Cast

Nominal composition: Si 9-11, Fe 0.7, Cu 0.25, Mg 0.15-0.5, Mn 0.25-0.5, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si9Mg; *France:* A-S9G; F100

A-S9GU NF A 57-702 (France) Cast

Nominal composition: Si 8-11, Fe 0.9, Cu 0.4-1, Mg 0.15-0.5, Mn 0.25-0.6, Zn 0.5, Ni 0.2, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si9MgCu; *France:* A-S9GU

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A-S9KG		NF (France)						Cast
Approximate composition: Si 9, Co, Mg, Aluminium rem.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y20 [-]	78.5	-	157	4	74.5	50HB	Typical (Est-alu)	
Y23 [-]	157	-	235	3	74.5	80HB	Typical (Est-alu)	
Y30 [-]	98	-	177	4	74.5	55HB	Typical (Est-alu)	
Y33 [-]	177	-	245	3	74.5	85HB	Typical (Est-alu)	
A-S9U3		NF A 57-703 (France)						Cast
Nominal composition: Si 8-10, Fe 1, Cu 2.7-3.7, Mg 0.1-0.3, Mn 0.6, Zn 1.2, Ni 0.5, Ti 0.2, Pb 0.2, Sn 0.2, Aluminium rem. Density (kg.m ⁻³) 2710								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> AAA380; <i>European (ISO):</i> Al-Si9-Cu3FeZn; Al-Si9-Cu3; <i>France:</i> A-S9U3; <i>Germany:</i> 226D; <i>Japan:</i> ADC10; <i>UK:</i> LM24								
Comments: Complex, high quality castings. Motor parts.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y40 [As cast bar (6.2mm D)]	170	-	300	3.5	76.4	HB90	Pressure die cast (Valfond)	
Y40 [Cast/machined (3mm t)]	130	-	210	1.25	76.4	HB90	Pressure die cast (Valfond)	
A-S9U3 Y4		NF A 57-703 (France)						Cast
Nominal composition: Si 8-10, Fe 1, Cu 2.7-3.7, Mg 0.1-0.3, Mn 0.6, Zn 1.2, Ni 0.5, Ti 0.2, Pb 0.2, Sn 0.2, Aluminium rem.								
Identified Product forms: Ingot								
A-S9U3Z Y4		NF A 57-703 (France)						Cast
Nominal composition: Si 7.5-10, Fe 1.3, Cu 2.5-4, Mg 0.3, Mn 0.6, Zn 3, Ni 0.5, Ti 0.2, Pb 0.2, Sn 0.2, Aluminium rem.								
Identified Product forms: Ingot								
A-S10G		NF A 57-702 (France)						Cast
Nominal composition: Si 9-11, Fe 0.6, Cu 0.1, Mg 0.17-0.4, Mn 0.5, Zn 0.1, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Sb, Sr <=0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2650								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>USA:</i> AAA360.0; <i>European (ISO):</i> Al-Si10Mg; <i>France:</i> A-S10G; <i>Germany:</i> G-AlSi10Mg; <i>Japan:</i> AC4A; <i>UK:</i> LM2; <i>Proprietary:</i> Pech.Affimet Calypso 69N, 69B; Valfond Silafont 36								
Comments: Also NF A 57-105 (Sr <=0.20) Corrosion resistance: Good Weldability: Good (oxy-acet., MIG/TIG) Machinability: Good Finishing: Good (anodized)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y20 [-]	93	-	157	3.5	74.5	55HB	Typical (Est-alu)	
Y20 [Cast test piece]	90	-	150	3	76	50HB	NF A 57-702 (Pechiney)	
Y20 [Sand cast test piece]	95	-	170	4	76	60HB	Na-modified alloy (Pechiney/Affimet)	
Y23 [-]	177	-	226	1.5	74.5	75HB	Typical (Est-alu)	
Y23 [Cast test piece]	180	-	230	1	76	75HB	NF A 57-702 (Pechiney)	
Y23 [Sand cast test piece]	215	-	260	2	76	95HB	Na-modified alloy (Pechiney/Affimet)	
Y30 [-]	108	-	177	2	74.5	65HB	Typical (Est-alu)	
Y30 [Cast test piece]	90	-	170	4	76	55HB	NF A 57-702 (Pechiney)	
Y30 [Chill cast test piece]	95	-	195	9	76	60HB	Na-modified alloy (Pechiney/Affimet)	
Y33 [-]	177	-	255	1.5	74.5	80HB	Typical (Est-alu)	
Y33 [Cast test piece]	180	-	250	1.5	76	80HB	NF A 57-702 (Pechiney)	
Y33 [Chill cast test piece]	215	-	290	10	76	95HB	Na-modified alloy (Pechiney/Affimet)	
Y40 [Pressure cast test bar (6.2mm)]	150	-	250	7.5	74.4	85HB	EI%: 5 - 10 (Valfond)	
A-S10G/R		NF (France)						Cast
Nominal composition: Si 9.3-10.3, Fe 0.32, Cu 0.04, Mg 0.3-0.4, Mn 0.12-0.18, Zn 0.09, Ni 0.04, Ti 0.1-0.15, Pb+Sn 0.02; Sb 0.1-0.16, Aluminium rem. Density (kg.m ⁻³) 2650								
Identified Product forms: Ingot								
Corrosion resistance: Good Weldability: Good (oxy-acet., arc TIG/MIG) Machinability: Good Finishing: Good (anodized)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y30 [Chill cast test piece]	95	-	195	6	76	60HB	Typical (Pechiney/Affimet)	
Y33 [Chill cast test piece]	215	-	290	6	76	95HB	Typical (Pechiney/Affimet)	
A-S10UG		NF A 57-702 (France)						Cast
Nominal composition: Si 9.2-10.8, Fe 0.6-1, Cu 1.8-2.6, Mg 0.7-1.5, Mn 0.3-0.7, Zn 0.2, Ni 0.25, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>European (ISO):</i> Al-Si10CuMg; <i>France:</i> A-S10UG								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y25 [-]	147	-	167	0.5	74.5	80HB	Typical (Est-alu)	
Y35 [-]	157	-	196	0.5	74.5	95HB	Typical (Est-alu)	
A-S11UNG		NF A 57-702 (France)						Cast
Nominal composition: Si 10-12, Fe 0.75, Cu 0.8-1.5, Mg 0.8-1.5, Mn 0.2, Zn 0.2, Ni 0.6-1.3, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>European (ISO):</i> Al-Si11CuNiMg; <i>France:</i> A-S11UNG								
A-S12		NF A57-703 (France)						Cast
Approximate composition: Si 11-13.5, Fe 1.2, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.15, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem. Density (kg.m ⁻³) 2650								
Similar/Equivalent alloys: <i>USA:</i> AAA413.0; <i>European (ISO):</i> Al-Si12; <i>France:</i> A-S12; F101; <i>Germany:</i> G-AlSi12; <i>Japan:</i> AC3A; <i>UK:</i> LM6								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)	
Y40 [As cast bar (6.2mm D)]	140	-	280	4	76.4	HB90	Pressure die cast. EI%: 3 - 5 (Valfond)	
Y40 [Machined from casting, 3mm t]	110	-	180	3	76.4	HB90	Pressure die cast. EI%: 2 - 4 (Valfond)	

A-S12 Y4	NF A 57-703 (France)						Cast
Nominal composition: Si 11-13.5, Fe 1.2, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.15, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem.							
Identified Product forms: Ingot							
A-S12N2G	NF (France)						Cast
Approximate composition: Si 12, Ni 2, Mg, Aluminium rem.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y35 [-]	177	-	196	0.5 74.5	100HB	Typical	(Est-alu)
A-S12U	NF A 57-702 (France)						Cast
Nominal composition: Si 11-13.5, Fe 0.9, Cu 1, Mg 0.3, Mn 0.6, Zn 0.5, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <u>European (ISO):</u> Al-Si12Cu; <u>France:</u> A-S12U							
A-S12UN	NF (France)						Cast
Approximate composition: Si 12, Cu, Ni, Aluminium rem.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y35 [-]	147	-	186	0.5 74.5	85HB	Typical	(Est-alu)
A-S12UNG	NF A 57-702 (France)						Cast
Nominal composition: Si 11.5-13.5, Fe 0.75, Cu 0.8-1.5, Mg 0.8-1.5, Mn 0.2, Zn 0.2, Ni 0.6-1.3, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <u>European (ISO):</u> AlSi12CuNiMg; <u>France:</u> A-S12UNG; <u>Proprietary:</u> Pech.Affimet Calypso 82P							
Comments: Al-Si Cu(Mg) eutectic alloy							
A-S12UY4	NF A 57-703 (France)						Cast
Nominal composition: Si 11-13.5, Fe 1.3, Cu 1, Mg 0.3, Mn 0.6, Zn 0.5, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, Aluminium rem.							
Identified Product forms: Ingot							
A-S13	NF A 57-702 (France)						Cast
Nominal composition: Si 11-13.5, Fe 0.7, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.15, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, Sb, Sr <=0.20, Others: Each 0.05 Total 0.15, Aluminium rem.							
Density (kg.m⁻³): 2650							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <u>European (ISO):</u> Al-Si13; <u>France:</u> A-S13; <u>Proprietary:</u> Pech.Affimet Calypso 43X, 43B.							
Comments: Also NF A 57-105 (Sr <=0.20). Al-Si eutectic alloy. Corrosion resistance: Good Weldability: Excellent (oxy-acet., MIG/TIG) Machinability: Poor Finishing: Good (anodized).							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y20 [-]	78.5	-	162	4 74.5	50HB	Typical	(Est-alu)
Y20 [Cast test piece]	80	-	165	7 76	55HB	Pechiney alloy	(Pechiney)
Y20 [Cast test piece]	70	-	160	4 76	50HB	NF A 57-702	(Pechiney)
Y20 [Sand cast test piece]	80	-	165	7 76	55HB	Na-modified alloy	(Pechiney/Affimet)
Y30 [-]	78.5	-	177	5 74.5	60HB	Typical	(Est-alu)
Y30 [Cast test piece]	80	-	180	10 76	55HB	Pechiney alloy	(Pechiney)
Y30 [Cast test piece]	75	-	170	5 76	55HB	NF A 57-702	(Pechiney)
Y30 [Chill cast test piece]	80	-	180	10 76	55HB	Na-modified alloy	(Pechiney/Affimet)
A-S17U4G	Valfond (France)						Cast
Nominal composition: Si 16-18, Fe 1.1, Cu 4-5, Mg 0.45-0.65, Mn 0.5, Zn 1.5, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem. Density (kg.m⁻³): 2730							
Similar/Equivalent alloys: <u>USA:</u> AAB390.0; <u>European (ISO):</u> Al-Si17Cu4Fe1Mg; <u>UK:</u> LM30							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y40 [Pressure cast test bar 6.2mm]	260	-	290	1 82	120HB		(Valfond)
A-S18UNG	NF A 57-702 (France)						Cast
Nominal composition: Si 16.5-19.5, Fe 0.75, Cu 0.8-1.5, Mg 0.8-1.5, Mn 0.2, Zn 0.2, Ni 0.8-1.3, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <u>European (ISO):</u> Al-Si18CuNiMg; <u>France:</u> A-S18UNG							
Comments: Phosphorus refined Corrosion resistance: Poor Weldability: Poor Machinability: Poor Finishing: Poor (anodized)							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y33 [Chill cast test piece]	90	-	120	1.5 82		250 C (after 1000hrs/250 C)	(Pechiney/Affimet)
Y33 [Chill cast test piece]	260	-	265	0.5 82		RT typical properties	(Pechiney/Affimet)
Y35 [Chill cast test piece]	90	-	120	1.5 82		250 C (after 1000hrs/250 C)	(Pechiney/Affimet)
Y35 [Chill cast test piece]	200	-	210	0.5 82	90HB	RT typical properties	(Pechiney/Affimet)
A-S20U	NF (France)						Cast
Approximate composition: Si 20, Cu, Aluminium rem.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y35 [-]	118	-	177	0.5 80.9	85HB	Typical	(Est-alu)
A-S22UNK	NF (France)						Cast
Approximate composition: Si 22, Cu, Ni, Co, Aluminium rem.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Y35 [-]	157	-	167	0.3 84.3	100HB	Typical	(Est-alu)

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A-S25UNG NF A 57-702 (France) Cast

Nominal composition: Si 23.5-27, Fe 0.75, Cu 0.8-1.5, Mg 0.8-1.5, Mn 0.2, Zn 0.2, Ni 0.8-1.3, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Si25CuNiMg; *France:* A-S25UNG

A-U4NT NF A 57-702 (France) Cast

Nominal composition: Si 0.45, Fe 0.65, Cu 3.5-4.5, Mg 1.2-1.8, Mn 0.3, Zn 0.1, Ni 1.7-2.3, Ti 0.05-0.2, Cr 0.2, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Cu4Ni2Mg2; *France:* A-U4NT

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	118	-	157	0.5 70.6	HB70	Typical	(Est- <i>alu</i>)
Y24 [-]	157	-	226	0.5 70.6	HB85	Typical	(Est- <i>alu</i>)
Y30 [-]	137	-	177	0.5 70.6	HB75	Typical	(Est- <i>alu</i>)
Y34 [-]	186	-	255	0.5 70.6	HB95	Typical	(Est- <i>alu</i>)

A-U4T NF (France) Cast

Approximate composition: Cu 4, Ti, Aluminium rem.

Identified Product forms: Die cast

Similar/Equivalent alloys: *European (ISO):* Al-Cu4Ti; *France:* A-U4T

Comments: Simple mechanical/structural components. Machine construction, textile industry, transport, armaments.

A-U5GT NF A 57-702 (France) Cast

Nominal composition: Si 0.2, Fe 0.35, Cu 4.2-5, Mg 0.15-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05-0.3, Pb 0.05, Sn 0.05, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2800

Similar/Equivalent alloys: *European (ISO):* AlCu4MgTi; *France:* A-U5GT

Comments: Aluminium-copper type alloy. **Corrosion resistance:** Poor **Weldability:** Poor (MIG/TIG) **Machinability:** Excellent **Finishing:** Anodized (Good)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	380	-	420	3 72	125HB	Pechiney/Affimet alloy	(Pechiney)
Y24 [-]	186	-	294	5 68.6	90HB	Typical	(Est- <i>alu</i>)
Y24 [Sand cast test piece]	250	-	400	14 72	110HB	Pechiney/Affimet alloy	(Pechiney)
Y24 [Sand cast test piece]	200	-	320	5 72	90HB	NF A 57-702	(Pechiney)
Y33 [Chill cast test piece]	380	-	420	8 72	125HB	Pechiney/Affimet alloy	(Pechiney)
Y34 [-]	196	-	324	7 68.6	90HB	Typical	(Est- <i>alu</i>)
Y34 [Chill cast test piece]	200	-	340	8 72	95HB	NF A 57-702	(Pechiney)
Y34 [Chill cast test piece]	250	-	400	21 72	110HB	Pechiney/Affimet alloy	(Pechiney)

A-U5NKZr NF A 57-702 (France) Cast

Nominal composition: Si 0.35, Fe 0.5, Cu 4.5-5.5, Mg 0.05, Mn 0.2-0.3, Zn 0.05, Ni 1.3-1.8, Ti 0.15-0.25, Co 0.1-0.4, Pb 0.05, Sn 0.05, Zr 0.1-0.3, Ti+Zr <=0.50; Sb 0.10-0.40; Sb+Co <=0.60, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2800

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Cu5NiCo; *France:* A-U5NKZr

Corrosion resistance: Poor **Weldability:** V. Poor **Machinability:** Excellent **Finishing:** Anodized (Poor)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	270	-	295	1 72	100HB	Typical	(Pechiney/Affimet)
Y33 [Chill cast test piece]	255	-	325	2 72	104HB	Typical	(Pechiney/Affimet)

A-U8S NF A 57-702 (France) Cast

Nominal composition: Si 2-4.5, Fe 0.85, Cu 6-8.5, Mg 0.15, Mn 0.4, Zn 0.5, Ni 0.2, Ti 0.3, Pb 0.1, Sn 0.1, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Cu8Si; *France:* A-U8S

Corrosion resistance: V. Poor **Weldability:** Excellent (oxy-acet., arc TIG/MIG) **Machinability:** Excellent

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y20 [-]	108	-	147	0.5 70.6	75HB	Typical	(Est- <i>alu</i>)
Y20 [Sand cast test piece]	125	-	160	0.5 70	85HB	Typical	(Pechiney/Affimet)
Y30 [-]	118	-	177	0.5 70.6	80HB	Typical	(Est- <i>alu</i>)
Y30 [Chill cast test piece]	130	-	190	0.5 -	90HB	Typical	(Pechiney/Affimet)

A-U8SZ NF A 57-702 (France) Cast

Nominal composition: Si 2-5, Fe 0.9, Cu 5-8.5, Mg 0.3, Mn 0.5, Zn 2, Ni 0.4, Ti 0.3, Pb 0.25, Sn 0.2, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* Al-Cu8SiZn; *France:* A-U8SZ

A-U10G NF (France) Cast

Approximate composition: Cu 10, Mg, Aluminium rem.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y35 [-]	147	-	177	0.5 70.6	110HB	Typical	(Est- <i>alu</i>)

A-U10S4 NF (France) Cast

Approximate composition: Cu 10, Si 4, Aluminium rem.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [-]	177	-	186	0.2 70.6	110HB	Typical	(Est- <i>alu</i>)

A-Z5G	NF A 57-702 (France)	Cast
Official composition: Si 0.3, Fe 0.8, Cu 0.15-0.35, Mg 0.4-0.7, Mn 0.4, Zn 4.5-6, Ni 0.05, Ti 0.1-0.25, Cr 0.15-0.6, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2800		
Identified Product forms: Sand cast, Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-71000; AC-AL-Zn5Mg (<i>ISO</i>): Al-Zn5Mg; <i>France:</i> A-Z5G		
Comments: Aluminium-zinc type alloy. Corrosion resistance: Good Weldability: Excellent (MIG/TIG) Machinability: Excellent Finishing: Anodized (Good)		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%)E (GPa) Hardness	Notes (Source)
T1 [Chill cast]	130 - 210 4 - 65HB	Min. values (VAW-IMCO)
T1 [Sand cast]	120 - 190 4 - 60HB	Min. values (VAW-IMCO)
Y25 [-]	137 - 196 3.5 70.6 60HB	(Est- <i>alu</i>)
Y25 [Sand cast test piece]	140 - 205 6 72 70HB	Pechiney alloy (Pechiney)
Y29 [-]	127 - 196 5 70.6 60HB	(Est- <i>alu</i>)
Y29 [Sand cast test piece]	120 - 205 9 72 65HB	Pechiney alloy (Pechiney)
Y29 [Sand cast test piece]	120 - 190 4 72 60HB	NF A 57-702 (Pechiney)
Y35 [-]	147 - 196 5 70.6 65HB	(Est- <i>alu</i>)
Y39 [-]	127 - 226 8 70.6 65HB	(Est- <i>alu</i>)
A-Z10S8G	Affimet (France)	Cast
Nominal composition: Si 7.7-8.3, Fe 0.27, Cu 0.08, Mg 0.25-0.35, Mn 0.09, Zn 9.5-10.5, Ni 0.04, Ti 0.09, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2900		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Proprietary:</i> Pechiney/Affimet A-Z10S8G		
Comments: Not in NF A 57-702; or NF A 57-703 Corrosion resistance: Fair Weldability: Poor Machinability: Good Finishing: Anodized (Fair)		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%)E (GPa) Hardness	Notes (Source)
Y29 [Sand cast test piece]	200 - 250 1 - 100HB	Typical (Pechiney/Affimet)
Y39 [Chill cast test piece]	210 - 290 2.5 76 105HB	Typical (Pechiney/Affimet)
A201.0	AA (USA)	Cast
Official composition: Si 0.05, Fe 0.1, Cu 4-5, Mg 0.15-0.35, Mn 0.2-0.4, Ti 0.15-0.35, Ag 0.4-1, Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <i>USA:</i> AA201.0 A, MIL -A-21180		
A201.1	AA (USA)	Cast
Official composition: Si 0.05, Fe 0.07, Cu 4-5, Mg 0.2-0.35, Mn 0.2-0.4, Ti 0.15-0.35, Ag 0.4-1, Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA201.1 A (Old AA - A201.2)		
A206.0	AA (USA)	Cast
Official composition: Si 0.05, Fe 0.1, Cu 4.2-5, Mg 0.15-0.35, Mn 0.2-0.5, Zn 0.1, Ni 0.05, Ti 0.15-0.3, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
A206.2	AA (USA)	Cast
Official composition: Si 0.05, Fe 0.07, Cu 4.2-5, Mg 0.2-0.35, Mn 0.2-0.5, Zn 0.05, Ni 0.03, Ti 0.15-0.25, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA206.2 A; <i>Proprietary:</i> Pech. Affimet Calypso 25M		
A242.0	AA (USA)	Cast
Official composition: Si 0.6, Fe 0.8, Cu 3.7-4.5, Mg 1.2-1.7, Mn 0.1, Zn 0.1, Ni 1.8-2.3, Ti 0.07-0.2, Cr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <i>USA:</i> AA242.0 A (Old AA - A142)		
A242.1	AA (USA)	Cast
Official composition: Si 0.6, Fe 0.6, Cu 3.7-4.5, Mg 1.3-1.7, Mn 0.1, Zn 0.1, Ni 1.8-2.3, Ti 0.07-0.2, Cr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA242.1 A (Old AA - A142)		
A242.2	AA (USA)	Cast
Official composition: Si 0.35, Fe 0.6, Cu 3.7-4.5, Mg 1.3-1.7, Mn 0.1, Zn 0.1, Ni 1.8-2.3, Ti 0.07-0.2, Cr 0.15-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>USA:</i> AA242.2 A (Old AA - A142)		
A305.0	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
A305.1	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1995. Listed by AA as Inactive.		
A305.2	AA (USA)	Cast
No composition: -		
Comments: Reclassified in 1988. Listed by AA as Inactive.		

262 Aluminium Alloys (cast)

A319.0	AA (USA)	Cast																
Official composition: Si 5.5-6.5, Fe 1, Cu 3-4, Mg 0.1, Mn 0.5, Zn 3, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast																		
A319.1	AA (USA)	Cast																
Official composition: Si 5.5-6.5, Fe 0.8, Cu 3-4, Mg 0.1, Mn 0.5, Zn 3, Ni 0.35, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>USA:</i> AA319.1 A; <i>European (ISO):</i> AISi6Cu4; <i>France:</i> A-S5U3; A-S6UZ; <i>Germany:</i> G-AISI6Cu4, 3.2151, 3.2155; <i>Italy:</i> 7369-74/4; <i>Japan:</i> C2BS; <i>UK:</i> LM21; <i>Proprietary:</i> VAW Veral 225																		
A333.0	AA (USA)	Cast																
Official composition: Si 8-10, Fe 1, Cu 3-4, Mg 0.05-0.5, Mn 0.5, Zn 3, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Permanent mould cast																		
A333.1	AA (USA)	Cast																
Official composition: Si 8-10, Fe 0.8, Cu 3-4, Mg 0.1-0.5, Mn 0.5, Zn 3, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot																		
A355.0	AA (USA)	Cast																
Official composition: Si 4.5-5.5, Fe 0.09, Cu 1-1.5, Mg 0.45-0.6, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast																		
A355.2	AA (USA)	Cast																
Official composition: Si 4.5-5.5, Fe 0.06, Cu 1-1.5, Mg 0.5-0.6, Mn 0.03, Zn 0.03, Ti 0.04-0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot																		
A356	Hydro Raufoss (Norway)	Cast																
Proprietary composition: Si 7, Mg 0.3, Aluminium rem. Comments: Heat-treatable castings. Used for vehicle components. Condition [Form] T6 [Castings]																		
	<table border="1"> <thead> <tr> <th>PS (MPa)</th> <th>YS (MPa)</th> <th>UTS (MPa)</th> <th>EI (%)</th> <th>E (GPa)</th> <th>Hardness</th> <th>Notes</th> <th>(Source)</th> </tr> </thead> <tbody> <tr> <td>195</td> <td>-</td> <td>260</td> <td>-</td> <td>-</td> <td>-</td> <td>Typical</td> <td>(Raufoss)</td> </tr> </tbody> </table>	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)	195	-	260	-	-	-	Typical	(Raufoss)	
PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)											
195	-	260	-	-	-	Typical	(Raufoss)											
A356.0	AA (USA)	Cast																
Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> AA356.0 A (Old AA - A356), MIL -A-21180																		
A356.1	AA (USA)	Cast																
Official composition: Si 6.5-7.5, Fe 0.15, Cu 0.2, Mg 0.3-0.45, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot																		
A356.2	AA (USA)	Cast																
Official composition: Si 6.5-7.5, Fe 0.12, Cu 0.1, Mg 0.3-0.45, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>USA:</i> AA356.2 A (Old AA - A356); <i>European (ISO):</i> AISi7Mg; <i>France:</i> A-S7G03; <i>Germany:</i> G-AISI7Mg; 3.2371; 3.2335; <i>Italy:</i> 8024; <i>Japan:</i> C4CV; <i>Switzerland:</i> G-AISI7Mg; <i>UK:</i> LM25; <i>Proprietary:</i> VAW Pantal 7																		
A357.0	AA (USA)	Cast																
Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.4-0.7, Mn 0.1, Zn 0.1, Ti 0.04-0.2, Be 0.04-0.07, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> AA357.0 A (Old AA - A357), MIL -A-21180																		
A357.2	AA (USA)	Cast																
Official composition: Si 6.5-7.5, Fe 0.12, Cu 0.1, Mg 0.45-0.7, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Be 0.04-0.07, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>USA:</i> AA357.2 A (Old AA - A357)																		
A359.0	AA (USA)	Cast																
Official composition: Si 8.5-9.5, Fe 0.25, Cu 0.2, Mg 0.4-0.6, Mn 0.1, Zn 0.05, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Comments: Designation added to AA (USA) register since previous issue (01/89)																		
A359.1	AA (USA)	Cast																
Official composition: Si 8.5-9.5, Fe 0.2, Cu 0.2, Mg 0.45-0.6, Mn 0.1, Zn 0.05, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89). Primarily used for making metal-matrix composites.																		
A360.0	AA (USA)	Cast																
Official composition: Si 9-10, Fe 1.3, Cu 0.6, Mg 0.4-0.6, Mn 0.35, Zn 0.5, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <i>USA:</i> AA360.0 A (Old AA - A360)																		

A360.1	AA (USA)	Cast
Official composition: Si 9-10, Fe 1, Cu 0.6, Mg 0.45-0.6, Mn 0.35, Zn 0.4, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA360.1 A (Old AA - A360)		
A360.2	AA (USA)	Cast
Official composition: Si 9-10, Fe 0.6, Cu 0.1, Mg 0.45-0.6, Mn 0.05, Zn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA360.2 A (Old AA - A360)		
A380.0	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1.3, Cu 3-4, Mg 0.1, Mn 0.5, Zn 3, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA380.0 A (Old AA - A380)		
A380.1	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1, Cu 3-4, Mg 0.1, Mn 0.5, Zn 2.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA380.1 A (Old AA - A380)		
A380.2	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 0.6, Cu 3-4, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Others: Each 0.15 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA380.2 A (Old AA - A380)		
A383.0	AA (USA)	Cast
Official composition: Si 9.5-11.5, Fe 1.3, Cu 2-3, Mg 0.1-0.3, Mn 0.5, Zn 3, Ni 0.3, Sn 0.15, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Comments: Designation added to AA (USA) register since previous issue (01/89)		
A383.1	AA (USA)	Cast
Official composition: Si 9.5-11.5, Fe 1, Cu 2-3, Mg 0.15-0.3, Mn 0.5, Zn 2.9, Ni 0.3, Sn 0.15, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89)		
A384.0	AA (USA)	Cast
Official composition: Si 10.5-12, Fe 1.3, Cu 3-4.5, Mg 0.1, Mn 0.5, Zn 1, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA384.0 A (Old AA - 384)		
A384.1	AA (USA)	Cast
Official composition: Si 10.5-12, Fe 1, Cu 3-4.5, Mg 0.1, Mn 0.5, Zn 0.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA384.1 A (Old AA - 384)		
A390.0	AA (USA)	Cast
Official composition: Si 16-18, Fe 0.5, Cu 4-5, Mg 0.45-0.65, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA390.0 A (Old AA - A390); <u>European (ISO):</u> AISi17Cu4Mg; <u>France:</u> A-S17U4G; <u>Proprietary:</u> Pechiney/Affimet Calypso 87P Comments: See AA documentation for method of expressing Mg content.		
A390.1	AA (USA)	Cast
Official composition: Si 16-18, Fe 0.4, Cu 4-5, Mg 0.5-0.65, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA390.1 A (Old AA - A390); <u>UK:</u> LM30; <u>Proprietary:</u> VAW Veral Si17Cu4Mg(H) Comments: See AA documentation for method of expressing Mg content.		
A413.0	AA (USA)	Cast
Official composition: Si 11-13, Fe 1.3, Cu 1, Mg 0.1, Mn 0.35, Zn 0.5, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA413.0 A (Old AA - A13)		
A413.1	AA (USA)	Cast
Official composition: Si 11-13, Fe 1, Cu 1, Mg 0.1, Mn 0.35, Zn 0.4, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA413.1 A (Old AA - A13); <u>European (ISO):</u> AISi12Fe; AISi12CuFe; <u>France:</u> A-S12; A-S12U; <u>Germany:</u> GD-AISi12, 3.2582, 3.2586; GD-AISi12(Cu), 3.2982, 3.2985; <u>Italy:</u> 5079-74; <u>Japan:</u> C3AS; <u>UK:</u> LM2, LM20; <u>Proprietary:</u> VAW Veral Si12(D), Veral 231(D)		
A413.2	AA (USA)	Cast
Official composition: Si 11-13, Fe 0.6, Cu 0.1, Mg 0.05, Mn 0.05, Zn 0.05, Ni 0.05, Sn 0.05, Others: Total 0.1, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA413.2 A (Old AA - A13); <u>European (ISO):</u> AISi12; <u>France:</u> A-S13; <u>Germany:</u> G-AISi11, 3.2211, 3.2212; G-AISi12, 3.2581, 3.2582; <u>Italy:</u> 4514; <u>Japan:</u> C3AV; <u>Switzerland:</u> G-AISi13; <u>UK:</u> LM6; <u>Proprietary:</u> VAW Silumin, Veral Si12A		

264 Aluminium Alloys (cast)

A443.0	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.8, Cu 0.3, Mg 0.05, Mn 0.5, Zn 0.5, Ti 0.25, Cr 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA443.0 A (Old AA - 43 (0.30 Cu max.))		
A443.1	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.6, Cu 0.3, Mg 0.05, Mn 0.5, Zn 0.5, Ti 0.25, Cr 0.25, Others: Total 0.35, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA443.1 A (Old AA - 43 (0.30 Cu max.))		
A444.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.1, Mg 0.05, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA444.0 A (Old AA - A344)		
A444.1	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.05, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot		
A444.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.12, Cu 0.05, Mg 0.05, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA444.2 A (Old AA - A344)		
A535.0	AA (USA)	Cast
Official composition: Si 0.2, Fe 0.2, Cu 0.1, Mg 6.5-7.5, Mn 0.1-0.25, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> AA535.0 A (Old AA - A218)		
A535.1	AA (USA)	Cast
Official composition: Si 0.2, Fe 0.15, Cu 0.1, Mg 6.6-7.5, Mn 0.1-0.25, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA535.1 A (Old AA - A218)		
AA150	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.3, Fe 0.4, Others: Each 0.03 Total 0.15, Aluminium rem. Identified Product forms: Ingot		
AA160	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.1, Fe 0.3, Mn+Ti+Cr+V 0.01, Fe >= 2 x Si, Others: Each 0.02 Total 0.1, Aluminium rem. Identified Product forms: Ingot		
AA170	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.2, Fe 0.25, Cu 0.02, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot		
AA175	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.2, Fe 0.2, Cu 0.02, (Fe 0.25 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot		
AA180	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.15, Fe 0.15, Cu 0.02, (Fe 0.2 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot		
AA185	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.1, Fe 0.1, Cu 0.02, (Fe 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot		
AC1A (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 1.2, Fe 0.5, Cu 4-5, Mg 0.2, Mn 0.3, Zn 0.3, Ni 0.05, Ti 0.25, Cr 0.05, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <u>Japan:</u> JIS H 2211 AC1A.1 & .2 Comments: Finished casting composition limits.		
AC1A.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 1.2, Fe 0.4, Cu 4-5, Mg 0.2, Mn 0.3, Zn 0.3, Ni 0.05, Ti 0.25, Cr 0.05, Bi 0.05, Pb 0.05, V 0.05, Sn 0.05, Fe 0.5 in casting., Aluminium rem. Identified Product forms: Ingot		
AC1A.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 1.2, Fe 0.3, Cu 4-5, Mg 0.2, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.25, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.		

AC1B (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 0.2, Fe 0.35, Cu 4.2-5, Mg 0.15-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05-0.3, Cr 0.05, Pb 0.05, Sn 0.05, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2211 AC1B.1 & .2		
Comments: Finished casting composition limits.		
AC1B.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 0.2, Fe 0.3, Cu 4.2-5, Mg 0.2-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05-0.3, Cr 0.05, Pb 0.05, Sn 0.05, Mg 0.15-0.35, Fe 0.35 in casting., Aluminium rem.		
Identified Product forms: Ingot		
AC1B.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 0.2, Fe 0.2, Cu 4.2-5, Mg 0.2-0.35, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.05-0.3, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition limits.		
AC2A (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 4-6, Fe 0.8, Cu 3-4.5, Mg 0.25, Mn 0.55, Zn 0.55, Ni 0.3, Ti 0.2, Cr 0.15, Pb 0.15, Sn 0.05, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2211 AC2A.1 & .2		
Comments: Finished casting composition limits.		
AC2A.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 4-6, Fe 0.7, Cu 3-4.5, Mg 0.25, Mn 0.55, Zn 0.55, Ni 0.3, Ti 0.2, Cr 0.15, Pb 0.15, Sn 0.05, Fe 0.8 in casting., Aluminium rem.		
Identified Product forms: Ingot		
AC2A.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 4-6, Fe 0.3, Cu 3-4.5, Mg 0.25, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition limits.		
AC2B (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 5-7, Fe 1, Cu 2-4, Mg 0.5, Mn 0.5, Zn 0.1, Ni 0.35, Ti 0.2, Cr 0.2, Pb 0.2, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2211 AC2B.1 & .2		
Comments: Finished casting composition limits.		
AC2B.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 5-7, Fe 0.8, Cu 2-4, Mg 0.5, Mn 0.5, Zn 1, Ni 0.35, Ti 0.2, Cr 0.2, Pb 0.2, Sn 0.1, Fe 1.0 in casting., Aluminium rem.		
Identified Product forms: Ingot		
AC2B.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 5-7, Fe 0.3, Cu 2-4, Mg 0.5, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition limits.		
AC3A (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 10-13, Fe 0.8, Cu 0.25, Mg 0.15, Mn 0.35, Zn 0.3, Ni 0.1, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2211 AC3A.1 & .2		
Comments: Finished casting composition limits.		
AC3A.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 10-13, Fe 0.7, Cu 0.25, Mg 0.15, Mn 0.35, Zn 0.3, Ni 0.1, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.1, Fe 0.8 in casting., Aluminium rem.		
Identified Product forms: Ingot		
AC3A.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 10-13, Fe 0.3, Cu 0.05, Mg 0.03, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.03, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition limits.		
AC4A (casting)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 8-10, Fe 0.55, Cu 0.25, Mg 0.3-0.6, Mn 0.3-0.6, Zn 0.25, Ni 0.1, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.05, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2211 AC4A.1 & .2		
Comments: Finished casting composition limits.		
AC4A.1	JIS H 2211 (Japan)	Cast
Nominal composition: Si 8-10, Fe 0.4, Cu 0.25, Mg 0.35-0.6, Mn 0.3-0.6, Zn 0.25, Ni 0.1, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.05, Mg 0.3-0.6, Fe 0.55 in casting., Aluminium rem.		
Identified Product forms: Ingot		
AC4A.2 (ingot)	JIS H 2211 (Japan)	Cast
Nominal composition: Si 8-10, Fe 0.3, Cu 0.05, Mg 0.35-0.6, Mn 0.3-0.6, Zn 0.03, Ni 0.03, Ti 0.03, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Ingot composition limits.		

266 Aluminium Alloys (cast)

AC4B (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 7-10, Fe 1, Cu 2-4, Mg 0.5, Mn 0.5, Zn 1, Ni 0.35, Ti 0.2, Cr 0.2, Pb 0.2, Sn 0.1, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC4B.1 & .2 Comments: Finished casting composition limits.</p>		
AC4B.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 7-10, Fe 0.8, Cu 2-4, Mg 0.5, Mn 0.5, Zn 1, Ni 0.35, Ti 0.2, Cr 0.2, Pb 0.2, Sn 0.1, Fe 1.0 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC4B.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 7-10, Fe 0.3, Cu 2-4, Mg 0.5, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.03, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC4C (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.55, Cu 0.25, Mg 0.2-0.45, Mn 0.35, Zn 0.35, Ni 0.1, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC4C.1 & .2 Comments: Finished casting composition limits.</p>		
AC4C.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.4, Cu 0.25, Mg 0.25-0.45, Mn 0.35, Zn 0.35, Ni 0.1, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.05, Mg 0.2-0.45, Fe 0.55 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC4C.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.3, Cu 0.05, Mg 0.25-0.45, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC4CH (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.2, Cr 0.05, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC4CH.1 & .2 Comments: Finished casting composition limits.</p>		
AC4CH.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.17, Cu 0.2, Mg 0.3-0.45, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.2, Cr 0.05, Pb 0.05, Sn 0.05, Mg 0.25-0.45, Fe 0.2 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC4CH.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.05, Mg 0.3-0.34, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC4D (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 4.5-5.5, Fe 0.6, Cu 1-1.5, Mg 0.4-0.6, Mn 0.5, Zn 0.3, Ni 0.2, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC4D.1 & .2 Comments: Finished casting composition limits.</p>		
AC4D.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 4.5-5.5, Fe 0.5, Cu 1-1.5, Mg 0.45-0.6, Mn 0.5, Zn 0.3, Ni 0.2, Ti 0.2, Cr 0.15, Pb 0.1, Sn 0.05, Mg 0.4-0.6, Fe 0.6 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC4D.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 4.5-5.5, Fe 0.3, Cu 1-1.5, Mg 0.45-0.6, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC5A (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 0.8, Fe 0.7, Cu 3.5-4.5, Mg 1.2-1.8, Mn 0.35, Zn 0.15, Ni 1.7-2.3, Ti 0.2, Cr 0.15, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC5A.1 & .2 Comments: Finished casting composition limits.</p>		
AC5A.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 0.6, Fe 0.7, Cu 3.5-4.5, Mg 1.3-1.8, Mn 0.35, Zn 0.15, Ni 1.7-2.3, Ti 0.2, Cr 0.15, Pb 0.05, Sn 0.05, Mg 1.2-1.8, Fe 0.8 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC5A.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 0.4, Fe 0.4, Cu 3.5-4.5, Mg 1.3-1.8, Mn 0.03, Zn 0.03, Ni 1.7-2.3, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		

AC7A (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 0.2, Fe 0.3, Cu 0.1, Mg 3.5-5.5, Mn 0.6, Zn 0.15, Ni 0.05, Ti 0.2, Cr 0.15, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC7A.1 & .2 Comments: Finished casting composition limits.</p>		
AC7A.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 0.2, Fe 0.25, Cu 0.1, Mg 3.6-5.5, Mn 0.6, Zn 0.15, Ni 0.05, Ti 0.2, Cr 0.15, Pb 0.05, Sn 0.05, Mg 3.5-5.5, Fe 0.3 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC7A.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.2, Cu 0.05, Mg 3.6-5.5, Mn 0.6, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC8A (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.8, Cu 0.8-1.3, Mg 0.7-1.3, Mn 0.15, Zn 0.15, Ni 0.8-1.5, Ti 0.2, Cr 0.1, Pb 0.05, Sn 0.05, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC8A.1 & .2 Comments: Finished casting composition limits.</p>		
AC8A.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.7, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.15, Zn 0.15, Ni 0.8-1.5, Ti 0.2, Cr 0.1, Pb 0.05, Sn 0.05, Mg 0.7-1.3, Fe 0.8 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC8A.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.4, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.03, Zn 0.03, Ni 0.8-1.5, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC8B (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 1, Cu 2-4, Mg 0.5-1.5, Mn 0.5, Zn 0.5, Ni 0.1-1, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC8B.1 & .2 Comments: Finished casting composition limits.</p>		
AC8B.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 0.8, Cu 2-4, Mg 0.6-1.5, Mn 0.5, Zn 0.5, Ni 0.1-1, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Mg 0.5-1.5, Fe 1.0 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC8B.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 0.4, Cu 2-4, Mg 0.6-1.5, Mn 0.03, Zn 0.03, Ni 0.1-1, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC8C (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 1, Cu 2-4, Mg 0.5-1.5, Mn 0.5, Zn 0.5, Ni 0.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC8C.1 & .2 Comments: Finished casting composition limits.</p>		
AC8C.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 0.8, Cu 2-4, Mg 0.6-1.5, Mn 0.5, Zn 0.5, Ni 0.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Mg 0.5-1.5, Fe 1.0 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC8C.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 8.5-10.5, Fe 0.4, Cu 2-4, Mg 0.6-1.5, Mn 0.03, Zn 0.03, Ni 0.03, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AC9A (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 22-24, Fe 0.8, Cu 0.5-1.5, Mg 0.5-1.5, Mn 0.5, Zn 0.2, Ni 0.5-1.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC9A.1 & .2 Comments: Finished casting composition limits.</p>		
AC9A.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 22-24, Fe 0.7, Cu 0.5-1.5, Mg 0.6-1.5, Mn 0.5, Zn 0.2, Ni 0.5-1.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Mg 0.5-1.5, Fe 0.8 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC9A.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 22-24, Fe 0.4, Cu 0.5-1.5, Mg 0.6-1.5, Mn 0.03, Zn 0.03, Ni 0.5-1.5, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		

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AC9B (casting)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 18-20, Fe 0.8, Cu 0.5-1.5, Mg 0.5-1.5, Mn 0.5, Zn 0.2, Ni 0.5-1.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2211 AC9B.1 & .2 Comments: Finished casting composition limits.</p>		
AC9B.1	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 18-20, Fe 0.7, Cu 0.5-1.5, Mg 0.6-1.5, Mn 0.5, Zn 0.2, Ni 0.5-1.5, Ti 0.2, Cr 0.1, Pb 0.1, Sn 0.1, Mg 0.5-1.5, Fe 0.8 in casting., Aluminium rem. Identified Product forms: Ingot</p>		
AC9B.2 (ingot)	JIS H 2211 (Japan)	Cast
<p>Nominal composition: Si 18-20, Fe 0.4, Cu 0.5-1.5, Mg 0.6-1.5, Mn 0.03, Zn 0.03, Ni 0.5-1.5, Ti 0.2, Cr 0.03, Pb 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Comments: Ingot composition limits.</p>		
AD1.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.9, Cu 1, Mg 0.3, Mn 0.3, Zn 0.5, Ni 0.5, Sn 0.1, Fe 1.3 in casting., Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD1.1; H 2212 D1V; H 5302 ADC1</p>		
AD1.2 (ingot)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 11-13, Fe 0.3-0.6, Cu 0.05, Mg 0.03, Mn 0.03, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD1.2; H 2212 D1V; H 5302 ADC1 Comments: Ingot composition limits.</p>		
AD3.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 9-10, Fe 0.9, Cu 0.6, Mg 0.4-0.6, Mn 0.3, Zn 0.5, Ni 0.5, Sn 0.1, In finished casting: Fe 1.3., Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD3.1; H 2212 D3V; H 5302 ADC3</p>		
AD3.2 (ingot)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 9-10, Fe 0.3-0.6, Cu 0.05, Mg 0.4-0.6, Mn 0.03, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD3.2; H 2212 D3V; H 5302 ADC3 Comments: Ingot composition limits.</p>		
AD5.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 0.3, Fe 1.1, Cu 0.2, Mg 4.1-8.5, Mn 0.3, Zn 0.1, Ni 0.1, Sn 0.1, In finished casting: Mg 4.0-8.5, Fe 1.8, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD5.1; H 2212 D5V; H 5302 ADC5</p>		
AD5.2 (ingot)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 0.3, Fe 0.3-0.6, Cu 0.05, Mg 4.1-8.5, Mn 0.03, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD5.2; H 2212 D5V; H 5302 ADC5 Comments: Ingot composition limits.</p>		
AD6.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 1, Fe 0.6, Cu 0.1, Mg 2.6-4, Mn 0.4-0.6, Zn 0.4, Ni 0.1, Sn 0.1, In finished casting: Mg 2.5-4.0, Fe 0.8, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD6.1; H 2212 D6V; H 5302 ADC6</p>		
AD6.2 (ingot)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 1, Fe 0.3-0.6, Cu 0.05, Mg 2.6-4, Mn 0.4-0.6, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD6.2; H 2212 D6V; H 5302 ADC6 Comments: Ingot composition limits.</p>		
AD10.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 7.5-9.5, Fe 0.9, Cu 2-4, Mg 0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.3, Fe 1.3 in casting., Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD10.1; H 2212 D10V; H 5302 ADC10</p>		
AD10.2 (ingot)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 7.5-9.5, Fe 0.3-0.6, Cu 2-4, Mg 0.03, Mn 0.3, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD10.2; H 2212 D10V; H 5302 ADC10 Comments: Ingot composition limits.</p>		
AD10Z.1	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 7.5-9.5, Fe 0.9, Cu 2-4, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.3, Fe 1.3 in castings, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD10Z.1; H 5302 ADC10Z</p>		

AD12.1 (LME)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 9.6-12, Fe 0.9, Cu 1.5-3.5, Mg 0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.3, Fe 1.3 in castings, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD12.1 (LME); H 2212 D12V; H 5302 ADC12		
AD12.2 (ingot)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 9.6-12, Fe 0.3-0.6, Cu 1.5-3.5, Mg 0.03, Mn 0.03, Zn 0.03, Ni 0.03, Sn 0.3, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD12.2; H 2212 D12V; H 5302 ADC12		
Comments: Ingot composition limits.		
AD12Z.1	JIS H 2118 (Japan)	Cast
Nominal composition: Si 9.6-12, Fe 0.9, Cu 1.5-3.5, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.3, Fe 1.3 in castings, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD12Z; H 5302 ADC12Z		
AD14.1	JIS H 2118 (Japan)	Cast
Nominal composition: Si 16-18, Fe 0.9, Cu 4-5, Mg 0.5-0.65, Mn 0.5, Zn 1.5, Ni 0.3, Sn 0.3, Mg 0.45-0.65, Fe 1.3 in castings., Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD14.1; H 5302 ADC14		
AD14.2 (ingot)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 16-18, Fe 0.3-0.6, Cu 4-5, Mg 0.5-0.65, Mn 0.03, Zn 0.03, Ni 0.03, Sn 0.03, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD14.2; H 5302 ADC14		
Comments: Ingot composition limits.		
ADC1 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 11-13, Fe 1.3, Cu 1, Mg 0.3, Mn 0.3, Zn 0.5, Ni 0.5, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD1.1 & .2; H 5302 ADC1		
Comments: Finished casting composition limits.		
ADC3 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 9-10, Fe 1.3, Cu 0.6, Mg 0.4-0.6, Mn 0.3, Zn 0.5, Ni 0.5, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD3.1 & .2; H 5302 ADC3		
Comments: Finished casting composition limits.		
ADC5 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Fe 1.8, Cu 0.2, Mg 4-8.5, Mn 0.3, Zn 0.1, Ni 0.1, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD5.1 & .2; H 5302 ADC5		
Comments: Finished casting composition limits.		
ADC6 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Fe 0.8, Cu 0.1, Mg 2.5-4, Mn 0.4-0.6, Zn 0.4, Ni 0.1, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD6.1 & .2; H 5302 ADC6		
Comments: Finished casting composition limits.		
ADC10 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 7.5-9.5, Fe 1.3, Cu 2-4, Mg 0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.3, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD10.1 & .2; H 5302 ADC10		
Comments: Finished casting composition limits.		
ADC10Z (casting)	JIS H 5302 (Japan)	Cast
Nominal composition: Si 7.5-9.5, Fe 1.3, Cu 2-4, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.3, Aluminium rem.		
Comments: Finished casting composition limits.		
ADC12 (casting)	JIS H 2118 (Japan)	Cast
Nominal composition: Si 9.6-12, Fe 1.3, Cu 1.5-3.5, Mg 0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.3, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 2118 AD12.1 & .2; H 5302 ADC12		
Comments: Finished casting composition limits.		
ADC12Z (casting)	JIS H 5302 (Japan)	Cast
Nominal composition: Si 9.6-12, Fe 1.3, Cu 1.5-3.5, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.3, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 5302 AD12Z.1		
Comments: Finished casting composition limits.		
ADC14 (casting)	JIS H 5302 (Japan)	Cast
Nominal composition: Si 16-18, Fe 1.3, Cu 4-5, Mg 0.45-0.65, Mn 0.5, Zn 1.5, Ni 0.3, Sn 0.3, Aluminium rem.		
Similar/Equivalent alloys: <i>Japan</i> : JIS H 5302 AD14.1		
Comments: Finished casting composition limits.		

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ADC14 (casting)	JIS H 2118 (Japan)	Cast
<p>Nominal composition: Si 16-18, Fe 1.3, Cu 4-5, Mg 0.45-0.65, Mn 0.5, Zn 1.5, Ni 0.3, Sn 0.3, Aluminium rem. Similar/Equivalent alloys: <i>Japan:</i> JIS H 2118 AD14.1 & .2; H 5302 ADC14 Comments: Finished casting composition limits.</p>		
AG 3	NF (France)	Cast
<p>Approximate composition: Mg 3, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <i>European (ISO):</i> Al-Mg3; <i>France:</i> AG 3 Comments: Decorative anodising for construction, shipbuilding, food, furniture, optical industries. Good resistance to marine and chemical corrosion.</p>		
AG5S	NF (France)	Cast
<p>Approximate composition: Mg 5, Si, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <i>European (ISO):</i> Al-Mg5S; <i>France:</i> AG5S Comments: Good surface finish and marine corrosion resistance. Good elevated temperature properties. Decorative items for vehicles and construction.</p>		
AG.10	GM Metal (France)	Cast
<p>Proprietary composition: Si 0.1, Fe 0.2, Mg 9-11, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Comments: Mother alloy for making magnesium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 600 kg.</p>		
AG.20	GM Metal (France)	Cast
<p>Proprietary composition: Si 0.1, Fe 0.2, Mg 19-21, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Comments: Mother alloy for making magnesium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 600 kg.</p>		
AG.25	GM Metal (France)	Cast
<p>Proprietary composition: Si 0.1, Fe 0.2, Mg 23-27, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Comments: Mother alloy for making magnesium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 600 kg.</p>		
AK4M2116 (AI17B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 3.5-5.5, Fe 1.2, Cu 1.5-3, Mg 0.1-0.3, Mn 0.4-0.7, Zn 5-7, Ni 0.5, Fe 1.3 chill cast., Others: Total 1.7, Aluminium rem. Identified Product forms: Ingot</p>		
AK4M4 (AI15B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 3-5, Fe 1.2, Cu 3.5-5, Mg 0.5, Mn 0.2-0.6, Zn 2, Ni 0.5, Fe 1.3 chill cast., Others: Total 4, Aluminium rem. Identified Product forms: Permanent mould cast, Ingot</p>		
AK5M2 (AI3B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 4-6, Fe 1, Cu 1.5-3.5, Mg 0.2-0.8, Mn 0.2-0.8, Zn 0.5, Ni 0.5, Fe 1.3 chill & pressure die cast., Others: Total 2, Aluminium rem. Identified Product forms: Permanent mould cast, Die cast, Ingot</p>		
AK5M7 (AI10B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 4.5-6.5, Fe 1.2, Cu 6-8, Mg 0.2-0.5, Mn 0.5, Zn 0.6, Ni 0.5, Fe 1.3 pressure die cast., Others: Total 2.5, Aluminium rem. Identified Product forms: Die cast, Ingot</p>		
AK7 (AI9B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 6-8, Fe 1.1, Cu 1.5, Mg 0.2-0.5, Mn 0.6, Zn 0.5, Ni 0.3, Fe 1.2 chill cast, Fe 1.3 pressure die cast., Others: Total 3.7, Aluminium rem. Identified Product forms: Permanent mould cast, Die cast, Ingot</p>		
AK7M2 (AI14B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 6-8, Fe 1.1, Cu 1.5-3, Mg 0.2-0.6, Mn 0.2-0.6, Zn 0.5, Ni 0.3, Fe 1.2 chill cast, Fe 1.3 pressure die cast., Others: Total 1.8, Aluminium rem. Identified Product forms: Ingot</p>		
AK9 (AI4B)	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 8-11, Fe 0.9, Cu 1, Mg 0.2-0.4, Mn 0.2-0.5, Zn 0.5, Ni 0.3, Fe 1.2 chill cast, Fe 1.3 pressure die cast., Aluminium rem. Identified Product forms: Permanent mould cast, Die cast, Ingot</p>		
AK21M2.5N2.5	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 20-22, Fe 0.9, Cu 2.2-3, Mg 0.2-0.5, Mn 0.2-0.4, Zn 0.2, Ni 2.2-2.8, Ti 0.1-0.3, Cr 0.2-0.4, Pb 0.04, Sn 0.01, Others: Total 1.1, Aluminium rem. Identified Product forms: Ingot</p>		
AI 1	GOST 2685-75 (Russia (CIS))	Cast
<p>Nominal composition: Si 0.7, Fe 0.7, Cu 3.75-4.5, Mg 1.25-1.75, Zn 0.1, Ni 1.75-2.25, Ti 0.1, Zr 0.1, Fe 0.8 for Chill Cast, Others: Total 1.4, Aluminium rem. Identified Product forms: Permanent mould cast, Ingot</p>		

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Al 2	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 10-13, Fe 0.7, Cu 0.6, Mg 0.1, Mn 0.5, Zn 0.3, Ti 0.1, Fe <1 chill cast, Fe <1.5 pressure die cast., Others: Total 2.1, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 3	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 4.5-5.5, Fe 0.6, Cu 1.5-3, Mg 0.35-0.6, Mn 0.6-0.9, Zn 0.3, Pb 0.05, Sn 0.01, Zr+Ce 0.5, Fe <1.2 chill cast, Fe <1.6 pressure die cast., Others: Total 1.1, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 4	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 8-10.5, Fe 0.6, Cu 0.3, Mg 0.17-0.3, Mn 0.2-0.5, Zn 0.3, Pb 0.05, Sn 0.01, Be 0.1, Ti+Zr 0.15, Fe 0.9 chill cast, Fe 1.0 pressure die cast., Others: Total 1.1, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 4-1	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 9-10.5, Fe 0.3, Cu 0.1, Mg 0.23-0.3, Mn 0.2-0.35, Zn 0.3, Ti 0.08-0.15, Pb 0.03, Sn 0.005, Zr 0.1, B 0.1, Be 0.1, Others: Total 0.6, Aluminium rem.		
Identified Product forms: Ingot		
Al 5	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 4.5-5.5, Fe 0.6, Cu 1-1.5, Mg 0.35-0.6, Mn 0.5, Zn 0.3, Sn 0.01, Be 0.1, Ti+Zr 0.15, Fe 1.0 chill cast, Fe 1.5 pressure die cast., Others: Total 1, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 5-1	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 4.5-5.5, Fe 0.3, Cu 1-1.5, Mg 0.4-0.55, Mn 0.1, Zn 0.3, Ti 0.08-0.15, Sn 0.01, Zr 0.1, B 0.1, Others: Total 0.6, Aluminium rem.		
Identified Product forms: Ingot		
Al 6	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 4.5-6, Fe 1.1, Cu 2-3, Mg 0.1, Mn 0.3, Zn 0.3, Zr 0.1, B 0.1, Fe 1.4 chill cast, Fe 1.5 pressure die cast., Others: Total 0.6, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 7	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 1.2, Fe 1, Cu 4-5, Mg 0.03, Mn 0.1, Zn 0.2, Ti 0.2, Pb 0.01, Sn 0.01, Zr 0.1, Others: Total 2.1, Aluminium rem.		
Identified Product forms: Ingot		
Al 8	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.3, Fe 0.3, Cu 0.1, Mg 9.3-10, Mn 0.1, Zn 0.1, Ti 0.07, Zr 0.2, Be 0.07, Others: Total 1, Aluminium rem.		
Identified Product forms: Ingot		
Al 9	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 6-8, Fe 0.6, Cu 0.2, Mg 0.2-0.4, Mn 0.5, Zn 0.3, Pb 0.05, Sn 0.01, Be 0.1, Ti+Zr 0.15, Fe 1.0 chill cast, Fe 1.5 pressure die cast., Others: Total 1.1, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 9-1	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 7-8, Fe 0.3, Cu 0.1, Mg 0.25-0.4, Mn 0.1, Zn 0.2, Ti 0.08-0.15, Pb 0.03, Sn 0.005, Zr 0.1, B 0.1, Be 0.1, Others: Total 0.6, Aluminium rem.		
Identified Product forms: Ingot		
Al 11	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 6-8, Fe 0.7, Cu 0.6, Mg 0.1-0.3, Mn 0.5, Zn 7-12, Fe 1.2 chill cast, Fe 1.5 pressure die cast., Others: Total 1.7, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 13	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.8-1.3, Fe 0.5, Cu 0.1, Mg 4.5-5.5, Mn 0.1-0.4, Zn 0.2, Zr 0.15, Others: Total 0.6, Aluminium rem.		
Identified Product forms: Ingot		
Al 19	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.3, Fe 0.2, Cu 4.5-5.3, Mg 0.05, Mn 0.6-1, Zn 0.2, Ni 0.1, Ti 0.15-0.35, Zr 0.2, Fe 0.3 for Chill Cast, Others: Total 0.9, Aluminium rem.		
Identified Product forms: Permanent mould cast, Ingot		
Al 21	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.5, Fe 0.6, Cu 4.6-6, Mg 0.8-1.3, Mn 0.15-0.25, Zn 0.3, Ni 2.6-3.6, Cr 0.1-0.2, Others: Total 1.3, Aluminium rem.		
Identified Product forms: Ingot		
Al 22	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.8-1.2, Fe 0.5, Mg 10.5-13, Zn 0.1, Ti 0.05-0.15, Zr 0.2, Be 0.03-0.07, Fe 1.0 chill cast, Fe 1.2 pressure die cast., Others: Total 0.6, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 23	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.2, Fe 0.2, Cu 0.15, Mg 6-7, Mn 0.1, Zn 0.1, Ti 0.05-0.15, Zr 0.05-0.2, Be 0.02-0.1, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		

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Al 23-1	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.05, Fe 0.05, Cu 0.05, Mg 6-7, Mn 0.1, Zn 0.05, Ti 0.05-0.15, Zr 0.05-0.2, Be 0.02-0.1, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Al 24	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.3, Fe 0.5, Cu 0.2, Mg 1.5-2, Mn 0.2-0.5, Zn 3.5-4.5, Ti 0.1-0.2, Zr 0.1, Be 0.1, Others: Total 0.9, Aluminium rem.		
Identified Product forms: Ingot		
Al 25	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 11-13, Fe 0.8, Cu 1.5-3, Mg 0.8-1.3, Mn 0.3-0.6, Zn 0.5, Ni 0.8-1.3, Ti 0.05-0.2, Cr 0.2, Pb 0.1, Sn 0.02, Others: Total 1.1, Aluminium rem.		
Identified Product forms: Ingot		
Al 27	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.2, Fe 0.2, Cu 0.15, Mg 9.5-10.5, Mn 0.1, Zn 0.1, Ti 0.05-0.15, Zr 0.05-0.2, Be 0.05-0.15, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Al 27-1	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.05, Fe 0.05, Cu 0.05, Mg 9.5-10.5, Mn 0.1, Zn 0.05, Ti 0.05-0.15, Zr 0.05-0.2, Be 0.05-0.15, Others: Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Al 28	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.3, Fe 0.3, Cu 0.3, Mg 4.8-6.3, Mn 0.4-1, Ti 0.05-0.15, Zr 0.1, Fe 0.4 chill cast, Fe 0.5 pressure die cast., Others: Total 0.5, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 29	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.5-1, Fe 0.9, Cu 0.1, Mg 6-8, Mn 0.25-0.6, Zn 0.2, Be 0.01, Others: Total 1, Aluminium rem.		
Identified Product forms: Ingot		
Al 30	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 11-13, Fe 0.7, Cu 0.8-1.5, Mg 0.8-1.3, Mn 0.2, Zn 0.2, Ni 0.8-1.3, Ti 0.2, Pb 0.05, Sn 0.01, Others: Total 1.1, Aluminium rem.		
Identified Product forms: Ingot		
Al 32	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 7.5-8.5, Fe 0.7, Cu 1-1.5, Mg 0.3-0.5, Mn 0.3-0.5, Zn 0.3, Ti 0.1-0.3, Zr 0.1, Fe 0.8 chill cast, Fe 0.9 pressure die cast., Others: Total 0.9, Aluminium rem.		
Identified Product forms: Permanent mould cast, Die cast, Ingot		
Al 33	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 0.3, Fe 0.3, Cu 5.5-6.2, Mg 0.05, Mn 0.6-1, Ni 0.8-1.2, Zr 0.05-0.2, Ce 0.15 - 0.3, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Al 34	GOST 2685-75 (Russia (CIS))	Cast
Nominal composition: Si 6.5-8.5, Fe 0.6, Cu 0.3, Mg 0.35-0.55, Mn 0.1, Zn 0.3, Ti 0.1-0.3, Zr 0.2, B 0.1, Be 0.15-0.4, Others: Total 1, Aluminium rem.		
Identified Product forms: Ingot		
Al B 3	Aleastur (Spain)	Cast
Approximate composition: B 3, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.		
Al B 4	Aleastur (Spain)	Cast
Approximate composition: B 4, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.		
Al B 5	Aleastur (Spain)	Cast
Approximate composition: B 5, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.		
Al Ca	Aleastur (Spain)	Cast
No composition: (Ca), Aluminium rem.		
Identified Product forms: Ingot		
Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.		
Al Cu	Aleastur (Spain)	Cast
No composition: (Cu), Aluminium rem.		
Identified Product forms: Ingot		
Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.		

Al Si	Aleatur (Spain)	Cast
<p>No composition: (Si), Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Sr 3.5	Aleatur (Spain)	Cast
<p>Approximate composition: Sr 3.5, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Sr 5	Aleatur (Spain)	Cast
<p>Approximate composition: Sr 5, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Sr 10	Aleatur (Spain)	Cast
<p>Approximate composition: Sr 10, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Sr10 Ca3	GM Metal (France)	Cast
<p>Proprietary composition: Si 0.2, Fe 0.3, Mn 0.1, Sr 9-11, Ca 2.8 - 3.8, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Comments: Mother alloy for making strontium/calcium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 kg.</p>		
Al Sr Ti B 10/1/0.2	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 1, Sr 10, B 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti 5	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 5, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti 6	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 6, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti 10	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 10, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti B 3/0.2	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 3, B 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti B 3/1	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 3, B 1, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti B 5/0.2	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 5, B 0.2, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti B 5/0.6	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 5, B 0.6, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Ti B 5/1	Aleatur (Spain)	Cast
<p>Approximate composition: Ti 5, B 1, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		

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Al Ti B 6/0.4	Aleastur (Spain)	Cast
<p>Approximate composition: Ti 6, B 0.4, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Zr 5	Aleastur (Spain)	Cast
<p>Approximate composition: Zr 5, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al Zr 10	Aleastur (Spain)	Cast
<p>Approximate composition: Zr 10, Aluminium rem. Identified Product forms: Ingot Comments: Grain refiner/master alloy based on 99.7% min. aluminium. Coil, conti-bar ingot, waffle-plate ingot and sticks.</p>		
Al-Cu4MgTi	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.3, Fe 0.35, Cu 4.2-5, Mg 0.15-0.35, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.05-0.35, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Cu4Ni2Mg2	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.7, Fe 0.7, Cu 3.5-4.5, Mg 1.2-1.8, Mn 0.6, Zn 0.1, Ni 17-2.3, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Cu4Ti	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.25, Fe 0.25, Cu 4-5, Mg 0.05, Mn 0.1, Zn 0.2, Ni 0.1, Ti 0.05-0.3, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Mg3	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.5, Fe 0.5, Cu 0.1, Mg 2.5-4.5, Mn 0.6, Zn 0.2, Ni 0.05, Ti 0.2, Cr 0.1, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Mg3Si2	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.9-2.2, Fe 0.5, Cu 0.1, Mg 2.5-4.5, Mn 0.6, Zn 0.2, Ni 0.05, Ti 0.2, Cr 0.4, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Mg5Si1	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.5-1.5, Fe 0.5, Cu 0.1, Mg 4-6, Mn 0.5, Zn 0.2, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Mg6	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.5, Fe 0.5, Cu 0.1, Mg 4.5-7, Mn 0.6, Zn 0.2, Ni 0.05, Ti 0.2, Cr 0.5, Pb 0.05, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Mg10	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 0.3, Fe 0.3, Cu 0.1, Mg 9.5-11, Mn 0.15, Zn 0.1, Ni 0.1, Ti 0.15, Pb 0.05, Sn 0.05, Be 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al/Sb 10	GM Metal (France)	Cast
<p>Proprietary composition: Si 0.2, Fe 0.3, Sb 9 - 11, Others: Each 0.05, Aluminium rem. Identified Product forms: Ingot Comments: Mother alloy for making antimony additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 kg.</p>		
Al-Si5	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 4.5-6, Fe 0.8, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Si5Cu1Mg	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 4.5-5.5, Fe 0.6, Cu 1-1.5, Mg 0.4-0.6, Mn 0.5, Zn 0.5, Ni 0.3, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Si5Cu3	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 4-6, Fe 0.8, Cu 2-4, Mg 0.15, Mn 0.2-0.6, Zn 0.5, Ni 0.3, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Si5Fe	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 4.5-6, Fe 1.3, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Aluminium rem. Identified Product forms: Ingot</p>		
Al-Si5Mg	ISO 3522 (Europe)	Cast
<p>Nominal composition: Si 3.5-6, Fe 0.6, Cu 0.1, Mg 0.5-0.9, Mn 0.6, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem. Identified Product forms: Ingot Comments: For anodising the silicon content should be between 3.5 and 4.5%.</p>		

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Al-Si6Cu4	ISO 3522 (Europe)	Cast
Nominal composition: Si 5-7, Fe 1, Cu 3-5, Mg 0.3, Mn 0.2-6, Zn 2, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si6Cu4Fe	ISO 3522 (Europe)	Cast
Nominal composition: Si 5-7, Fe 1.3, Cu 3-5, Mg 0.3, Mn 0.2-0.6, Zn 2, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si7Mg	ISO 3522 (Europe)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.2, Cu 0.1, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si7Mg(Fe)	ISO 3522 (Europe)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.5, Cu 0.2, Mg 0.2-0.4, Mn 0.6, Zn 0.3, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si8Cu3Fe	ISO 3522 (Europe)	Cast
Nominal composition: Si 7.5-9.5, Fe 1.3, Cu 2.5-4, Mg 0.3, Mn 0.6, Zn 1.2, Ni 0.5, Ti 0.2, Pb 0.3, Sn 0.2, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si10Mg	ISO 3522 (Europe)	Cast
Nominal composition: Si 9-11, Fe 0.6, Cu 0.1, Mg 0.15-0.4, Mn 0.6, Zn 0.1, Ni 0.05, Ti 0.2, Pb 0.05, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si12	ISO 3522 (Europe)	Cast
Nominal composition: Si 11-13.5, Fe 0.7, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si12Cu	ISO 3522 (Europe)	Cast
Nominal composition: Si 11-13.5, Fe 0.9, Cu 1.2, Mg 0.3, Mn 0.5, Zn 0.5, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si12CuFe	ISO 3522 (Europe)	Cast
Nominal composition: Si 11-13.5, Fe 1.3, Cu 1.2, Mg 0.3, Mn 0.5, Zn 0.5, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Al-Si12Fe	ISO 3522 (Europe)	Cast
Nominal composition: Si 11-13.5, Fe 1.3, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Al/Sr 10	GM Metal (France)	Cast
Proprietary composition: Si 0.2, Fe 0.3, Mn 0.1, Sr 9-11, Others: Each 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Mother alloy for making strontium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 or 600 kg.		
Al/Sr 5	GM Metal (France)	Cast
Proprietary composition: Si 0.2, Fe 0.3, Mn 0.1, Sr 4.5-5.5, Others: Each 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Mother alloy for making strontium additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 or 600 kg.		
Al-Zn5Mg	ISO 3522 (Europe)	Cast
Nominal composition: Si 0.3, Fe 0.8, Cu 0.35, Mg 0.5-0.7, Mn 0.4, Zn 4.5-6, Ni 0.05, Ti 0.1-0.3, Cr 0.15-0.6, Pb 0.05, Sn 0.05, Aluminium rem.		
Identified Product forms: Ingot		
AS.25	GM Metal (France)	Cast
Proprietary composition: Si 23-27, Fe 0.5, Ca < 0.01, P < 10 ppm, (Also Fe < 0.3 version), Others: Each 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Mother alloy for making silicon additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 kg.		
AS.35	GM Metal (France)	Cast
Proprietary composition: Si 32-38, Fe 0.5, Ca < 0.01, P < 10 ppm, (Also Fe < 0.3 version), Others: Each 0.05, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Mother alloy for making silicon additions to aluminium alloy melts. Small ingots (600mm long) weighing 1 kg. Breakable into 100 g portions. Deliverable in packs of 30 kg.		

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Autodur	VAW (Germany)	Cast					
Proprietary composition: Si 8.5-9.5, Fe 0.15, Cu 0.01, Mg 0.3-0.5, Mn 0.03, Zn 9.5-10.5, Ti 0.01, (Fe 0.2-0.4, Mn 0.2-0.3 for pressure die castings), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2850 Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot Comments: High-purity, hypoeutectic alloy produced from primary aluminium. Good flow & die filling properties; no hot tearing tendency. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. Naturally ageing. Easy castability with good strength for engineering parts, e.g. motor, gear-box casings, parts for ABS braking systems. Corrosion resistance: Good Weldability: Good Machinability: Good (after aging) Finishing: Good (polish); Good (protective anodize)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	210	-	220	6	75	95HB	Min. values (VAW)
[Sand castings (<20mm)]	160	-	170	1	75	85HB	Min. values (VAW)
B201.1	AA (USA)	Cast					
Official composition: Si 0.05, Fe 0.05, Cu 4.5-5, Mg 0.25-0.35, Mn 0.2-0.5, Ti 0.15-0.35, Ag 0.5-1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast							
B319.0	AA (USA)	Cast					
Official composition: Si 5.5-6.5, Fe 1.2, Cu 3-4, Mg 0.1-0.5, Mn 0.8, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> AA319.0 B (Old AA - SAE 329)							
B319.1	AA (USA)	Cast					
Official composition: Si 5.5-6.5, Fe 0.9, Cu 3-4, Mg 0.15-0.5, Mn 0.8, Zn 1, Ni 0.5, Ti 0.25, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot							
B356.0	AA (USA)	Cast					
Official composition: Si 6.5-7.5, Fe 0.09, Cu 0.05, Mg 0.25-0.45, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast							
B356.2	AA (USA)	Cast					
Official composition: Si 6.5-7.5, Fe 0.06, Cu 0.03, Mg 0.3-0.45, Mn 0.03, Zn 0.03, Ti 0.04-0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot							
B357.0	AA (USA)	Cast					
Official composition: Si 6.5-7.5, Fe 0.09, Cu 0.05, Mg 0.4-0.6, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Sand cast, Permanent mould cast							
B357.2	AA (USA)	Cast					
Official composition: Si 6.5-7.5, Fe 0.06, Cu 0.03, Mg 0.45-0.6, Mn 0.03, Zn 0.03, Ti 0.04-0.2, Others: Each 0.03 Total 0.1, Aluminium rem. Identified Product forms: Ingot							
B380.0	AA (USA)	Cast					
Official composition: Si 7.5-9.5, Fe 1.3, Cu 3-4, Mg 0.1, Mn 0.5, Zn 1, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: <u>USA:</u> AA380.0 B (Old AA - A380)							
B380.1	AA (USA)	Cast					
Official composition: Si 7.5-9.5, Fe 1, Cu 3-4, Mg 0.1, Mn 0.5, Zn 0.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: <u>USA:</u> AA380.1 B (Old AA - A380); <u>European (ISO):</u> AISi8Cu3Fe; <u>France:</u> A-S9U3; <u>Germany:</u> GD-AISi9Cu3, 3.2163, 3.2166; <u>Italy:</u> 5075-79; <u>UK:</u> LM24; <u>Proprietary:</u> VAW Veral 226(D)							
B384.0	AA (USA)	Cast					
Official composition: Si 10.5-12, Fe 1.3, Cu 3-4.5, Mg 0.1-0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Comments: Designation added to AA (USA) register since previous issue (01/89)							
B384.1	AA (USA)	Cast					
Official composition: Si 10.5-12, Fe 1, Cu 3-4.5, Mg 0.15-0.3, Mn 0.5, Zn 0.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89)							
B390.0	AA (USA)	Cast					
Official composition: Si 16-18, Fe 1.3, Cu 4-5, Mg 0.45-0.65, Mn 0.5, Zn 1.5, Ni 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Die cast Comments: See AA documentation for method of expressing Mg content.							
B390.1	AA (USA)	Cast					
Official composition: Si 16-18, Fe 1, Cu 4-5, Mg 0.5-0.65, Mn 0.5, Zn 1.4, Ni 0.1, Ti 0.2, Others: Each 0.1 Total 0.2, Aluminium rem. Identified Product forms: Ingot Comments: See AA documentation for method of expressing Mg content.							

Aluminium Alloys (cast) 277

B413.0	AA (USA)	Cast
Official composition: Si 11-13, Fe 0.5, Cu 0.1, Mg 0.05, Mn 0.35, Zn 0.1, Ni 0.05, Ti 0.25, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
B413.1	AA (USA)	Cast
Official composition: Si 11-13, Fe 0.4, Cu 0.1, Mg 0.05, Mn 0.35, Zn 0.1, Ni 0.05, Ti 0.25, Others: Each 0.05 Total 0.2, Aluminium rem.		
Identified Product forms: Ingot		
B443.0	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.8, Cu 0.15, Mg 0.05, Mn 0.35, Zn 0.35, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA443.0 B (Old AA - 43 (0.15 Cu max.))		
B443.1	AA (USA)	Cast
Official composition: Si 4.5-6, Fe 0.6, Cu 0.15, Mg 0.05, Mn 0.35, Zn 0.35, Ti 0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA443.1 B (Old AA - 43 (0.15 Cu max.))		
B535.0	AA (USA)	Cast
Official composition: Si 0.15, Fe 0.15, Cu 0.1, Mg 6.5-7.5, Mn 0.05, Ti 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast		
Similar/Equivalent alloys: <u>USA:</u> AA535.0 B (Old AA - B218)		
B535.2	AA (USA)	Cast
Official composition: Si 0.1, Fe 0.12, Cu 0.05, Mg 6.6-7.5, Mn 0.05, Ti 0.1-0.25, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA535.2 B (Old AA - B218)		
BA170	AS 1874-1988 (Australia)	Cast
Nominal composition: Si 0.1, Fe 0.3, Mn+Ti+Cr+V 0.025, Fe >= 1.5 x Si, Fe+Si not in other elements, Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
C355.0	AA (USA)	Cast
Official composition: Si 4.5-5.5, Fe 0.2, Cu 1-1.5, Mg 0.4-0.6, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
Similar/Equivalent alloys: <u>USA:</u> AA355.0 C (Old AA - C355), MIL -A-21180		
C355.1	AA (USA)	Cast
Official composition: Si 4.5-5.5, Fe 0.15, Cu 1-1.5, Mg 0.45-0.6, Mn 0.1, Zn 0.1, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
C355.2	AA (USA)	Cast
Official composition: Si 4.5-5.5, Fe 0.13, Cu 1-1.5, Mg 0.5-0.6, Mn 0.05, Zn 0.05, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <u>USA:</u> AA355.2 C (Old AA - C355)		
C356.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.07, Cu 0.05, Mg 0.25-0.45, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
C356.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.04, Cu 0.03, Mg 0.3-0.45, Mn 0.03, Zn 0.03, Ti 0.04-0.2, Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
C357.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.09, Cu 0.05, Mg 0.45-0.7, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Be 0.04-0.07, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
C357.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.06, Cu 0.03, Mg 0.5-0.7, Mn 0.03, Zn 0.03, Ti 0.04-0.2, Be 0.04-0.07, Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
C380.0	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1.3, Cu 3-4, Mg 0.1-0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Die cast		
Comments: Designation added to AA (USA) register since previous issue (01/89)		
C380.1	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1, Cu 3-4, Mg 0.15-0.3, Mn 0.5, Zn 2.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Designation added to AA (USA) register since previous issue (01/89)		

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C384.0	AA (USA)	Cast					
Official composition: Si 10.5-12, Fe 1.3, Cu 3-4.5, Mg 0.1-0.3, Mn 0.5, Zn 3, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Die cast Comments: Designation added to AA (USA) register since previous issue (01/89)							
C384.1	AA (USA)	Cast					
Official composition: Si 10.5-12, Fe 1, Cu 3-4.5, Mg 0.15-0.3, Mn 0.5, Zn 2.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem. Identified Product forms: Ingot Comments: Designation added to AA (USA) register since previous issue (01/89)							
C443.0	AA (USA)	Cast					
Official composition: Si 4.5-6, Fe 2, Cu 0.6, Mg 0.1, Mn 0.35, Zn 0.5, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Die cast Similar/Equivalent alloys: USA : AA443.0 C (Old AA - A43)							
C443.1	AA (USA)	Cast					
Official composition: Si 4.5-6, Fe 1.1, Cu 0.6, Mg 0.1, Mn 0.35, Zn 0.4, Ni 0.5, Sn 0.15, Others: Total 0.25, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: USA : AA443.1 C (Old AA - A43)							
C443.2	AA (USA)	Cast					
Official composition: Si 4.5-6, Fe 0.7-1.1, Cu 0.1, Mg 0.05, Mn 0.1, Zn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: USA : AA443.2 C (Old AA - A43)							
Calypso 25M	Affimet (France)	Cast					
Proprietary composition: Si 0.02, Fe 0.02, Cu 4.5-5, Mg 0.25-0.35, Mn 0.25-0.35, Zn 0.02, Ni 0.02, Ti 0.17-0.23, Aluminium rem. Identified Product forms: Ingot Similar/Equivalent alloys: USA : AAA206.2; Proprietary: Pech. Affimet Calypso 25M Comments: Controlled low Si and Fe levels. For sand or lost-wax casting. Heat treatable. Used for thick-section parts with combination of strength, ductility and resilience. For defence, train and aeronautic components.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
T4/Y24 [Sand cast test piece]	265	-	405	17 72	110HB	Typical	(Pechiney/Affimet)
T7/Y23 [Sand cast test piece]	350	-	420	7 72	120HB	Typical	(Pechiney/Affimet)
Calypso 41R	Affimet (France)	Cast					
Proprietary composition: Si 10.5-11.5, Fe 0.16-0.27, Cu 0.02, Mg 0.02, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.09, Pb+Sn 0.02; Sb 0.23-0.33, Aluminium rem. Density (kg.m ⁻³) 2650 Identified Product forms: Ingot Similar/Equivalent alloys: European (ISO) : AISi11; France : A-S11 Comments: Al-Si hypoeutectic alloy. Prerefined with Sb. Lightly-loaded, thin components. Corrosion resistance: Good Weldability: Excellent (oxy-acet., arc TIG/MIG) Machinability: Poor Finishing: Poor (polished); Good (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	70	-	170	17 76	50HB	Typical	(Pechiney/Affimet)
Calypso 43B	Affimet (France)	Cast					
Proprietary composition: Si 12-13.5, Fe 0.27, Cu 0.01-0.02, Mg 0.04, Mn 0.18, Zn 0.09, Ni 0.04, Ti 0.14, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2650 Identified Product forms: Ingot Similar/Equivalent alloys: European (ISO) : AISi12; France : A-S13 Comments: Al-Si eutectic alloy. For sand-casting. Suitable for modification with Na. Thin, lightly loaded components with local fixing bosses. Uses motorised driver's door on TGV high-speed trains. Corrosion resistance: Good Weldability: Excellent (oxy-acet., arc TIG/MIG) Machinability: Fair Finishing: Poor (polished); Good (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	90	-	190	9 76	65HB	Na-modified alloy	(Pechiney/Affimet)
Calypso 43X	Affimet (France)	Cast					
Proprietary composition: Si 12-13.5, Fe 0.27, Cu 0.01-0.02, Mg 0.04, Mn 0.18, Zn 0.09, Ni 0.04, Ti 0.14, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2650 Identified Product forms: Ingot Similar/Equivalent alloys: European (ISO) : AISi12; France : A-S13 Comments: Al-Si eutectic alloy. For permanent mould-casting. Thin, lightly loaded components. Uses cam-belt covers, cases brackets. Corrosion resistance: Good Weldability: Excellent (oxy-acet., arc TIG/MIG) Machinability: Fair Finishing: Poor (polished); Good (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	80	-	150	4 76	60HB	Typical	(Pechiney/Affimet)
Y30 [Chill cast test piece]	80	-	170	7 76	60HB	Na-modified alloy	(Pechiney/Affimet)
Calypso 49R	Affimet (France)	Cast					
Proprietary composition: Si 8.5-9.5, Fe 0.3-0.5, Cu 0.02, Mg 0.02, Mn 0.12-0.18, Zn 0.09, Ni 0.04, Ti 0.09, Pb+Sn 0.02; Sb 0.28-0.40, Aluminium rem. Density (kg.m ⁻³) 2650 Identified Product forms: Ingot Similar/Equivalent alloys: European (ISO) : (AISi9); France : A-S9 Comments: Al-Si hypoeutectic alloy. For high-pressure die casting. Prerefined with Sb. Good ductility, impact and shock resistance. Used for dynamic & static loaded parts, e.g. bicycle derailleur parts. Corrosion resistance: Good Weldability: Excellent (oxy-acet., arc TIG/MIG) Machinability: Good Finishing: Good (polished); Good (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y40 [Die-cast test piece 2.5mm]	145	-	265	8 76	75HB	Test piece 25 sq.mm	(Pechiney/Affimet)
Y40 [Die-cast test piece 6mm]	125	-	235	7 -	75HB	Test piece 120 sq.mm	(Pechiney/Affimet)

Calypso 61S Affimet (France) Cast**Proprietary composition:** Si 10.5-11.5, Fe 0.14, Cu 0.02, Mg 0.14-0.2, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.08-0.12, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2650**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi11; *France:* A-S11**Comments:** Al-Si Mg hypoeutectic alloy. Prerefined with Sr. Used for vehicle wheels. Heat treatable. **Corrosion resistance:** Good **Weldability:** Excellent (oxy-acet., arc TIG/MIG) **Machinability:** Poor **Finishing:** Poor (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	80	-	180	14	76	55HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	175	-	260	14	76	80HB	Typical (Pechiney/Affimet)

Calypso 67B Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.3; *France:* A-S7G03**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Suitable for modification with Na. For permanent mould (gravity & low-pressure) and sand casting. Used for vehicle components and general engineering parts. Heat-treated. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Fair **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	200	-	275	6	74	90HB	Typical (Pechiney/Affimet)
Y30 [Chill cast test piece]	90	-	200	16	74	55HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	200	-	290	18	74	90HB	Typical (Pechiney/Affimet)

Calypso 67B1 Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.5-0.6, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.6; *France:* A-S7G06**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Suitable for modification with Na. For permanent mould (gravity & low-pressure) and sand casting. Used for vehicle components and general engineering parts. Heat-treated. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Good **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	250	-	285	2	74	100HB	Na-modified alloy (Pechiney/Affimet)
Y33 [Chill cast test piece]	250	-	325	14	74	100HB	Na-modified alloy (Pechiney/Affimet)

Calypso 67N Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.3; *France:* A-S7G03**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Na-premodified. For permanent mould casting (gravity and low-pressure). Heat-treatable. Used for vehicle components (cylinder heads) and general engineering parts. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Fair **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	200	-	275	6	74	90HB	Typical (Pechiney/Affimet)
Y30 [Chill cast test piece]	90	-	200	16	74	55HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	200	-	290	18	74	90HB	Typical (Pechiney/Affimet)

Calypso 67N1 Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.5-0.6, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.6; *France:* A-S7G06**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Premodified with Na. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Good **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	250	-	285	2	74	100HB	Na-modified alloy (Pechiney/Affimet)
Y33 [Chill cast test piece]	250	-	325	14	74	100HB	Na-modified alloy (Pechiney/Affimet)

Calypso 67R Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.3; *France:* A-S7G03**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Prerefined with Sb. For permanent mould casting (gravity & low-pressure). Used for vehicle wheels, breaking system parts. Other mechanical parts needing fatigue resistance. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Fair **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	90	-	200	14	74	55HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	230	-	300	15	74	95HB	Typical (Pechiney/Affimet)

Calypso 67R1 Affimet (France) Cast**Proprietary composition:** Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.5-0.6, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. **Density** (kg.m⁻³) 2680**Identified Product forms:** Ingot**Similar/Equivalent alloys:** *European (ISO):* AISi7Mg0.6; *France:* A-S7G06**Comments:** Al-Si Mg hypoeutectic alloy. Restricted P content. Prerefined with Sb. Used for vehicle wheels, break system parts. Other mechanical parts needing fatigue & shock resistance. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Good **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y33 [Chill cast test piece]	250	-	325	14	74	110HB	Typical (Pechiney/Affimet)

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Calypto 67R2 Affimet (France) Cast

Proprietary composition: Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.22-0.28, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* AISi7Mg(0.2); *France:* A-S7G(0.2); *Proprietary:* Pech. Affimet Calypto 67R2

Comments: Al-Si Mg hypoeutectic alloy. Restricted P content. Prerefined with Sb. Used for vehicle wheels, break system parts. Other mechanical parts needing fatigue & shock resistance.

Calypto 67S Affimet (France) Cast

Proprietary composition: Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* AISi7Mg0.3; *France:* A-S7G03

Comments: Al-Si Mg hypoeutectic alloy. Restricted P content. Premodified with Sr. For permanent mould castings (gravity & low-pressure). Heat-treatable. Used for engineering parts, vehicle wheels. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Fair **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y30 [Chill cast test piece]	90	-	200	14	74	55HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	200	-	290	16	74	90HB	Typical (Pechiney/Affimet)

Calypto 67S2 Affimet (France) Cast

Proprietary composition: Si 6.7-7.3, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* AISi7Mg0.3; *France:* A-S7G03; *Proprietary:* Pech. Affimet Calypto 67S2

Comments: Al-Si Mg hypoeutectic alloy. Restricted P content. Premodified with Sr. For permanent mould castings (gravity & low-pressure). Heat-treatable. Used for engineering parts, vehicle wheels. **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Fair **Finishing:** Good (polished); Good (anodized).

Calypto 67XB Affimet (France) Cast

Proprietary composition: Si 6.7-7.3, Fe 0.05, Cu 0.02, Mg 0.3-0.37, Mn 0.02, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Aluminium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* , ASTM B536-2; *France:* A-S7G03; *Proprietary:* Pech. Affimet Calypto 67XB

Comments: Controlled P content. Low Fe level. May be Na- or Sr modified to reduce gassing. For sand, die- permanent mould and investment casting. Heat treatable. Uses: high performance components, vehicle, aeronautic, defence.

Calypto 67XB1 Affimet (France) Cast

Proprietary composition: Si 6.7-7.3, Fe 0.05, Cu 0.02, Mg 0.5-0.6, Mn 0.02, Zn 0.02, Ni 0.02, Ti 0.1-0.15, Aluminium rem.

Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* , ASTM B357-2; *France:* A-S7G06HP; *Proprietary:* Pech. Affimet Calypto 67XB1

Comments: Controlled P content. Low Fe level. May be Na- or Sr modified to reduce gassing. For sand, die, permanent mould and investment casting. Heat treatable. Uses: high performance components, vehicle, aeronautic (e.g. EFA fighter plane canopy), defence.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	255	-	295	3.5	74	100HB	Typical (Pechiney/Affimet)
Y33 [Chill cast test piece]	250	-	335	14	74	110HB	Typical (Pechiney/Affimet)

Calypto 67XR Affimet (France) Cast

No composition: -

Identified Product forms: Ingot

Comments: Controlled P content. Low Fe level. Prerefined with Sb. For die, permanent mould and investment casting. Heat treatable. Uses: high performance dynamic loaded parts, e.g. special vehicle braking systems, industrial vehicle wheels, aeronautic structures, hydraulic blocks.

Calypto 67XR1 Affimet (France) Cast

No composition: -

Identified Product forms: Ingot

Comments: Controlled P content. Low Fe level. Prerefined with Sb. For die, permanent mould and investment casting. Heat treatable. Uses: high performance dynamic loaded parts, e.g. special vehicle braking systems, industrial vehicle wheels, aeronautic structures, hydraulic blocks.

Calypto 69B Affimet (France) Cast

Proprietary composition: Si 9-10, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. **Density** (kg.m⁻³) 2650

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* AISi10Mg; *France:* A-S10G

Comments: Al-Si Mg hypoeutectic alloy. Restricted P content. Suitable for modification with Na. For sand or permanent mould casting. Used for diesel engine blocks (boats, vehicles). **Corrosion resistance:** Good **Weldability:** Good (oxy-acet., arc TIG/MIG) **Machinability:** Good **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y23 [Sand cast test piece]	220	-	280	4	76	95HB	Na-modified alloy (Pechiney/Affimet)
Y30 [Chill cast test piece]	95	-	200	14	76	60HB	Na-modified alloy (Pechiney/Affimet)
Y33 [Chill cast test piece]	220	-	300	14	76	95HB	Na-modified alloy (Pechiney/Affimet)

Calypto 69R Affimet (France) Cast

Proprietary composition: Si 8.5-9.5, Fe 0.3-0.5, Cu 0.02, Mg 0.3-0.4, Mn 0.12-0.18, Zn 0.09, Ni 0.04, Ti 0.09, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. **Density** (kg.m⁻³) 2650

Identified Product forms: Ingot

Similar/Equivalent alloys: *European (ISO):* AISi9Mg; *France:* A-S9G03

Comments: Al-Si hypoeutectic alloy. For high-pressure die casting. Prerefined with Sb. Used for vibration and fatigue-loaded parts, e.g. vehicle industry motor supports, chassis parts. **Corrosion resistance:** Good **Weldability:** Excellent (oxy-acet., arc TIG/MIG) **Machinability:** Good **Finishing:** Good (polished); Good (anodized).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Y40 [Die-cast test piece 6mm]	130	-	240	3	76	85HB	Test piece 120 sq.mm (Pechiney/Affimet)

Calypso 69R2		Affimet (France)					Cast
Proprietary composition: Si 9-10, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.04, Ti 0.09-0.13, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. Density (kg.m ⁻³) 2650							
Identified Product forms: Ingot							
Comments: Al-Si hypoeutectic alloy. For high-pressure die casting. Prerefined with Sb. Used for vibration and fatigue-loaded parts, e.g. vehicle industry motor supports, chassis parts.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y23 [Sand cast test piece]	230	-	280	2.5	90HB	Typical (Pechiney/Affimet)	
Y33 [Chill cast test piece]	230	-	305	14	95HB	Typical (Pechiney/Affimet)	
Calypso 69S		Affimet (France)					Cast
Proprietary composition: Si 9-10, Fe 0.14, Cu 0.02, Mg 0.3-0.4, Mn 0.04, Zn 0.04, Ni 0.02, Ti 0.1-0.15, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2650							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (ISO):</i> AISi10Mg; <i>France:</i> A-S10G							
Comments: Al-Si Mg hypoeutectic alloy. Low P content. Premodified with Sr. For permanent mould casting. Corrosion resistance: Good Weldability: Good (oxy-acet., arc TIG/MIG) Machinability: Good Finishing: Good (polished); Good (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y30 [Chill cast test piece]	95	-	200	12	76 60HB	Typical (Pechiney/Affimet)	
Y33 [Chill cast test piece]	220	-	300	12	76 95HB	Typical (Pechiney/Affimet)	
Calypso 82P1		Affimet (France)					Cast
Proprietary composition: Si 11.8-12.7, Fe 0.55, Cu 1.15-1.45, Mg 1.2-1.5, Mn 0.09, Zn 0.04, Ni 0.85-1.15, Ti 0.09, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2720							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (ISO):</i> AISi12CuNiMg; <i>France:</i> A-S12UNG							
Comments: Al-Si Cu (Mg) eutectic alloy. Premodified with P. Hot components. Good dimensional stability. Used for pistons in vehicle engines (cars and HGV), cylinders for motorbikes. Corrosion resistance: Poor Weldability: Good (oxy-acet., arc MIG/TIG) Machinability: Poor Finishing: Poor (polished); Fair (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y33 [Chill cast test piece]	260	-	300	0.5	76 110HB	RT typical (Pechiney/Affimet)	
Y35 [Chill cast test piece]	70	-	115	5	76	250 C (After 1000hrs/250 C) (Pechiney/Affimet)	
Calypso 85R		Affimet (France)					Cast
Proprietary composition: Si 4.7-5.3, Fe 0.12, Cu 2.7-3.3, Mg 0.3-0.4, Mn 0.09, Zn 0.09, Ni 0.04, Ti 0.1-0.15, Pb+Sn 0.02; Sb 0.10-0.16, Aluminium rem. Density (kg.m ⁻³) 2750							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (ISO):</i> AISi5Cu(Mg); <i>France:</i> A-S5U3G							
Comments: Al-Si Cu (Mg) hypoeutectic alloy. Restricted Fe & P contents. Refined with Sb. Load-bearing components, including cylinder caps hydraulic & pneumatic rams. Not recommended for vehicle cylinder heads. Corrosion resistance: Poor Weldability: Excellent (oxy-acet., arc MIG/TIG) Machinability: Excellent Finishing: Good (polished); Poor (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y30 [Chill cast test piece]	170	-	240	2	72 70HB	Typical (Pechiney/Affimet)	
Y33 [Chill cast test piece]	345	-	415	4	72 125HB	Typical (Pechiney/Affimet)	
Y34 [Chill cast test piece]	220	-	360	9	72 100HB	Typical (Pechiney/Affimet)	
Calypso 87P		Affimet (France)					Cast
Proprietary composition: Si 16-18, Fe 0.4, Cu 4-5, Mg 0.5-0.65, Mn 0.1, Zn 0.04, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Others: Each 0.1 Total 0.2, Aluminium rem. Density (kg.m ⁻³) 2730							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>USA:</i> AAA390; <i>European (ISO):</i> AISi17Cu4Mg; <i>France:</i> A-S17U4G							
Comments: Al-Si Cu Mg hypereutectic alloy. Prerefined P. Corrosion resistance: Poor Weldability: Poor Machinability: Poor Finishing: Poor (polished); Poor (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y30 [Chill cast test piece]	171	-	173	1	82 120HB	Typical (Pechiney/Affimet)	
Calypso 92A		Affimet (France)					Cast
Proprietary composition: Si 0.13, Fe 1.25-1.55, Cu 0.09, Mg 0.04, Mn 0.09, Zn 0.09, Ni 0.04, Ti 0.09, Co 1.45-1.75, Pb+Sn 0.02, Aluminium rem. Density (kg.m ⁻³) 2700							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <i>European (ISO):</i> (AlCo2Fe); <i>France:</i> A-K2							
Comments: Pressure-cast components. Used for lightly-loaded, decorative parts anodised or polished, e.g. architectural components. Corrosion resistance: Good Weldability: Good (oxy-acet., arc MIG/TIG) Machinability: Fair Finishing: Excellent (polished); Excellent (anodized).							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes (Source)	
Y30 [Chill cast test piece]	45	-	115	16.5	68 38HB	Typical (Pechiney/Affimet)	
D355.2		AA (USA)					Cast
No composition: -							
Comments: Reclassified in 1974. Listed by AA as Inactive.							
D357.0		AA (USA)					Cast
Official composition: Si 6.5-7.5, Fe 0.2, Mg 0.55-0.6, Mn 0.1, Ti 0.1-0.2, Be 0.4-0.07, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast							
Similar/Equivalent alloys: <i>USA:</i> AA357.0 D, AMS 4241.							
D380.0		AA (USA)					Cast
Official composition: Si 7.5-9.5, Fe 1.3, Cu 3-4, Mg 0.1-0.3, Mn 0.5, Zn 1, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.							
Identified Product forms: Die cast							
Comments: Designation added to AA (USA) register since previous issue (01/89)							

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D380.1	AA (USA)	Cast
Official composition: Si 7.5-9.5, Fe 1, Cu 3-4, Mg 0.15-0.3, Mn 0.5, Zn 0.9, Ni 0.5, Sn 0.35, Others: Total 0.5, Aluminium rem.		
Identified Product forms: Ingot		
Comments: Designation added to AA (USA) register since previous issue (01/89)		
F100	NF (France)	Cast
Nominal composition: Si 9-11, Fe 0.6, Cu 0.2, Mg 0.2-0.5, Mn 0.2-0.35, Zn 0.2, Ni 0.1, Ti 0.15, Pb 0.05, Sn 0.05, Aluminium rem. Density (kg.m ⁻³) 2650		
Similar/Equivalent alloys: <i>France:</i> A-S9G; A-S12U; F100		
Corrosion resistance: Poor Weldability: V. Good (oxy-acet., arc-TIG/MIG) Machinability: Fair Finishing: Poor (anodized)		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes	(Source)
Y20 [Sand cast test piece]	90 - 170 2 76 60HB Na-modified (A-S12U type alloy)	(Pechiney/Affimet)
Y30 [Chill cast test piece]	90 - 200 5 76 65HB Na-modified (A-S12U type alloy)	(Pechiney/Affimet)
Y30 [Chill cast test piece]	95 - 185 5 76 60HB Na-modified (A-S9G type alloy)	(Pechiney/Affimet)
Y40 [Die-cast test piece]	- - 210 1 76 60-80HB (A-S12U type alloy)	(Pechiney/Affimet)
F101	NF (France)	Cast
Nominal composition: Si 12.7-13.5, Fe 0.65, Cu 0.1, Mg 0.1, Mn 0.2, Zn 0.15, Ni 0.05, Ti 0.15, Pb 0.05, Sn 0.05, Aluminium rem. Density (kg.m ⁻³) 2650		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>France:</i> A-S12; A-S9U3; F101		
Corrosion resistance: Good Weldability: Excellent (oxy-acet., arc MIG/TIG) in Y30. Machinability: Poor Finishing: Good (anodized)		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes	(Source)
Y30 [Chill cast test piece]	160 - 230 1 76 80HB Na-modified A-S9U3 type alloy	(Pechiney/Affimet)
Y30 [Chill cast test piece]	80 - 180 10 76 55HB Na-modified A-S12 type alloy	(Pechiney/Affimet)
Y40 [Die cast test piece]	- - 240 0.5 76 80-110HB NF A 57-703 A-S9U3 type Min. values	(Pechiney/Affimet)
Y40 [Die-cast test piece]	- - 210 1 - 50-70HB NF A 57-703 A-S12 type Min. values	(Pechiney/Affimet)
F300	NF (France)	Cast
Nominal composition: Si 5-5.5, Fe 0.6, Cu 3-3.5, Mg 0.05, Mn 0.25-0.4, Zn 0.2, Ni 0.3, Ti 0.05-0.15, Pb 0.05, Sn 0.05, Aluminium rem. Density (kg.m ⁻³) 2750		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>France:</i> A-S5U3		
Corrosion resistance: Poor Weldability: Excellent (oxy-acet., arc TIG/MIG) Machinability: Good Finishing: Poor (anodized)		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes	(Source)
Y20 [Sand cast test piece]	150 - 180 0.5 72 75HB Na-modified A-S5U3 type alloy	(Pechiney/Affimet)
Y30 [Chill cast test piece]	150 - 220 1.5 72 75HB Na-modified A-S5U3 type alloy	(Pechiney/Affimet)
F356.0	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.2, Cu 0.2, Mg 0.17-0.25, Mn 0.1, Zn 0.1, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Sand cast, Permanent mould cast		
F356.2	AA (USA)	Cast
Official composition: Si 6.5-7.5, Fe 0.12, Cu 0.1, Mg 0.17-0.25, Mn 0.05, Zn 0.05, Ti 0.04-0.2, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
G-AiCu4Ti	Önorm M3429 (Austria)	Cast
Nominal composition: Si 0.12, Fe 0.12, Cu 4.5-5.2, Mg 0.03, Mn 0.05, Zn 0.07, Ti 0.15-0.3, (Si 0.15, Fe 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
G-AiCu4TiMg	Önorm M3429 (Austria)	Cast
Nominal composition: Si 0.12, Fe 0.12, Cu 4.2-4.9, Mg 0.15-0.3, Mn 0.05, Zn 0.07, Ti 0.15-0.3, (Si 0.15, Fe 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
GB-AiCu4Ti	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.15, Fe 0.15, Cu 4.5-5.2, Mn 0.001-0.5, Zn 0.07, Ti 0.15-0.3, (Si 0.18, Fe 0.18 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-AiCu4Ti; 3.1842		
GB-AiCu4TiMg	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.15, Fe 0.15, Cu 4.2-4.9, Mg 0.15-0.3, Mn 0.001-0.5, Zn 0.07, Ti 0.15-0.3, (Si 0.18, Fe 0.18 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-AiCu4TiMg; 3.1372		
GB-AiMg3	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.5, Fe 0.4, Cu 0.03, Mg 2.7-3.5, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, Be, by agreement. (Cu 0.05; Mg 2.5-3.5; Si 0.5; Fe 0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51100; AC-AI-Mg3(a); AC-51000; AC-AI-Mg3(b); <i>Germany:</i> GB-AiMg3; 3.3542; 242		
GB-AiMg3Si	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.9-1.3, Fe 0.4, Cu 0.03, Mg 2.7-3.5, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, Be, by agreement. (Cu 0.05; Mg 2.5-3.5; Fe 0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-AiMg3Si; 3.3242; 243		

GB-ALMg5	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.5, Fe 0.4, Cu 0.03, Mg 4.8-5.5, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, Be by agreement. (Cu 0.05; Mg 4.5-5.5; Si 0.5 Fe 0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51300; AC-Al-Mg5; <i>Germany:</i> GB-ALMg5; 3.3562; 244		
GB-ALMg5Si	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.9-1.5, Fe 0.4, Cu 0.03, Mg 4.8-5.5, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, Be by agreement. (Cu 0.05; Mg 4.5-5.5; Fe 0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51400; AC-Al-Mg5(Si); <i>Germany:</i> GB-ALMg5Si; 3.3262; 245		
GB-ALSi5Mg	DIN 1725 (Germany)	Cast
Nominal composition: Si 5-6, Fe 0.3, Cu 0.03, Mg 0.4-0.8, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, (Cu 0.05; Fe 0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi5Mg; 3.2342; 235		
GB-ALSi6Cu4	DIN 1725 (Germany)	Cast
Nominal composition: Si 5-7.5, Fe 1, Cu 3-5, Mg 0.1-0.5, Mn 0.1-0.6, Zn 2, Ni 0.3, Ti 0.15, Pb 0.3, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45000; AC-Al-Si6Cu4; <i>Germany:</i> GB-ALSi6Cu4; 3.2155; 225		
GB-ALSi7Mg	DIN 1725 (Germany)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.03, Mg 0.3-0.45, Mn 0.1, Zn 0.07, Ti 0.001-0.2, (Cu 0.05; Mg 0.25-0.45; Fe 0.18 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi7Mg; 3.2335		
GB-ALSi9Cu3	DIN 1725 (Germany)	Cast
Nominal composition: Si 8-11, Fe 0.8, Cu 2-3.5, Mg 0.1-0.5, Mn 0.1-0.5, Zn 1.2, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, (Fe 0.8 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi9Cu3; 3.2165; 226A		
GB-ALSi9Mg	DIN 1725 (Germany)	Cast
Nominal composition: Si 9-10, Fe 0.15, Cu 0.03, Mg 0.3-0.45, Mn 0.1, Zn 0.07, Ti 0.15, (Cu 0.05; Mg 0.25-0.45; Fe 0.18 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi9Mg; 3.2333		
GB-ALSi10Mg	DIN 1725 (Germany)	Cast
Nominal composition: Si 9-11, Fe 0.3, Cu 0.03, Mg 0.2-0.5, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.05; Fe 0.5; Zn 0.1 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi10Mg; 3.2331; 239A		
GB-ALSi10Mg(Cu)	DIN 1725 (Germany)	Cast
Nominal composition: Si 9-11, Fe 0.6, Cu 0.3, Mg 0.2-0.5, Mn 0.1-0.4, Zn 0.3, Ni 0.1, Ti 0.15, (Fe 0.6 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-43200; AC-Al-Si10Mg(Cu); <i>Germany:</i> GB-ALSi10Mg(Cu); 3.2332; 233		
GB-ALSi11	DIN 1725 (Germany)	Cast
Nominal composition: Si 10-11.8, Fe 0.15, Cu 0.01, Mg 0.001-0.45, Mn 0.03, Zn 0.07, Ti 0.15, (Cu 0.03; Fe 0.18 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi11; 3.2212		
GB-ALSi12	DIN 1725 (Germany)	Cast
Nominal composition: Si 10.5-13.5, Fe 0.3, Cu 0.03, Mg 0.05, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.05; Fe 0.5; Zn 0.1 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi12; 3.2521; 230A		
GB-ALSi12(Cu)	DIN 1725 (Germany)	Cast
Nominal composition: Si 10.5-13.5, Fe 0.8, Cu 1, Mg 0.3, Mn 0.1-0.5, Zn 0.5, Ni 0.2, Ti 0.15, Pb 0.2, Sn 0.1, (Fe 0.8 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>Germany:</i> GB-ALSi12(Cu); 3.2523; 231A		

284 Aluminium Alloys (cast)

GBD-AIMg9	DIN 1725 (Germany)	Cast
Nominal composition: Si 0.01-2.5, Fe 0.8, Cu 0.03, Mg 7.5-10, Mn 0.2-0.5, Zn 0.1, Ti 0.15, Be by agreement. (Cu 0.05; Mg 7.0-10.0; Fe 1.0 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-51200; AC-Al-Mg9; <i>Germany:</i> GBD-AIMg9; 3.3293; 349		
GBD-AISi9Cu3	DIN 1725 (Germany)	Cast
Nominal composition: Si 8-11, Fe 1, Cu 2-3.5, Mg 0.1-0.5, Mn 0.1-0.4, Zn 1.2, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, (Fe 1.2; Mn 0.1-0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46200; AC-Al-Si8Cu3; <i>Germany:</i> GBD-AISi9Cu3; 3.2166; 226		
GBD-AISi10Mg	DIN 1725 (Germany)	Cast
Nominal composition: Si 9-11, Fe 0.8, Cu 0.08, Mg 0.2-0.5, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.10; Fe 1.0; Zn 0.1 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-43000; AC-AISi10Mg(a); AC-43100; AC-AISi10Mg(b); <i>Germany:</i> GBD-AISi10Mg; 3.2336; 239		
GBD-AISi12	DIN 1725 (Germany)	Cast
Nominal composition: Si 10.5-13.5, Fe 0.8, Cu 0.08, Mg 0.05, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.10; Fe 1.0; Zn 0.1 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-44100; AC-AISi12(b); AC-44200; AC-AISi12(a); <i>Germany:</i> GBD-AISi12; 3.2586; 230		
GBD-AISi12(Cu)	DIN 1725 (Germany)	Cast
Nominal composition: Si 10.5-13.5, Fe 1, Cu 1, Mg 0.4, Mn 0.1-0.4, Zn 0.5, Ni 0.2, Ti 0.15, Pb 0.2, Sn 0.1, (Cu 1.2; Fe 1.2; Mn 0.1-0.5 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
Similar/Equivalent alloys: <i>European (CEN):</i> A-47000; AC-Al-Si12(Cu); <i>Germany:</i> GBD-AISi12(Cu); 3.2985; 231		
L119	BS (UK)	Cast
Nominal composition: Si 0.25, Fe 0.4, Cu 4.7-5.5, Mg 0.1, Mn 0.2-0.3, Zn 0.1, Ni 1.3-1.7, Ti 0.15-0.25, Co 0.1-0.3, Zr 0.1-0.3, Be 0.07, Sb 0.10-0.30; Ti+Zr <=0.50 (Cu 4.5-5.5; Si 0.30; Fe 0.50 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L154	BS (UK)	Cast
Nominal composition: Si 1-1.5, Fe 0.25, Cu 3.8-4.5, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.05-0.25, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L155	BS (UK)	Cast
Nominal composition: Si 1-1.5, Fe 0.25, Cu 3.8-4.5, Mg 0.1, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.05-0.25, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L169	BS (UK)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.5-0.75, Mn 0.1, Zn 0.1, Ni 0.05, Ti 0.1-0.2, Pb 0.05, Sn 0.05, Be 0.07, (Fe 0.20 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L173	BS (UK)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Be 0.07, (Cu 0.20; Fe 0.20; Ti 0.04-0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L174	BS (UK)	Cast
Nominal composition: Si 6.5-7.5, Fe 0.15, Cu 0.1, Mg 0.25-0.45, Mn 0.1, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Be 0.07, (Cu 0.20; Fe 0.20; Ti 0.04-0.25 in finished casting), Others: Each 0.05 Total 0.15, Aluminium rem.		
Identified Product forms: Ingot		
L-2640	UNE 38 264 75 (Spain)	Cast
Approximate composition: Si 11-13, Fe 1, Cu 1.75-2.5, Mg 0.3, Mn 0.5, Zn 1.5, Ni 0.3, Ti 0.1, Pb 0.15, Sn 0.1, Aluminium rem.		
Similar/Equivalent alloys: <i>European (CEN):</i> AC-46100; AC-Al-Si11Cu2(Fe); <i>UK:</i> LM2		
Condition [Form]	PS (MPa)	YS (MPa)
As cast [Die cast]	140	-
		UTS (MPa)
		240
		EI (%)E (GPa)
		-
		Hardness
		80HB
		Notes
		Min. values, EI%<1
		(Source)
		(VAW-IMCO)
LMO	BS 1490 (UK)	Cast
Nominal composition: Si 0.3, Fe 0.4, Cu 0.03, Mg 0.03, Mn 0.03, Zn 0.07, Ni 0.03, Pb 0.03, Sn 0.03, Aluminium 99.5 min.		
Identified Product forms: Ingot		

LM2	BS 1490 (UK)						Cast
Nominal composition: Si 9-11.5, Fe 1, Cu 0.7-2.5, Mg 0.3, Mn 0.5, Zn 2, Ni 0.5, Ti 0.2, Pb 0.3, Sn 0.2, Others: Total 0.5, Aluminium rem.							
Identified Product forms: Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	150	-	-	Chill cast	(#2)
LM4	BS 1490 (UK)						Cast
Nominal composition: Si 4-6, Fe 0.8, Cu 2-4, Mg 0.2, Mn 0.2-0.6, Zn 0.5, Ni 0.3, Ti 0.2, Pb 0.1, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45200; AC-Al-Si5Cu3Mn; <i>UK:</i> LM4							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
As cast [Chill cast]	80	-	160	1	-	70HB	Min. values (VAW-IMCO)
As cast [Sand cast]	70	-	140	1	-	60HB	Min. values (VAW-IMCO)
M [-]	-	-	160	2	-	-	Chill cast (#2)
M [-]	-	-	140	2	-	-	Sand cast (#2)
T6 [Chill cast]	230	-	280	-	-	90HB	Min. values; EI% <1 (VAW-IMCO)
T6 [Sand cast]	200	-	230	-	-	90HB	Min. values; EI% <1 (VAW-IMCO)
TF [-]	-	-	230	-	-	-	Sand cast (#2)
TF [-]	-	-	280	-	-	-	Chill cast (#2)
LM5	BS 1490 (UK)						Cast
Nominal composition: Si 0.3, Fe 0.6, Cu 0.1, Mg 3-6, Mn 0.3-0.7, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.05, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	140	3	-	-	Sand cast (#2)
M [-]	-	-	170	5	-	-	Chill cast (#2)
LM6	BS 1490 (UK)						Cast
Nominal composition: Si 10-13, Fe 0.6, Cu 0.1, Mg 0.1, Mn 0.5, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Similar/Equivalent alloys: <i>USA:</i> AA A413.2; <i>France:</i> A-S13; <i>Germany:</i> G-AISi11; 3.2211; 3.2212; <i>Italy:</i> 4514; <i>Japan:</i> C3AV; <i>Switzerland:</i> G-AISi13; <i>UK:</i> LM6; <i>Proprietary:</i> VAW Silumin							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	190	7	-	-	Chill cast (#2)
M [-]	-	-	160	5	-	-	Sand cast (#2)
LM9	BS 1490 (UK)						Cast
Nominal composition: Si 10-13, Fe 0.6, Cu 0.2, Mg 0.2-0.6, Mn 0.3-0.7, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	190	3	-	-	Chill cast (#2)
TE [-]	-	-	170	1.5	-	-	Sand cast (#2)
TE [-]	-	-	230	2	-	-	Chill cast (#2)
TF [-]	-	-	240	-	-	-	Sand cast (#2)
TF [-]	-	-	295	-	-	-	Chill cast (#2)
LM12	BS 1490 (UK)						Cast
Nominal composition: Si 2.5, Fe 1, Cu 9-11, Mg 0.2-0.4, Mn 0.6, Zn 0.8, Ni 0.5, Ti 0.2, Pb 0.1, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	170	-	-	-	Chill cast (#2)
LM13	BS 1490 (UK)						Cast
Nominal composition: Si 10-13, Fe 1, Cu 0.7-1.5, Mg 0.8-1.5, Mn 0.5, Zn 0.5, Ni 1.5, Ti 0.2, Pb 0.1, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
TE [-]	-	-	210	-	-	HB 90 - 130	Chill cast (#2)
TF [-]	-	-	170	-	-	HB 100 - 150	Sand cast (#2)
TF [-]	-	-	280	-	-	HB 100 - 150	Chill cast (#2)
TF7 [-]	-	-	140	-	-	HB 65 - 90	Sand cast (#2)
TF7 [-]	-	-	200	-	-	HB 65 - 90	Chill cast (#2)
LM16	BS 1490 (UK)						Cast
Nominal composition: Si 4.5-5.5, Fe 0.6, Cu 1-1.5, Mg 0.4-0.6, Mn 0.5, Zn 0.1, Ni 0.25, Ti 0.2, Pb 0.1, Sn 0.05, Ti 0.5 if used alone for grain refining, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Similar/Equivalent alloys: <i>European (CEN):</i> AC-45300; AC-Al-Si5Cu1Mg; <i>Italy:</i> 3600; <i>UK:</i> LM16							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
T4 [Chill cast]	140	-	230	3	-	85HB	Min. values (VAW-IMCO)
T4 [Sand cast]	120	-	170	2	-	80HB	Min. values (VAW-IMCO)
T6 [Chill cast]	210	-	280	-	-	110HB	Min. values, EI% <1 (VAW-IMCO)
T6 [Sand cast]	200	-	230	-	-	100HB	Min. values, EI% <1 (VAW-IMCO)
TB [-]	-	-	170	2	-	-	Sand cast (#2)
TB [-]	-	-	230	3	-	-	Chill cast (#2)
TF [-]	-	-	230	-	-	-	Sand cast (#2)
TF [-]	-	-	280	-	-	-	Chill cast (#2)

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LM20	BS 1490 (UK)						Cast
Nominal composition: Si 10-13, Fe 1, Cu 0.4, Mg 0.2, Mn 0.5, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Others: Each 0.05 Total 0.2, Aluminium rem.							
Identified Product forms: Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	190	5	-	Chill cast	(#2)
LM21	BS 1490 (UK)						Cast
Nominal composition: Si 5-7, Fe 1, Cu 3-5, Mg 0.1-0.3, Mn 0.2-0.6, Zn 2, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	150	1	-	Sand cast	(#2)
M [-]	-	-	170	1	-	Chill cast	(#2)
LM22	BS 1490 (UK)						Cast
Nominal composition: Si 4-6, Fe 0.6, Cu 2.8-3.8, Mg 0.05, Mn 0.2-0.6, Zn 0.15, Ni 0.15, Ti 0.2, Pb 0.1, Sn 0.05, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Permanent mould cast							
Similar/Equivalent alloys: <u>European (CEN):</u> AC-45400; AC-AISI5Cu3; <u>UK:</u> LM22							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
T4 [Chill cast]	110	-	230	6	-	75HB Min. values	(VAW-IMCO)
TB [-]	-	-	245	8	-	Chill cast	(#2)
LM24	BS 1490 (UK)						Cast
Nominal composition: Si 7.5-9.5, Fe 1.3, Cu 3-4, Mg 0.3, Mn 0.5, Zn 3, Ni 0.5, Ti 0.2, Pb 0.3, Sn 0.2, Others: Total 0.5, Aluminium rem.							
Identified Product forms: Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [-]	-	-	180	1.5	-	Chill cast	(#2)
LM25	BS 1490 (UK)						Cast
Nominal composition: Si 6.5-7.5, Fe 0.5, Cu 0.2, Mg 0.2-0.6, Mn 0.3, Zn 0.1, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.05, Ti 0.5 if used alone for grain refining, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Similar/Equivalent alloys: <u>European (CEN):</u> AC-42000; AC-AI-Si7Mg; <u>UK:</u> LM25							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
As cast [Chill cast]	90	-	170	2.5	-	55HB Min. values	(VAW-IMCO)
As cast [Sand cast]	80	-	140	2	-	50HB Min. values	(VAW-IMCO)
M [-]	-	-	160	3	-	Chill cast	(#2)
M [-]	-	-	130	2	-	Sand cast	(#2)
T6 [Chill cast]	220	-	260	1	-	90HB Min. values	(VAW-IMCO)
T6 [Sand cast]	180	-	220	1	-	75HB Min. values	(VAW-IMCO)
T64 [Chill cast]	200	-	240	2	-	80HB Min. values	(VAW-IMCO)
TB7 [-]	-	-	230	5	-	Chill cast	(#2)
TB7 [-]	-	-	160	2.5	-	Sand cast	(#2)
TE [-]	-	-	190	2	-	Chill cast	(#2)
TE [-]	-	-	150	1	-	Sand cast	(#2)
TF [-]	-	-	280	2	-	Chill cast	(#2)
TF [-]	-	-	230	-	-	Sand cast	(#2)
LM26	BS 1490 (UK)						Cast
Nominal composition: Si 8.5-10.5, Fe 1.2, Cu 2-4, Mg 0.5-1.5, Mn 0.5, Zn 1, Ni 1, Ti 0.2, Pb 0.2, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
TE [-]	-	-	210	-	-	HB 90 - 120 Chill cast	(#2)
LM27	BS 1490 (UK)						Cast
Nominal composition: Si 6-8, Fe 0.8, Cu 1.5-2.5, Mg 0.35, Mn 0.2-0.6, Zn 1, Ni 0.3, Ti 0.2, Pb 0.2, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Similar/Equivalent alloys: <u>European (CEN):</u> AC-46600; AC-AISI7Cu2							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
As cast [Chill cast]	130	-	210	4	-	65HB Min. values	(VAW-IMCO)
As cast [Sand cast]	90	-	150	1	-	60HB Min. values	(VAW-IMCO)
M [-]	-	-	160	2	-	Chill cast	(#2)
M [-]	-	-	140	1	-	Sand cast	(#2)
LM28	BS 1490 (UK)						Cast
Nominal composition: Si 17-20, Fe 0.7, Cu 1.3-1.8, Mg 0.8-1.5, Mn 0.6, Zn 0.2, Ni 0.8-1.5, Ti 0.2, Cr 0.6, Co 0.5, Pb 0.1, Sn 0.1, Others: Each 0.1 Total 0.3, Aluminium rem.							
Identified Product forms: Sand cast, Permanent mould cast							
Comments: Subject to metallographic structure requirements.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
TE [-]	-	-	170	-	-	HB 90 - 130 Chill cast	(#2)
TF [-]	-	-	120	-	-	HB 100 - 140 Sand cast	(#2)
TF [-]	-	-	190	-	-	HB 100 - 140 Chill cast	(#2)

LM29 BS 1490 (UK) Cast

Nominal composition: Si 22-25, Fe 0.7, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.6, Zn 0.2, Ni 0.8-1.3, Ti 0.2, Cr 0.6, Co 0.5, Pb 0.1, Sn 0.1, Others: Each 0.1 Total 0.3, Aluminium rem.

Identified Product forms: Sand cast, Permanent mould cast

Comments: Subject to metallographic structure requirements.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
TE [-]	-	-	190	-	HB 100 - 140	Chill cast	(#2)
TE [-]	-	-	120	-	HB 100 - 140	Sand cast	(#2)
TF [-]	-	-	190	-	HB 100 - 140	Chill cast	(#2)
TF [-]	-	-	120	-	HB 100 - 140	Sand cast	(#2)

LM30 BS 1490 (UK) Cast

Nominal composition: Si 16-18, Fe 1.1, Cu 4-5, Mg 0.4-0.7, Mn 0.3, Zn 0.2, Ni 0.1, Ti 0.2, Pb 0.1, Sn 0.1, Others: Each 0.1 Total 0.3, Aluminium rem.

Identified Product forms: Permanent mould cast

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
M [-]	-	-	150	-	-	Chill cast	(#2)
TS [-]	-	-	160	-	-	Chill cast	(#2)

LM31 BS 1490 (UK) Cast

Nominal composition: Si 0.25, Fe 0.5, Cu 0.1, Mg 0.5-0.75, Mn 0.1, Zn 4.8-5.7, Ni 0.1, Ti 0.25, Cr 0.4-0.6, Pb 0.05, Sn 0.05, Ti 0.5 if used alone for grain refining, Others: Each 0.05 Total 0.15, Aluminium rem.

Identified Product forms: Sand cast

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
M [-]	-	-	215	4	-	Sand cast	(#2)
TE [-]	-	-	215	4	-	Sand cast	(#2)

Metacs 20 TYK (Japan) Cast Wrought

Proprietary composition: 20% silicon carbide particles in 6061 alloy, Aluminium rem. **Density** (kg.m⁻³) 2800

Identified Product forms: Extrusion, Forging stock/Billet, Die cast

Comments: Silicon carbide particle reinforced aluminium alloy metal matrix composite. (20 volume % reinforcement in A6061-T6 alloy). High strength, high-temperature strength, high modulus, superior wear characteristics, low thermal expansion (15.4 10⁻⁶/deg.C). Processed by extrusion, forging and die casting. For aerospace hot components, automotive engine parts, sports & leisure (ski, racket, golf clubs), Industrial machinery (robot parts).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[-]	380	-	450	7	105	Typical properties	(TYK)

Pantal 5 VAW (Germany) Cast

Proprietary composition: Si 5-6, Fe 0.15, Cu 0.01, Mg 0.4-0.8, Mn 0.001-0.4, Zn 0.05, Ti 0.001-0.2. (Cu 0.05, Fe 0.5, Zn 0.10, Others each: 0.05, Total 0.15 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2690

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *European (ISO):* AISi5Mg; *France:* A-S4G; *Germany:* G-AISi7Mg, 3.2341, 3.2343; *Italy:* 3054

Comments: High-purity, hypoeutectic alloy produced from primary aluminium. Good flow & die filling properties; no hot tearing tendency. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. For high strength (age hardened), corrosion resistant parts. Age hardenable. Suitable for food industry, mechanical equipment, fire-fighting equipment, e.g. brackets, dies for packaging, port-holes, casings. Good electrical conductivity. **Corrosion resistance:** Very good **Weldability:** Very good **Machinability:** Good **Finishing:** Good (polish); Fair (anodized - low Si).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die cast t <20mm]	180	-	220	2	73 90HB	Min. values	(VAW)
Age hardened [Sand casting t <20mm]	160	-	200	2	73 80HB	Min. values	(VAW)
As cast [Gravity die cast t <20mm]	100	-	140	2	73 60HB	Min. values	(VAW)
As cast [Sand casting t <20mm]	90	-	130	1	73 55HB	Min. values	(VAW)
Heat treated [Gravity die cast t <20mm]	130	-	160	4	73 70HB	Min. values	(VAW)
Heat treated [Sand casting t <20mm]	120	-	150	3	73 70HB	Min. values	(VAW)

Pantal 7 VAW (Germany) Cast

Proprietary composition: Si 6.5-7.5, Fe 0.15, Cu 0.01, Mg 0.3-0.45, Mn 0.03, Zn 0.07, Ti 0.001-0.2. (Mg 0.25-0.45, Cu 0.05, Fe 0.18, Mn 0.10, Zn 0.07 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AA A356.2; *European (ISO):* AISi7Mg; *France:* A-S7G03; *Germany:* G-AISi7Mg, 3.2371, 3.2335; *Italy:* 8024; *Japan:* C4CV; *Switzerland:* G-AISi7Mg; *UK:* LM25

Comments: High-purity, hypoeutectic alloy produced from primary aluminium. Good flow & die filling properties; no hot tearing tendency. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. For medium to thick walled castings, high strength & toughness (age, or partially age hardened) with very good corrosion resistance. Age hardenable. Suitable for chassis, telecommunications & aerospace components, e.g. bicycle hub (special pressure die casting), lorry & car wheels, steering-gear housing.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die cast t <20mm]	200	-	250	3	- 80HB	Min. values	(VAW)
Age hardened [Precision cast t <20mm]	190	-	230	3	- 70HB	Min. values	(VAW)
Age hardened [Sand casting t <20mm]	190	-	230	2	- 75HB	Min. values	(VAW)
As cast [Gravity die cast t <20mm]	80	-	170	4	- 50HB	Min. values	(VAW)
As cast [Sand casting t <20mm]	70	-	140	2	73 45HB	Min. values	(VAW)
Partially age hardened [Gravity diecast t <20mm]	130	-	220	5	- 70HB	Min. values	(VAW)
Partially age hardened [Sand casting t <20mm]	120	-	190	4	- 65HB	Min. values	(VAW)

SA2 SABS 989 (South Africa) Cast

Nominal composition: Si 0.3, Fe 0.4, Cu 0.03, Zn 0.07, Others: Each 0.03, Aluminium rem.

Identified Product forms: Ingot

288 Aluminium Alloys (cast)

SA4	SABS 989 (South Africa)						Cast
Nominal composition: Si 0.2, Fe 0.25, Cu 0.02, Zn 0.06, Others: Each 0.03, Aluminium rem.							
Identified Product forms: Ingot							
SGAlCu2NiMg	NBN P21-101 (Belgium)						Cast
Nominal composition: Si 0.7-2.3, Fe 0.8-1.4, Cu 1.5-2.5, Mg 0.6-1, Mn 0.1, Zn 0.5, Ni 0.8-1.8, Ti 0.35, Cr 0.2, Pb 0.05, Sn 0.05, Aluminium rem.							
Identified Product forms: Ingot							
SGAlCu4MgTi	NBN P21-101 (Belgium)						Cast
Nominal composition: Si 0.05-0.3, Fe 0.4, Cu 4-5, Mg 0.15-0.35, Mn 0.1, Zn 0.2, Ni 0.05, Ti 0.1-0.3, Cr 0.2, Pb 0.05, Sn 0.05, Aluminium rem.							
Identified Product forms: Ingot							
Silafont 36	Valfond (France)						Cast
Proprietary composition: Si 9.5-11.5, Fe 0.13, Cu 0.03, Mg 0.1-0.5, Mn 0.5-0.8, Zn 0.1, Ni 0.05, Ti 0.04-0.15, Pb 0.05, Sn 0.05, Sr 100 - 250 ppm, Aluminium rem. Density (kg.m ⁻³) 2630							
Identified Product forms: Ingot							
Similar/Equivalent alloys: <u>USA:</u> AA A360.0; <u>European (ISO):</u> Al-Si10Mg; <u>France:</u> A-S10G; <u>Germany:</u> G-AISi10Mg; <u>Japan:</u> AC4A; <u>UK:</u> LM2; <u>Proprietary:</u> Pech.Affimet Calypso 69N, 69B; Valfond Silafont 36							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Y40 [Pressure cast test bar 6.2mm]	150	-	250	7.5 74.4	85HB	EI%: 5 - 10	(Valfond)
Silumin	VAW (Germany)						Cast
Proprietary composition: Si 10-11.8, Fe 0.15, Cu 0.01, Mg 0.01, Zn 0.05, Ti 0.001-0.15, (Cu 0.3, Fe 0.18, Zn 0.07 in finished castings) Fe 0.2-0.4 in pressure die-castings. Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2680							
Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot							
Similar/Equivalent alloys: <u>USA:</u> AA A413.2; <u>European (ISO):</u> AlSi12; <u>France:</u> A-S13; <u>Germany:</u> G-AISi11, 3.2211, 3.2212; <u>Italy:</u> 4514; <u>Japan:</u> C3AV; <u>Switzerland:</u> G-AISi13; <u>UK:</u> LM6							
Comments: Produced from primary alloy. High-purity, eutectic casting alloy with very good flow & die filling properties. No tendency for hot-tearing. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. For complex thin-walled pressure-tight & dynamically loaded parts, e.g. wheels (cars, wheel-chairs), gas regular casing, filter casings. Heat-treatable. Si content 12.5-13.5% on request. Corrosion resistance: Very good Weldability: Excellent (special technique for die-casting) Machinability: Very good Finishing: Good (polished); Possible (protect. anodized)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Gravity castings t <20mm]	80	-	150	6 -	45HB	Min. values	(VAW)
As cast [Gravity die cast test piece]	70	-	150	6 -	45HB	Min. values	(VAW)
As cast [Press. Die-cast test piece]	120	-	220	3 -	60HB	Min. values	(VAW)
As cast [Sand cast test piece]	70	-	150	6 -	45HB	Min. values	(VAW)
As cast [Sand castings t <20mm]	70	-	140	5 -	45HB	Min. values	(VAW)
Heat treated [Gravity castings t <20mm]	80	-	150	8 -	40HB	Min. values	(VAW)
Heat treated [Gravity die cast test piece]	80	-	170	9 -	45HB	Min. values	(VAW)
Heat treated [Sand cast test piece]	70	-	150	8 75	45HB	Min. values	(VAW)
Heat treated [Sand castings t <20mm]	70	-	140	7 -	40HB	Min. values	(VAW)
Silumin-Beta	VAW (Germany)						Cast
Proprietary composition: Si 9-11, Fe 0.15, Cu 0.01, Mg 0.3-0.45, Mn 0.03, Zn 0.05, Ti 0.001-0.15, (Mg 0.25-0.45, Cu 0.05, Fe 0.18, Mn 0.10, Zn 0.07 in castings). Fe 0.2-0.4 in Press. Die castings. Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2680							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <u>USA:</u> AA359.2; <u>European (ISO):</u> AlSi10Mg; <u>France:</u> A-S10G; <u>Germany:</u> G-AISi9Mg, 3.2373, 3.2333; <u>Italy:</u> 3051; <u>Japan:</u> C4AV; <u>Switzerland:</u> G-AISi9Mg; <u>UK:</u> LM9							
Comments: Produced from primary alloy. High-purity, hypoeutectic casting alloy with very good flow & die filling properties. No tendency for hot-tearing. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. Treating pressure die casting by special techniques, e.g. VACURAL. For complex thin-walled, high-strength with good toughness (heat-treated) parts, e.g. automotive (diesel cylinder head, motorbike crank-case), aerospace. Heat-treatable. In the age-hardened condition this alloy is known as 'SILUMIN-GAMMA'. Corrosion resistance: Good Weldability: Excellent; special technique for press.die-casting Machinability: Good Finishing: Good (polish); Good (protective anodize)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Gravity die cast t <20mm]	90	-	180	3 -	60HB	Min. values	(VAW)
As cast [Gravity die cast test piece]	90	-	180	4 -	60HB	Min. values	(VAW)
As cast [Pressure die cast test piece]	140	-	220	2 -	60HB	Min. values; special process	(VAW)
As cast [Sand cast test piece]	80	-	160	2.5 74	50HB	Min. values	(VAW)
As cast [Sand casting t <20mm]	70	-	150	3 -	50HB	Min. values	(VAW)
Heat treated [Gravity die cast t <20mm]	190	-	240	3 -	80HB	Min. values Silumin-Gamma	(VAW)
Heat treated [Gravity die cast test piece]	200	-	250	4 -	80HB	Min. values Silumin-Gamma	(VAW)
Heat treated [Pressure die cast test piece]	200	-	250	4 -	80HB	Min. values; Silumin-Gamma; special casting process	(VAW)
Heat treated [Sand cast test piece]	190	-	230	2 -	75HB	Min. values Silumin-Gamma	(VAW)
Heat treated [Sand casting t <20mm]	180	-	220	2 -	75HB	Min. values Silumin-Gamma	(VAW)
Silumin-Delta	VAW (Germany)						Cast
Proprietary composition: Si 9-10, Fe 0.3-0.4, Cu 0.01, Mg 0.01, Mn 0.3-0.4, Zn 0.05, Ti 0.15, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2690							
Identified Product forms: Die cast, Ingot							
Similar/Equivalent alloys: <u>USA:</u> AA409.2; <u>France:</u> A-S9; <u>Germany:</u> GD-AISi10(H)							
Comments: Produced from primary aluminium. High-purity hypoeutectic alloy with good flow & die filling properties. No hot-tearing tendency; low 'sticking'. For complex, thin-walled pressure die-castings with high-toughness/corrosion resistance. Heat-treatable (if casting designed especially). Suitable for domestic appliances, e.g. coffee machine heater plate, iron sole-plate, bearing blocks, side-wall casings. Corrosion resistance: Very good Weldability: Only with special techniques Machinability: Good Finishing: Good (polish); Possible (protective anodize)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Pressure die-cast test piece]	80	-	180	8 -	60HB	Min. values	(VAW)
As cast [Pressure die-cast test piece]	120	-	220	4 74	60HB	Min. values	(VAW)

Silumin-Kappa

VAW (Germany)

Cast

Proprietary composition: Si 10-11.8, Fe 0.15, Cu 0.01, Mg 0.1-0.45, Zn 0.05, Ti 0.001-0.15, (Mg 0.4, Cu 0.03, Fe 0.18, Zn 0.07 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2670

Identified Product forms: Permanent mould cast, Die cast

Similar/Equivalent alloys: *USA:* AA369.1; *Germany:* G-AISI11, 3.2211, 3.2212; *Italy:* 3049; *Switzerland:* G-AISI13Mg; *UK:* LM9

Comments: High purity hypoeutectic alloy produced from primary aluminium. Excellent flow & die filling properties; no hot tearing tendency. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. For complex, thin-walled, pressure-tight, dynamically loaded castings. High strength and good toughness (heat-treated) with very good corrosion resistance. Age hardening. Suitable for wheels, e.g. car & motorcycles. **Note:** Property values for Mg0.25%; higher Mg contents increase proof-, ultimate strength & hardness, but lower elongation (vice versa). **Corrosion resistance:** Very good **Weldability:** Excellent **Machinability:** Very good **Finishing:** Good (polish); Possible (Protect anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
As cast [Gravity die cast t <20mm]	80	-	160	3	- 55HB	Min. values	(VAW)
As cast [Gravity die cast test piece]	90	-	170	4	- 55HB	Min. values	(VAW)
As cast [Sand cast test piece]	80	-	160	2.5	74 50HB	Min. values	(VAW)
As cast [Sand casting t <20mm]	70	-	150	2	- 50HB	Min. values	(VAW)
Heat treated [Gravity die cast t <20mm]	190	-	240	3	- 80HB	Min. values	(VAW)
Heat treated [Gravity die cast test piece]	190	-	250	4	- 80HB	Min. values	(VAW)
Heat treated [Sand cast test piece]	180	-	230	2	- 75HB	Min. values	(VAW)
Heat treated [Sand casting t <20mm]	170	-	220	1	- 75HB	Min. values	(VAW)

Unifont

NF (France)

Cast

No composition: (Zn, Si)

Identified Product forms: Die cast

Similar/Equivalent alloys: *European (ISO):* Al-Zn10Si8; *France:* Unifont

Comments: Mechanical components.

Veral 99.5

VAW (Germany)

Cast

Proprietary composition: Si 0.2, Fe 0.4, Cu 0.02, Zn 0.07, Fe:Si 2:1, Others: Each 0.03, Aluminium 99.5 min. **Density** (kg.m⁻³) 2700

Identified Product forms: Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* AA150.1; *France:* A5; *UK:* LMO

Comments: For the production of rotors (cage rotors) for electrical motors; pressure die-cast, gravity die cast, low pressure die-cast & centrifugal casting. **Corrosion resistance:** Excellent **Weldability:** Not pressure die castings **Machinability:** Good **Finishing:** Not used

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die cast test piece]	20	-	60	30	71 14HB	Min. values	(VAW)
[Pressure die cast test piece]	20	-	80	10	71 15HB	Min. values	(VAW)

Veral 99.7

VAW (Germany)

Cast

Proprietary composition: Si 0.12, Fe 0.25, Cu 0.01, Zn 0.05, Fe:Si 2:1; Cr+Mn+Ti+V <0.03, Others: Each 0.01, Aluminium 99.7 min. **Density** (kg.m⁻³) 2700

Identified Product forms: Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* AA170.1; *France:* A7; *UK:* LMO

Comments: For the production of rotors (cage rotors) for electrical motors; pressure die-cast, gravity die cast, low pressure die-cast & centrifugal casting. **Corrosion resistance:** Excellent **Weldability:** Not pressure die castings **Machinability:** Good **Finishing:** Not used

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die cast test piece]	20	-	60	30	71 14HB	Min. values	(VAW)
[Pressure die cast test piece]	20	-	80	10	71 15HB	Min. values	(VAW)

Veral 100

VAW (Germany)

Cast

Proprietary composition: Si 0.4-0.6, Fe 0.4, Cu 0.02, Mg 0.8-1.3, Mn 0.03, Zn 1.8-2.2, Ti 0.03, Contains Be, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Age hardenable. For decorative fittings requiring a very good appearance, e.g. door and window handles & plates, furniture corners, etc. **Corrosion resistance:** Very good **Weldability:** Very good

Machinability: Good **Finishing:** Excellent (polish); Good (anodized sealing)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)
Aged [Sand castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)
As cast [Gravity die castings (<20mm)]	80	-	140	6	71 55HB	Min. values	(VAW)
Naturally aged [Gravity die castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)

Veral 100G

VAW (Germany)

Cast

Proprietary composition: Si 0.4-0.6, Fe 0.008, Cu 0.006, Mg 0.8-1.3, Mn 0.003, Zn 1.8-2.2, Ni 0.003, Ti 0.02, Contains Be, Others: Each 0.01 Total 0.05, Aluminium rem. **Density** (kg.m⁻³) 2730

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Lower impurities than Veral 100. Age hardenable. For decorative fittings requiring a very good appearance, e.g. door and window handles & plates, furniture corners, etc. **Corrosion resistance:** Very good

Weldability: Very good **Machinability:** Good **Finishing:** Excellent (polish); Good (anodized sealing)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)
Aged [Sand castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)
As cast [Gravity die castings (<20mm)]	80	-	140	6	71 55HB	Min. values	(VAW)
Naturally aged [Gravity die castings (<20mm)]	280	-	300	2	71 100HB	Min. values	(VAW)

290 Aluminium Alloys (cast)

Veral 225 VAW (Germany) Cast

Proprietary composition: Si 5-7.5, Fe 0.1, Cu 3-5, Mg 0.1-0.5, Mn 0.1-0.6, Zn 2, Ni 0.3, Ti 0.15, Pb 0.3, Sn 0.1, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2800

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAA319.1; *European (ISO):* AISi6Cu4; *France:* A-SU53; *Germany:* G-AISi6Cu4, 3.2151, 3.2155; *Italy:* 7369-74; *Japan:* C2BS; *UK:* LM21

Comments: Easily castable, universal alloy; low hot tearing tendency, increased with Mg content. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. For complex, heat resistant parts, e.g. cylinder heads, gas-burner parts, hand-wheels. **Corrosion resistance:** Moderate **Weldability:** Very good (except pressure die cast) **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	110	-	160	0.5	75	65HB	Min. values (VAW)
[Pressure die cast test piece]	140	-	220	0.5	74	80HB	Min. values (VAW)
[Sand castings (<20mm)]	100	-	140	0.5	75	60HB	Min. values (VAW)

Veral 226A VAW (Germany) Cast

Proprietary composition: Si 8-11, Fe 0.8, Cu 2-3.5, Mg 0.1-0.5, Mn 0.1-0.5, Zn 1.2, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, Fe 0.8 in finished castings, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2760

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AA333.1; *France:* A-S9U3; *Germany:* GD-AISi9Cu, 3.2163, 3.2166; *Italy:* 5075-79; *Japan:* C4BS; *Switzerland:* G-AISi8Cu3; *UK:* LM24

Comments: Easily castable, universal alloy; low hot tearing tendency, increased with Mg content. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. For complex, thin-walled, heat-resistant parts, e.g. automobile gear-box & axle casings, copier casings/supports. **Corrosion resistance:** Moderate **Weldability:** Very good **Machinability:** Good **Finishing:** Fair (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	100	-	160	0.5	75	65HB	Min. values (VAW)
[Sand castings (<20mm thick)]	100	-	140	0.5	75	60HB	Min. values (VAW)

Veral 226(D) VAW (Germany) Cast

Proprietary composition: Si 8-11, Fe 1, Cu 2-3.5, Mg 0.1-0.5, Mn 0.1-0.4, Zn 1.2, Ni 0.3, Ti 0.15, Pb 0.2, Sn 0.1, (Mn 0.1-0.5, Fe 1.2 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2760

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAB380.1; *European (ISO):* AISi8CuFe; *France:* A-S9U3; *Germany:* GD-AISi9Cu, 3.2163, 3.2166; *Italy:* 5075-79; *UK:* LM24

Comments: Easily castable, universal alloy; low hot tearing tendency, increased with Mg content. Pressure die casting version of Veral 226A. For complex, thin-walled, heat-resistant parts, e.g. automobile gear-box & axle casings, copier casings/supports. **Corrosion resistance:** Moderate **Weldability:** Not welded **Machinability:** Good **Finishing:** Fair (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Pressure die cast test piece]	140	-	240	0.5	75	80HB	Min. values (VAW)

Veral 231A VAW (Germany) Cast

Proprietary composition: Si 10.5-13.5, Fe 0.8, Cu 1, Mg 0.3, Mn 0.1-0.4, Zn 0.5, Ni 0.2, Ti 0.15, Pb 0.2, Sn 0.1, (Fe 0.8 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *European (ISO):* AISi12Cu; *France:* A-S12U; *Germany:* G-AISi12(Cu), 3.2583, 3.2523; *Italy:* 5079-74; *Switzerland:* G-AISi10Cu; *UK:* LM2

Comments: Easily castable; no hot tearing tendency. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. For complex, thin-walled, pressure-tight parts with high fatigue strength and moderate corrosion resistance to environment, e.g. casing parts, ribbed bodies, fan wheels. **Corrosion resistance:** Fair **Weldability:** Excellent **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	90	-	160	1	75	55HB	Min. values (VAW)
[Sand castings (<20mm)]	80	-	140	1	75	50HB	Min. values (VAW)

Veral 231(D) VAW (Germany) Cast

Proprietary composition: Si 10.5-13.5, Fe 1, Cu 1, Mg 0.4, Mn 0.1-0.5, (Cu 1.2, Fe 1.2 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAA413.1; *European (ISO):* AISi12CuFe; *France:* A-S12U; *Germany:* GD-AISi12(Cu), 3.2982, 3.2985; *Italy:* 5079-74; *UK:* LM2

Comments: Easily castable; no hot tearing tendency. Pressure die casting version of Veral 231A. For complex, thin-walled, pressure-tight parts with high fatigue strength and moderate corrosion resistance to environment, e.g. casing parts, ribbed bodies, fan wheels. **Corrosion resistance:** Fair **Weldability:** Not welded **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
[Pressure die cast test piece]	140	-	220	1	75	60HB	Min. values (VAW)

Veral 233 VAW (Germany) Cast

Proprietary composition: Si 9-11, Fe 0.6, Cu 0.03, Mg 0.2-0.5, Mn 0.1-0.4, Zn 0.3, Ni 0.01, Ti 0.15, (Fe 0.1 for pressure die casting ingot; Fe 0.6 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2690

Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* AA361.1; *France:* A-S9G; *Germany:* G-AISi10Mg(Cu), 3.2383, 3.2332; *Italy:* 5074-74; *Japan:* D3S

Comments: A hypoeutectic alloy, easily castable; low hot tearing tendency. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. For complex, thin-walled, pressure-tight parts with shock & fatigue resistance with environmental resistance, e.g. combustion engine parts (air intake ducts, oil filter adapters, steering casing). **Corrosion resistance:** Moderate **Weldability:** Excellent (not die castings) **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	190	-	220	0.5	74	80HB	Min. values (VAW)
Age hardened [Pressure die cast piece]	210	-	240	2	74	85HB	Min. values; special treatment (VAW)
Age hardened [Sand castings (<20mm)]	180	-	200	0.5	74	75HB	Min. values (VAW)
As cast [Gravity die castings (<20mm)]	100	-	180	0.5	74	60HB	Min. values (VAW)
As cast [Sand castings (<20mm)]	80	-	150	1	74	55HB	Min. values (VAW)

Veral 241	VAW (Germany)	Cast
Proprietary composition: Si 0.3-0.6, Fe 0.5, Cu 0.15, Mg 2.5-3.5, Mn 0.2-0.3, Zn 0.3, Ti 0.2, Contains Be, Others: Each 0.05 Total 0.15, Aluminium rem. Density (kg.m ⁻³) 2680		

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* (Old AA - F514.1); *European (ISO):* AlMg3; *France:* A-G3T; *UK:* LM5

Comments: Extensively grain-refined; contains Be to reduce oxidation. Low Si produces excellent anodised finish. For decorative/functional fittings, e.g. door, window handles, door risers, lock plates. **Corrosion resistance:** Good **Weldability:** Fair **Machinability:** Excellent **Finishing:** Very good (polish); Good (decorative anodise)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	80	-	140	2	70	50HB	Min. values (VAW)
[Sand castings (<20mm)]	70	-	130	2	70	50HB	Min. values (VAW)

Veral Cu4Ti	VAW (Germany)	Cast
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Proprietary composition: Si 0.1, Fe 0.15, Cu 4.5-5.2, Mg 0.1, Mn 0.001-0.5, Zn 0.05, Ti 0.15-0.3, (Fe 0.18, Mg 0.03, Si 0.18, Zn 0.07 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2790

Similar/Equivalent alloys: *USA:* (Old AA - 224); *European (ISO):* AlCu4Ti; *Germany:* G-AlCu4Ti, 3.1841, 3.1842; *Italy:* 3044; *Switzerland:* G-AlCu4Ti; *UK:* LM11; 2L91, 2L92

Comments: High purity alloy produced from primary aluminium, with intensive grain refining. For simple parts requiring high-strength (age hardened) and toughness (partially aged), e.g. aerospace, braking system parts. **Corrosion resistance:** Poor **Weldability:** Excellent **Machinability:** Good **Finishing:** Good (polish); Good (anodized, prot. & decorative)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	200	-	280	3	72	90HB	Min. values (VAW)
Age hardened [Sand castings (<20mm)]	180	-	250	2	72	90HB	Min. values (VAW)
Partially aged [Gravity die castings (<20mm)]	170	-	260	4	72	85HB	Min. values (VAW)
Partially aged [Sand castings (<20mm)]	160	-	240	3	72	80HB	Min. values (VAW)

Veral Cu4TiMg	VAW (Germany)	Cast
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Proprietary composition: Si 0.1, Fe 0.15, Cu 4.2-4.9, Mg 0.15-0.3, Mn 0.001-0.5, Zn 0.05, Ti 0.15-0.3, (Fe 0.18, Mg 0.03, Si 0.18, Zn 0.07 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2780

Similar/Equivalent alloys: *USA:* AA204.2; *European (ISO):* AlCu4MgTi; *France:* A-U5GT; *Germany:* G-AlCu4TiMg, 3.1371, 3.1372; *Switzerland:* G-AlCu5MgTi; *UK:* LM5

Comments: High purity alloy produced from primary aluminium, with intensive grain refining. For simple parts requiring high-strength (age hardened) and toughness (partially aged), e.g. aerospace, ventilator wheel/fan, hydraulic trolley body, casings. **Note:** in age hardened condition the alloy is sensitive to stress-corrosion cracking; this heat-treatment is no longer used. **Corrosion resistance:** Poor **Weldability:** Fair **Machinability:** Good **Finishing:** Good (polish); Good (anodized, prot. & decorative)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	220	-	300	2	-	95HB	Min. values (VAW)
Age hardened [Sand castings (<20mm)]	220	-	280	1	-	90HB	Min. values (VAW)
Naturally aged [Gravity die castings (<20mm)]	200	-	280	5	-	90HB	Min. values (VAW)
Naturally aged [Precision castings (<20mm)]	180	-	270	3	-	85HB	Min. values (VAW)
Naturally aged [Sand castings (<20mm)]	180	-	240	3	72	85HB	Min. values (VAW)

Veral Mg3	VAW (Germany)	Cast
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Proprietary composition: Si 0.5, Fe 0.4, Cu 0.03, Mg 2.7-3.5, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, Contains Be. (Mg 2.5-3.5, Cu 0.05, Fe 0.5, Si 0.5 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AA514.2; *European (ISO):* AlMg3; *France:* A-G3T; *Germany:* G-AlMg3, 3.3541, 3.3542; *Italy:* 3059; *Switzerland:* G-AlMg3Ti; *UK:* LM5

Comments: Excellent corrosion resistance, especially for sea water. For decorative parts (less brilliant than Veral Mg3(H)). Intensive grain refining, contains Be to reduce oxidation. For domestic appliance parts, door and window handles/locks.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die cast (<20mm)]	70	-	150	4	70	50HB	Min. values (VAW)
[Precision cast (<20mm)]	80	-	140	3	70	55HB	Min. values (VAW)
[Sand cast (<20mm)]	60	-	130	3	70	45HB	Min. values (VAW)

Veral Mg3(H)	VAW (Germany)	Cast
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Proprietary composition: Si 0.5, Fe 0.15, Cu 0.01, Mg 2.7-3.5, Mn 0.001-0.4, Zn 0.05, Ti 0.001-0.2, Contains Be (Mg 2.5-3.5, Cu 0.05, Fe 0.5, Si 0.5, Zn 0.1, each 0.05, total 0.15 in finished casting), Others: Each 0.03 Total 0.01, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* AA514.2; *European (ISO):* AlMg3; *France:* A-G3T; *Germany:* G-AlMg3, 3.3541, 3.3542; *Italy:* 3059; *Switzerland:* G-AlMg3Ti; *UK:* LM5

Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Excellent corrosion resistance (especially sea water). For parts requiring decorative finish (anodised), e.g. hinges, tube fittings, push-plate, door handles, lock-plates, etc. **Corrosion resistance:** Very good

Machinability: Good **Finishing:** Good (polish); Good (anodized, decorative)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
[Gravity die castings t <20mm]	70	-	150	4	70	50HB	Min. values (VAW)
[Precision cast t <20mm]	80	-	140	3	-	55HB	Min. values (VAW)
[Sand castings t <20mm]	60	-	130	3	70	45HB	Min. values (VAW)

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Veral Mg3Si(H)		VAW (Germany)					Cast
Proprietary composition: Si 0.9-1.3, Fe 0.15, Cu 0.01, Mg 2.7-3.5, Mn 0.001-0.4, Zn 0.05, Ti 0.001-0.2, Contains Be (Mg 2.5-3.5, Cu 0.05, Fe 0.5, Zn 0.1, each 0.05, total 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2680							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>USA:</i> AA512.2 (Old AA - B514.2); <i>European (ISO):</i> AlMg3Si2; <i>Germany:</i> G-AlMg3Si, 3.3241, 3.3242; <i>Switzerland:</i> G-AlMg3Si1							
Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Excellent corrosion resistance (especially sea water). Higher strength than Veral Mg3(H). For food industry and load-bearing fittings, e.g. supports, mast light casing, window handle, casings. Corrosion resistance: Excellent Weldability: Fair Machinability: Excellent Finishing: Good (polish); Good (anodize; decorative)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
Age hardened [Gravity die casting (<20mm)]	120	-	220	3	70 65HB	Min. values (VAW)	
Age hardened [Precision casting (<20mm)]	120	-	180	2	70 55HB	Min. values (VAW)	
Age hardened [Sand casting (<20mm)]	120	-	180	2	70 60HB	Min. values (VAW)	
As cast [Gravity die casting (<20mm)]	80	-	140	4	70 50HB	Min. values (VAW)	
As cast [Sand casting (<20mm)]	70	-	130	3	70 45HB	Min. values (VAW)	
Veral Mg5(H)		VAW (Germany)					Cast
Proprietary composition: Si 0.5, Fe 0.15, Cu 0.01, Mg 4.8-5.5, Mn 0.001-0.4, Zn 0.05, Ti 0.001-0.2, Contains Be (Mg 4.5-5.5, Cu 0.05, Fe 0.5, Si 0.5, Zn 0.1, each 0.05, total 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2660							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>USA:</i> AA535.2; <i>European (ISO):</i> AlMg6; <i>France:</i> A-G6T; <i>Germany:</i> G-AlMg5, 3.3561, 3.3562; <i>Italy:</i> 3058; <i>Japan:</i> C7AV; <i>UK:</i> LM5							
Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Very good corrosion resistance (sea-water). For interior & exterior architecture, food & chemical industry, fire-fighting equipment, e.g. flanged-rings, Airbus door grip, train hydraulic casing. Corrosion resistance: Very good Weldability: Good Machinability: Good Finishing: Good (polish); Good (anodize; decorative)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
[Gravity die casting (<20mm)]	100	-	150	2	69 55HB	Min. values (VAW)	
[Sand casting (<20mm)]	90	-	140	2	69 50HB	Min. values (VAW)	
Veral Mg5Si(H)		VAW (Germany)					Cast
Proprietary composition: Si 0.9-1.5, Fe 0.15, Cu 0.01, Mg 4.8-5.5, Mn 0.001-0.4, Zn 0.05, Ti 0.001-0.2, Contains Be (Mg 4.5-5.5, Cu 0.05, Fe 0.5, Zn 0.1, each 0.05, total 0.15 in finished casting), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2660							
Identified Product forms: Sand cast, Permanent mould cast, Ingot							
Similar/Equivalent alloys: <i>European (ISO):</i> AlMg5Si1; <i>France:</i> A-G6T; <i>Germany:</i> G-AlMg5Si, 3.3261, 3.3262							
Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Very good corrosion resistance (sea-water). For corrosion resistance in food & chemical industry, complex castings. Si improves castability compared with Veral Mg5(H), e.g. film camera body, casings/covers, cylinder head (air-cooled, diesel engine). NOTE: Cu-containing variant Veral Mg5Si(Cu) (H; Hy551) with 0.4-0.6% Cu for heat resistant uses, but has lower corrosion resistance. Corrosion resistance: Very good Weldability: Good Machinability: Good Finishing: Good (polish); Good (anodize; decorative)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
Age hardened [Gravity die casting (<20mm)]	130	-	220	3	69 70HB	Min. values (VAW)	
Age hardened [Sand casting (<20mm)]	120	-	160	2	69 65HB	Min. values (VAW)	
As cast [Gravity die casting (<20mm)]	100	-	150	1	69 60HB	Min. values (VAW)	
As cast [Sand casting (<20mm)]	100	-	140	1	69 55HB	Min. values (VAW)	
Veral Mg9		VAW (Germany)					Cast
Proprietary composition: Si 0.01-2.5, Fe 0.8, Cu 0.03, Mg 7.5-10, Mn 0.2-0.5, Zn 0.1, Ti 0.15, Contains Be, Others: Each 0.05 Total 0.15, Aluminium rem.							
Identified Product forms: Die cast, Ingot							
Similar/Equivalent alloys: <i>USA:</i> AA518.1; <i>France:</i> A-G10S; <i>Germany:</i> G-AlMg9, 3.3292, 3.3293; <i>Italy:</i> 5080-74; <i>UK:</i> LM10							
Comments: Good corrosion resistance. Intensive grain refining, contains Be to reduce oxidation. For decorative parts, optical industry, office & household equipment. Corrosion resistance: Very good Weldability: Only specially cast parts Machinability: Very good Finishing: Good (polish); Fair (decorative anodized)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
[Pressure die cast test piece]	140	-	200	1	68 70HB	Min. values (VAW)	
Veral Mg9(H)		VAW (Germany)					Cast
Proprietary composition: Si 0.01-2.5, Fe 0.3, Cu 0.01, Mg 7.5-10, Mn 0.2-0.5, Zn 0.05, Ti 0.15, Contains Be (Mg 7.0-10.0, Cu 0.05, Zn 0.1, each 0.05, total 0.15 in finished castings), Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2630							
Identified Product forms: Die cast, Ingot							
Similar/Equivalent alloys: <i>USA:</i> AA518.2; <i>European (ISO):</i> AlMg10; <i>Germany:</i> G-AlMg9, 3.3292, 3.3293							
Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. For pressure die castings requiring good corrosion resistance and surface appearance. Uses: optical industry, office and household equipment, e.g. covers & base plates, trigger guards, grip/handle plates. Corrosion resistance: Good Weldability: Poor Machinability: Very good Finishing: Good (polish); Good (anodize; decorative)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
As cast [Pressure die cast test piece]	140	-	200	1	68 70HB	Min. values (VAW)	
Homogenised [Pressure die cast test piece]	130	-	200	6	68 70HB	Min. values; special casting method (VAW)	
Veral Mg10(H)		VAW (Germany)					Cast
Proprietary composition: Si 0.3, Fe 0.15, Cu 0.01, Mg 9-11, Mn 0.03, Zn 0.05, Ti 0.15, Contains Be, Others: Each 0.03 Total 0.1, Aluminium rem. Density (kg.m ⁻³) 2600							
Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot							
Similar/Equivalent alloys: <i>USA:</i> AA520.2; <i>European (ISO):</i> AlMg10; <i>Italy:</i> 3056; <i>Japan:</i> C7BV; <i>UK:</i> LM10							
Comments: High-purity alloy produced from primary aluminium; with intensive grain refining & Be addition to reduce oxidation. Heat treatable. For high corrosion resistant, marine parts, e.g. hooks, handles, fittings, battery holder, steering casing. Corrosion resistance: Excellent Weldability: Poor Machinability: Excellent Finishing: Good (polish); Good (anodize; decorative)							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes (Source)	
Homogenised [Gravity die castings (<20mm)]	140	-	220	6	75HB	Min. values (VAW)	
Homogenised [Sand castings (<20mm)]	140	-	220	6	67 75HB	Min. values (VAW)	

Veral Si5MgA VAW (Germany) Cast

Proprietary composition: Si 5-6, Fe 0.3, Cu 0.03, Mg 0.4-0.8, Mn 0.001-0.4, Zn 0.1, Ti 0.001-0.2, (Cu 0.05, Fe 0.5 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2690

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *European* (ISO): AISi5Mg; *France:* A-S4GU; *Germany:* G-AISi5Mg, 3.2341, 3.2342; *Italy:* 5077-74; *Switzerland:* G-AISi6Mg; *UK:* LM8

Comments: A high hypoeutectic alloy with good flow & die filling properties; good hot tearing resistance. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter for gravity die castings. For corrosion resistant, high strength (age hardened) parts, e.g. food industry, fire-fighting equipment. Good electrical conductivity possible. **Corrosion resistance:** Very good **Weldability:** Very good

Machinability: Good (age hardened) **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die cast (<20mm)]	180	-	190	0.5	73 90HB	Min. values	(VAW)
Age hardened [Sand cast (<20mm)]	160	-	180	0.5	73 80HB	Min. values	(VAW)
As cast [Gravity die cast (<20mm)]	100	-	140	1	73 60HB	Min. values	(VAW)
As cast [Sand cast (<20mm)]	90	-	130	0.5	73 55HB	Min. values	(VAW)

Veral Si10Mg(D) VAW (Germany) Cast

Proprietary composition: Si 9-11, Fe 0.8, Cu 0.08, Mg 0.2-0.5, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.10, Fe 1.0, Zn 0.1 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Die cast, Ingot

Similar/Equivalent alloys: *USA:* AA360.2; *France:* A-S9G; *Germany:* GD-AISi10Mg, 3.2382, 3.2336; *Japan:* D3V

Comments: A hypoeutectic alloy with good flow & die filling properties; no tendency of hot tearing. Pressure die casting version of Veral Si10MgA. For complex, thin-walled, high strength parts with good toughness (age hardened) and very good corrosion resistance, e.g. body for pneumatic controller, vehicle cylinder head. **Corrosion resistance:** Good **Weldability:** Excellent **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Pressure die cast test piece]	140	-	220	1	74 70HB	Min. values	(VAW)

Veral Si10MgA VAW (Germany) Cast

Proprietary composition: Si 9-11, Fe 0.3, Cu 0.03, Mg 0.2-0.5, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.05, Fe 0.5, Zn 0.1 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *European* (ISO): AISi10Mg; *France:* A-S10G; *Germany:* G-AISi10Mg, 3.2381, 3.2331; *Japan:* C4AS; *UK:* LM9

Comments: A hypoeutectic alloy with good flow & die filling properties; no tendency of hot tearing. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter for gravity die castings. For complex, thin-walled, high strength parts with good toughness (age hardened) and very good corrosion resistance, e.g. body for pneumatic controller, vehicle cylinder head, . **Corrosion resistance:** Very good **Weldability:** Excellent **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings (<20mm)]	190	-	220	1	74 80HB	Min. values	(VAW)
Age hardened [Sand castings (<20mm)]	170	-	200	1	74 75HB	Min. values	(VAW)
As cast [Gravity die castings (<20mm)]	90	-	180	2	74 60HB	Min. values	(VAW)
As cast [Sand castings (<20mm)]	70	-	150	2	74 50HB	Min. values	(VAW)

Veral Si12A VAW (Germany) Cast

Proprietary composition: Si 10.5-13.5, Fe 0.3, Cu 0.03, Mg 0.05, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.05, Fe 0.5, Zn 0.1 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAA413.2; *European* (ISO): AISi12; *France:* A-S13; *Germany:* G-AISi12, 3.2581, 3.2582; *UK:* LM6

Comments: A eutectic alloy with good flow & die filling properties; no tendency of hot tearing. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter for gravity die castings. For complex, thin-walled, pressure tight parts with high fatigue resistance and very good corrosion resistance, e.g. casings and covers, transformer case, car heater parts. **Corrosion resistance:** Very good **Weldability:** Excellent **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Gravity die casting (<20mm)]	80	-	150	3	- 50HB	Min. values	(VAW)
As cast [Sand casting (<20mm)]	70	-	140	3	75 45HB	Min. values	(VAW)
Heat treated [Sand casting (<20mm)]	70	-	140	5	- 45HB	Min. values	(VAW)
Heat treated [Sand casting (<20mm)]	80	-	160	4	- 50HB	Min. values	(VAW)

Veral Si12A(D) VAW (Germany) Cast

Proprietary composition: Si 10.5-13.5, Fe 0.8, Cu 0.08, Mg 0.05, Mn 0.001-0.4, Zn 0.1, Ti 0.15, (Cu 0.10, Fe 1.0, Zn 0.1 in finished castings), Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Die cast, Ingot

Similar/Equivalent alloys: *USA:* AAA413.1; *European* (ISO): AISi12Fe; *France:* A-S12; *Germany:* GD-AISi12, 3.2582, 3.2586; *Japan:* C3AS; *UK:* LM20

Comments: A eutectic alloy with good flow & die filling properties; no tendency of hot tearing. Die casting version of Veral Si12A. For complex, thin-walled, pressure tight parts with high fatigue resistance and good corrosion resistance, e.g. casings and covers, transformer case, car heater parts. **Corrosion resistance:** Good **Weldability:** Difficult, unless specially cast to weld. **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)E (GPa)	Hardness	Notes	(Source)
As cast [Pressure die cast test piece]	140	-	220	1	- 60HB	Min. values	(VAW)

294 Aluminium Alloys (cast)

Veral Si12CuNiMg VAW (Germany) Cast

Proprietary composition: Si 11-13, Fe 0.7, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.4, Zn 0.2, Ni 0.8-1.3, Ti 0.15, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* (Old AA - A332.1); *France:* A-S11UNG; *Italy:* 6250-68; *Japan:* C8AS; *UK:* LM13

Comments: Easily castable; no hot tearing tendency. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. Age hardenable. For heat resistant, wear resistant parts, e.g. pistons, V-belt drives, bearings, sports-car cylinder head, camshaft bearings, agricultural seeding machine component. **Corrosion resistance:** Fair **Weldability:** Good (special pressure die castings) **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
[Pressure die cast test piece]	200	-	250	-	75	100	Min. values; El% <1	(VAW)
Age hardened [Gravity die cast (<20mm)]	270	-	290	-	75	110HB	Min. values; El% <1	(VAW)
Age hardened [Sand cast (<20mm)]	180	-	190	-	75	90HB	Min. values; El% <1	(VAW)
As cast [Gravity die cast (<20mm)]	180	-	180	-	75	110HB	Min. values; El% <1	(VAW)
As cast [Sand cast (<20mm)]	120	-	120	-	75	80HB	Min. values; El% <1	(VAW)

Veral Si12CuNiMg(H) VAW (Germany) Cast

Proprietary composition: Si 11-13, Fe 0.15, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.05, Zn 0.05, Ni 0.8-1.3, Ti 0.1, (Fe <0.4 for pressure die castings), Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2700

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AA336.2 (Old AA - A332.2); *France:* A-S11UNG; *Italy:* 6250-68; *Japan:* C8AV; *UK:* LM13

Comments: High-purity alloy produced from primary aluminium. Good casting properties; no hot tearing tendency. Na-modification for sand castings, thick-walled gravity die and gravity die with sand cores. "Hv" modified at smelter (Sr-modified) for gravity die castings. For wear resistant applications, heat resistant, e.g. pistons, V-belt drives, bearings. Age hardenable. Pressure die casting by special methods (VACURAL). **Corrosion resistance:** Fair **Weldability:** Good; special technique for pressure die cast **Machinability:** Good **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die casting t <20mm]	240	-	300	1	75	110HB	Min. values	(VAW)
Age hardened [Gravity die casting t <20mm]	280	-	300	0.5	75	110HB	Min. values	(VAW)
Age hardened [Sand castings t <20mm]	190	-	200	-	75	100HB	Min. values; El% <1	(VAW)
As cast [Gravity die casting t <20mm]	190	-	190	0.5	75	90HB	Min. values	(VAW)
As cast [Pressure die casting t <20mm]	200	-	250	0.5	75	100HB	Min. values	(VAW)
As cast [Sand castings t <20mm]	140	-	140	0.5	75	80HB	Min. values	(VAW)

Veral Si17Cu4Mg(H) VAW (Germany) Cast

Proprietary composition: Si 16-18, Fe 0.4, Cu 4-5, Mg 0.5-0.65, Mn 0.1, Zn 0.05, Ti 0.2, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2720

Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot

Similar/Equivalent alloys: *USA:* AAA390.1; *UK:* LM30

Comments: High-purity alloy produced from primary aluminium. Good casting properties; no hot tearing tendency. P-grain refined at smelter. For high wear resistance, heat resistant, low thermal expansion, e.g. cylinder blocks, brake cylinders, rotor flange. Age hardenable. **Corrosion resistance:** Fair **Weldability:** Good **Machinability:** Good (hard tools) **Finishing:** Fair (polish); Not anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings t <20mm]	260	-	270	-	81	120HB	Min. values; El% <1%	(VAW)
Age hardened [Sand castings t <20mm]	220	-	230	-	81	100HB	Min. values; El% <1%	(VAW)
As cast [Gravity die castings t <20mm]	160	-	170	-	81	90HB	Min. values; El% <1%	(VAW)
As cast [Pressure die castings t <20mm]	200	-	220	-	81	110HB	Min. values; El% <1%	(VAW)
As cast [Sand castings t <20mm]	120	-	130	-	81	85HB	Min. values; El% <1%	(VAW)

Veral Si18CuNiMg(H) VAW (Germany) Cast

Proprietary composition: Si 11-13, Fe 0.15, Cu 0.8-1.3, Mg 0.8-1.3, Mn 0.05, Zn 0.05, Ni 0.8-1.3, Ti 0.1, Others: Each 0.03 Total 0.1, Aluminium rem. **Density** (kg.m⁻³) 2680

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* AAA393.2; *France:* A-S18UNG; *Italy:* 6251-68; *UK:* LM28

Comments: High-purity alloy produced from primary aluminium. Good casting properties; no hot tearing tendency. P-grain refined at smelter. For high wear resistance, heat resistant, low thermal expansion, e.g. pistons, clutch cylinder activator, vacuum pump casing. Age hardenable. **Corrosion resistance:** Fair **Weldability:** Good **Machinability:** Good (hard tools) **Finishing:** Fair (polish); Not anodized

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Age hardened [Gravity die castings t <20mm]	260	-	270	-	81	120HB	Min. values; El% <1%	(VAW)
Age hardened [Sand castings t <20mm]	220	-	230	-	81	100HB	Min. values; El% <1%	(VAW)
As cast [Gravity die castings t <20mm]	160	-	170	-	81	90HB	Min. values; El% <1%	(VAW)
As cast [Sand castings t <20mm]	120	-	130	-	81	85HB	Min. values; El% <1%	(VAW)
Not stated [Gravity die castings t <20mm]	80	-	120	3	81	50HB	After long-term at 250°C; Typ.	(VAW)

Veral Zn10Si8CuMg VAW (Germany) Cast

Proprietary composition: Si 8.5-9.5, Fe 0.6, Cu 0.5-1.5, Mg 0.2-0.6, Mn 0.4, Zn 9.5-10.5, Ti 0.2, Others: Each 0.05 Total 0.15, Aluminium rem. **Density** (kg.m⁻³) 2890

Identified Product forms: Sand cast, Permanent mould cast, Die cast, Ingot

Comments: A hypoeutectic alloy with excellent flow & die filling properties; low hot tearing tendency. Na-modification necessary for sand castings, thick-walled gravity die castings and gravity die castings with sand cores. "Hv" modification (Sr-modified) at smelter. Naturally ageing with good strength properties. For engineering fittings, supports, tooling for plastics/foams. **Corrosion resistance:** Fair **Weldability:** Fair **Machinability:** Excellent (after ageing) **Finishing:** Good (polish); Possible (protective anodize)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
[Gravity die castings (<20mm)]	200	-	230	0.8	75	95HB	Min. values	(VAW)
[Pressure die cast test piece]	210	-	250	0.8	75	100HB	Min. values	(VAW)
[Sand castings (<20mm)]	160	-	170	-	75	90HB	Min. values; El% <1	(VAW)

Aluminium Alloys (powder)

404N	Total Europe (Japan)	Powder
Proprietary composition: Si 0.01, Fe 0.01, Cu 0.005, Zn 0.003, Aluminium 99.98 min.		
Comments: Atomised high-purity aluminium powder. Appearance: fine, spherical particles, grey powder. Apparent density: 0.8-1.1 g.cm ³ . Average diameter CILAS D50: 15.0-19.0. Particle size distribution: ASTM E11 325 mesh, No.140/325; NF11-501 45 microns; ISO 565 106/45 microns. Traces: 3 max.		
405	Total Europe (Japan)	Powder
Proprietary composition: Si 0.2, Fe 0.25, Cu 0.03, Zn 0.07, Aluminium 99.7 min.		
Comments: Atomised aluminium powder. Appearance: fine, grey powder. Apparent density: 0.8-1.1 g.cm ³ . Average diameter CILAS D50: 17.0-23.0. Particle size distribution: ASTM E11 325 mesh, No.140/325; NF11-501 45 microns; ISO 565 106/45 microns. Traces: 3-7.		
406S	Total Europe (Japan)	Powder
Proprietary composition: Si 0.01, Fe 0.01, Cu 0.005, Zn 0.003, Aluminium 99.98 min.		
Comments: Atomised high-purity aluminium powder. Appearance: fine, grey powder. Apparent density: 0.8-1.1 g.cm ³ . Average diameter CILAS D50: 18.0-23.0. Particle size distribution: ASTM E11 325 mesh, No.140/325; NF11-501 45 microns; ISO 565 106/45 microns. Traces: 3-7.		
416	Total Europe (Japan)	Powder
Proprietary composition: Si 0.2, Fe 0.25, Cu 0.03, Zn 0.07, Aluminium 99.7 min.		
Comments: Atomised aluminium powder. Appearance: fine, grey powder. Apparent density: 1.0-1.2 g.cm ³ . Average diameter CILAS D50: 18.0-24.0. Particle size distribution: ASTM E11 No.140; ISO 565 106 microns.		
432S	Total Europe (Japan)	Powder
Proprietary composition: Si 0.2, Fe 0.25, Cu 0.03, Zn 0.07, Aluminium 99.7 min.		
Comments: Atomised aluminium powder. Appearance: fine, grey powder. Apparent density: 1.1-1.3 g.cm ³ . Average diameter CILAS D50: 28.0-40.0. Particle size distribution: ASTM E11 325 mesh, No.70/325; NF11-501 45 microns; ISO 565 212/45 microns. Traces: 25-35.		
455	Total Europe (Japan)	Powder
Proprietary composition: Si 0.2, Fe 0.25, Cu 0.03, Zn 0.07, Aluminium 99.7 min.		
Comments: Atomised aluminium powder. Appearance: fine, grey powder. Apparent density: 1.2-1.5 g.cm ³ . Average diameter CILAS D50: 50.0-60.0. Particle size distribution: ASTM E11 32/325 mesh, No.35/325; NF11-501 500/45 microns; ISO 565 500/45 microns. Traces: 50-60.		
462	Total Europe (Japan)	Powder
Proprietary composition: Si 0.2, Fe 0.25, Cu 0.03, Zn 0.07, Aluminium 99.7 min.		
Comments: Atomised aluminium powder. Appearance: fine, grey powder. Apparent density: 1.1-1.3 g.cm ³ . Average diameter CILAS D50: 27.0-30.0. Particle size distribution: ASTM E11 400 mesh, No.70/400; NF11-501 - microns; ISO 565 212/38 microns. Traces: 25-30.		
Aluminium Needles (1)	ALPOCO (UK)	Powder
Proprietary composition: Si 0.2, Fe 0.4, Aluminium 99.5 min.		
Comments: Needles 7 x 1mm approx.		
Aluminium Needles (2)	ALPOCO (UK)	Powder
Proprietary composition: Si 0.1, Fe 0.2, Aluminium 99.7 min.		
Comments: Needles 7 x 1mm approx.		
Atomised Al 97%	ALPOCO (UK)	Powder
Proprietary composition: Si 0.4, Fe 1, Aluminium 97 min.		
Comments: Spherical particles.		
Atomised Al 99.7%	ALPOCO (UK)	Powder
Proprietary composition: Si 0.17, Fe 0.2, Aluminium 99.7 min.		
Comments: Spherical particles.		

296 Aluminium Alloys (powder)

Atomised Al 99.9%	ALPOCO (UK)	Powder
Proprietary composition: Si 0.4, Fe 0.4, Aluminium 99.9 min. Comments: Spherical particles.		
Atomised Al 99.97%	ALPOCO (UK)	Powder
Proprietary composition: Si 0.008, Fe 0.008, Aluminium 99.97 min. Comments: Spherical particles.		
Atomised Al 99.99%	ALPOCO (UK)	Powder
Proprietary composition: Aluminium 99.99 min. Comments: Spherical particles.		
Commercial Purity	ALPOCO (UK)	Powder
Proprietary composition: Si 0.17, Fe 0.02, Al 99.5-99.89. Comments: Atomised aluminium grit/powder.		
Fine	Ronald Britton & Co. (UK)	Flake Aluminium Powder
Approximate composition: Aluminium 97 min. Comments: For inks and pigments. Particle size: 40 microns.		
Ink Lining	Ronald Britton & Co. (UK)	Flake Aluminium Powder
Approximate composition: Aluminium 97 min. Comments: For inks and pigments. Particle size: 14 microns.		
Lining	Ronald Britton & Co. (UK)	Flake Aluminium Powder
Approximate composition: Aluminium 97 min. Comments: For inks and pigments. Particle size: 32 microns.		
Primary Grade	Ronald Britton & Co. (UK)	Powder
Approximate composition: Aluminium 99.5 min. Comments: Atomised aluminium powders for inks and pigments, fillers and production of diamond tooling. Available in a range of sizes: 75 - 400 microns, -100 microns, -63 microns and -45 microns.		
Secondary Grade	Ronald Britton & Co. (UK)	Powder
Approximate composition: Aluminium 97 min. Comments: Atomised aluminium powders for inks and pigments, fillers and production of diamond tooling. Available in a range of sizes: 250 - 1500 microns, 100 - 400 microns, -150 microns, -63 microns and -45 microns.		
Secondary Purity	ALPOCO (UK)	Powder
Proprietary composition: Si 0.5, Fe 1, Al 85-99.49. Comments: Atomised aluminium grit/powder.		
Standard	Ronald Britton & Co. (UK)	Flake Aluminium Powder
Approximate composition: Aluminium 97 min. Comments: For inks and pigments. Particle size: 47 microns.		
Super Ink Lining	Ronald Britton & Co. (UK)	Flake Aluminium Powder
Approximate composition: Aluminium 97 min. Comments: For inks and pigments. Particle size: 10 microns.		
Super Pure	ALPOCO (UK)	Powder
Proprietary composition: Si 0.01, Fe 0.01, Al 99.9-99.99. Comments: Atomised aluminium grit/powder.		
Various/Custom Alloys	Osprey Metals (UK)	Powder
Comments: Wide range of speciality, aluminium-based compositions produced by rapid solidification, patented 'Osprey' gas atomisation technique. Identified Product Forms: Fine powders, powder billets for extrusion and forging.		

Magnesium Alloys

2L121	BS (UK)	Wrought
<p>Nominal composition: Al 7.5-9, Mn 0.15-0.4, Zn 0.3-1, Cu 0.15, Si 0.3, Fe 0.05, Ni 0.01, Sn 0.1, C+Si+Fe+Ni <0.4, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11800, ASTM AZ80A, AMS 4360D, SAE 532, QQ -M40B; <i>European (AECMA):</i> MG-P-61; <i>France:</i> G-A7Z1, G-A8Z; <i>Germany:</i> MgAl8Zn; LW3515; Wk. 3.5812; <i>UK:</i> 2L121, 2L122; <i>Proprietary:</i> Mag.Elek AZ80</p>		
3.5003 - Wk.	DIN (Germany)	Wrought
<p>Approximate composition: Magnesium 99.8 min. Similar/Equivalent alloys: <i>USA:</i> ASTM B92; <i>Proprietary:</i> Otto Fuchs M10</p>		
3.5101 - Wk.	DIN (Germany)	Cast
<p>Approximate composition: Zn 4.5, Zr 0.7, Rare Earth 1.2, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> UNS M16410, ASTM ZE41A, AMS 4439A; <i>European (CEN):</i> MG-C-43 (<i>ISO:</i> MgZnReZr (<i>AECMA:</i> MG-C-43; <i>France:</i> RZ5, G-Z4TR; <i>Germany:</i> LW3.6104; Wk. 3.5101; <i>UK:</i> MAG5-TE; 2L.128; <i>Others:</i> Unavia 816.02; <i>Proprietary:</i> Mag.Elek RZ5, ZE41, W7(welding rod); RZ5, ZE41A</p>		
3.5103 - Wk.	DIN 1729 (Germany)	Cast
<p>Approximate composition: Zn 2.3, Zr 0.6, Rare Earth 3.0, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> UNS M12230, ASTM EZ33A, AMS 4442B; <i>European (CEN):</i> MG-C-91 (<i>AECMA:</i> MG-C-91; <i>France:</i> ZRE1, G-TR3Z2; <i>Germany:</i> LW 3.6204; Wk. 3.5103; <i>UK:</i> MAG6-TE; 2L.126; DTD 708; <i>Proprietary:</i> Mag.Elek. ZRE1, EZ33, W6 (welding rod); ZRE1</p>		
3.5161 - Wk.	DIN (Germany)	Wrought
<p>Approximate composition: Zn 4.8-6.2, Zr 0.45-0.8, Others: <0.3, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M16600, ASTM ZK60A, AMS 4352, 4362, QQ -M-31, -M-40; <i>France:</i> G-Z5Zr; <i>Germany:</i> MgZn6Zr; Wk. 3.5161; <i>UK:</i> MAG-E-161; DTD5041A; <i>Others:</i> USA WW-T-825; <i>Proprietary:</i> Mag.Elek ZW6</p>		
3.5312	DIN (Germany)	Wrought
<p>Nominal composition: Al 2.5-3.5, Mn 0.15-0.4, Zn 0.5-1.5, Cu 0.1, Si 0.1, Fe 0.003, Ni 0.005, Ca <0.04. Other <0.1, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> ASTM AZ31B; <i>European (AECMA):</i> MG-P-62; <i>France:</i> F3; G-A3Z1; <i>Germany:</i> MgAl3Zn; Wk. 3.5312, LW.3504.; <i>UK:</i> MAG-S-1110; MAG-E-111M; DTD742; <i>Proprietary:</i> Mag. Elek. AZ31</p>		
3.5612	DIN (Germany)	Wrought
<p>Approximate composition: Al 5.5-7, Mn 0.15-0.4, Zn 0.5-1.5, Cu 0.1, Si 0.1, Fe 0.03, Ni 0.005, Others: <0.1, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11610, ASTM AZ61A-F, AMS 4350K, 4358A, QQ -M-31B, -M-40B; <i>European (AECMA):</i> MG-P-63; <i>France:</i> M1; G-A6Z1; <i>Germany:</i> MgAl6Zn; W3150; Wk. 3.5612; <i>UK:</i> BS 3373 MAG-E121M; BS 3372 MAG-F121; BS 3371MAG-T-121M; BS 2L.503, L.513, L.512; DTD259A; <i>Others:</i> USA WW-T-825B; <i>Proprietary:</i> Mag.Elek AZM; M1; Otto Fuchs MA64</p>		
3.5812 - Wk.	DIN 1729 (Germany)	Cast
<p>Approximate composition: Al 8, Mn 0.3, Zn 0.7, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> ASTM AZ81A; <i>European (AECMA):</i> MG-C-61; <i>France:</i> FT, G-A9; <i>Germany:</i> MgAl8Zn1; Wk. 3.5812; <i>UK:</i> MAG1, MAG2; 3L.122; <i>Proprietary:</i> Mag.Elek A8, AZ81; Mag Corp AZ81A</p>		
3.5912 - Wk.	DIN (Germany)	Cast
<p>Approximate composition: Al 9, Mn 0.2, Zn 0.8, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11914, ASTM AZ91D, AMS 4437A; <i>France:</i> F10, G-A9Z1; <i>Germany:</i> LW 3.5194; Wk. 3.5912; <i>UK:</i> MAG3; 3L.124, 3L.125; <i>Proprietary:</i> Mag.Elek AZ91</p>		
3.5812 - Wk.	DIN (Germany)	Wrought
<p>Nominal composition: Al 7.8-9.2, Mn 0.12-0.3, Zn 0.2-0.8, Cu 0.05, Si 0.1, Ni 0.003, Other <0.3, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11800, ASTM AZ80A, AMS 4360D, SAE 532, QQ -M40B; <i>European (AECMA):</i> MG-P-61; <i>France:</i> G-A7Z1, G-A8Z; <i>Germany:</i> MgAl8Zn; LW3515; Wk. 3.5812; <i>UK:</i> 2L121, 2L122; <i>Proprietary:</i> Mag.Elek AZ80</p>		

298 Magnesium Alloys

AE42	Hydro Magnesium (Norway)							Cast
Nominal composition: Al 3.6-4.4, Mn 0.1 min., Zn 0.2, Cu 0.04, Fe 0.004, Ni 0.001, Rare Earth 2.0-3.0, Others: Each 0.01, Magnesium rem. Density (kg.m ⁻³) 1790								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>USA:</i> ASTM AE42; <i>Proprietary:</i> Hydro Mag. AE42; Mag.Elek AE42								
Comments: Hydro Magnesium modification of ASTM AE42 composition for ingots for die casting. (Properties for die castings). Draft Specification.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
As die cast. [-]	145	-	230	10	45	HB60	Typical values.	(Hydro Magnesium)
As die cast. [Test bars.]	145	-	230	11	-	-	Ave., 400t/cold chamber/6 cavity	(Hydro Magnesium)
AE42	Magnesium Elektron (UK)							Cast
Proprietary composition: Al 4, Mn 0.25, Rare Earth 2.5, Magnesium rem. Density (kg.m ⁻³) 1790								
Identified Product forms: Die cast								
Comments: High temperature die casting alloy. For automotive transmission parts & structural high-temperature uses. Development alloy - Draft Specification.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Pressure die casting]	-	140	225	9	45	HB57	Typical	(Magnesium Elektron)
AE42X1	Dow Magnesium (USA)							Cast
Proprietary composition: Al 3.5-4.5, Mn 0.27 min., Zn 0.2, Cu 0.04, Fe 0.004, Ni 0.004, Rare Earth 2 - 3, Others: Each 0.01, Magnesium rem.								
Identified Product forms: Die cast								
Comments: Good creep strength and tensile strength at high temperature.								
AM100A	ASTM B80, B93, B199, B403 (USA)							Cast
Nominal composition: Al 9.3-10.7, Mn 0.1 min., Zn 0.3, Cu 0.1, Si 0.3, Others: Total 0.3, Magnesium rem. Density (kg.m ⁻³) 1830								
Identified Product forms: Sand cast, Permanent mould cast								
Similar/Equivalent alloys: <i>USA:</i> UNS M10100, ASTM AM100A, AMS 4483, 4455, SAE 502: J465, QQ M-55								
Comments: Good tensile and ductility characteristics. Pressure-tight castings. Weldability: V. Good (gas-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Sand castings]	83	-	150	2	45	53HB	RT typical properties	(#3)
T4 [Sand castings]	90	-	275	10	-	52HB	RT typical properties	(#3)
T5 [Sand castings]	110	-	150	2	-	58HB	RT typical properties	(#3)
T61 [Sand castings]	150	-	275	1	-	69HB	RT typical properties	(#3)
T7 [Sand castings]	125	-	260	1	-	67HB	RT typical properties	(#3)
AM20	ASTM (USA)							Cast
Approximate composition: Al 2, Mn 0.5, Magnesium rem. Density (kg.m ⁻³) 1800								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> ASTM AM20; <i>Proprietary:</i> Mag.Elek AM20; Hydro Mag. AM20								
Comments: Ductile high pressure die casting alloy. For high ductility & impact strength applications (automotive safety parts).								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Pressure die cast]	-	105	185	10	45	HB47	Typical	(Magnesium Elektron)
AM20	Hydro Magnesium (Norway)							Cast
Nominal composition: Al 1.7-2.5, Mn 0.2 min., Zn 0.2, Cu 0.008, Si 0.05, Fe 0.004, Ni 0.001, Others: Each 0.001, Magnesium rem. Density (kg.m ⁻³) 1800								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>USA:</i> ASTM AM20; <i>Proprietary:</i> Hydro Mag. AM20; Mag.Elek AM20								
Comments: Hydro magnesium modification of ASTM AM20 composition for ingots for die casting. (Properties for die castings)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
As die cast. [-]	90	-	190	12	45	HB45	Typical values.	(Hydro Magnesium)
As die cast. [Test bars.]	90	-	210	20	-	-	Ave., 400t/cold chamber/6 cavity	(Hydro Magnesium)
AM50A	ASTM B93-94(a) (USA)							Cast
Nominal composition: Al 4.5-5.3, Mn 0.28-0.5, Zn 0.2, Cu 0.008, Si 0.05, Fe 0.004, Ni 0.001, Others: Each 0.001, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Ingot								
Similar/Equivalent alloys: <i>USA:</i> ASTM AM50A; <i>Proprietary:</i> Mag.Elek AM50; Mag Corp AM50A;								
Comments: Ingot for die casting.								
AM50A	ASTM B94-94 (USA)							Cast
Nominal composition: Al 4.4-5.4, Mn 0.26-0.6, Zn 0.22, Cu 0.01, Si 0.1, Fe 0.004, Ni 0.002, Others: Each 0.02, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> ASTM AM50A; <i>Proprietary:</i> Mag.Elek AM50								
Comments: Die cast properties. Ductile high pressure die casting alloy. Combines strength, ductility, castability & cold-workability. For seat-frames, instrument panels, brackets & wheels.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
As die cast. [-]	125	-	210	10	45	HB60	Typical values.	(Hydro Magnesium)
As die cast. [Test bars.]	125	-	230	15	-	-	Ave., 400t/cold chamber/6 cavity	(Hydro Magnesium)
Pressure die cast [-]	-	125	200	7	45	HB57	Typical	(Magnesium Elektron)
AM50B	ASTM (USA)							Cast
No composition: -								
Similar/Equivalent alloys: <i>USA:</i> ASTM AM50B; <i>Proprietary:</i> Mag.Elek AM50								

AM60 ASTM (USA) Cast

Nominal composition: Al 6, Mn 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Sand cast, Die cast

Similar/Equivalent alloys: *France:* G-A6; NF A57-705 AM60; *Germany:* DIN MgAl6; Mg-Al6Zn1; *UK:* AM60; *Proprietary:* Mag. Elek. AM60; Timminco AM60X, AM60SX

Comments: Ductile high pressure die casting alloy. Combines strength, ductility, castability & cold-workability. For seat-frames, instrument panels & wheels.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Sand cast]	-	95	210	10	45	HB57	Typical	(Magnesium Elektron)
T4 [Sand cast]	-	100	220	11	45	HB57	Typical	(Magnesium Elektron)
Y40 [Die cast test bar (6.2mm D)]	140	-	250	10	44.5	HB60		(Valfond)
Not stated [Pressure die cast]	-	135	210	6	45	HB62	Typical	(Magnesium Elektron)

AM60A ASTM B94 (USA) Cast

Nominal composition: Al 5.5-6.5, Mn 0.13 min., Zn 0.22, Cu 0.35, Si 0.5, Ni 0.03, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Die cast

Similar/Equivalent alloys: *USA:* UNS M10600, ASTM AM60A; *France:* G-A6; *Germany:* MgAl6; Wk. 3.5662

Comments: Die-casting of parts needing good ductility & toughness, with moderate tensile properties. Used in F condition. Automotive wheels. AM60B has improved corrosion resistance (if Fe-Mn ratio is maintained). **Weldability:** Not weldable.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	115	205	6	-		RT typical properties	(#3)
F [Castings]	-	130	220	6	45		RT typical properties	(#3)

AM60B ASTM B93-94(a) (USA) Cast

Nominal composition: Al 5.6-6.4, Mn 0.26-0.5, Zn 0.2, Cu 0.008, Si 0.05, Fe 0.004, Ni 0.001, Others: Each 0.01, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* ASTM AM60B; *Proprietary:* Timminco AM60X, AM60SX

Comments: Ingot for die casting.

AM60B ASTM B94-94 (USA) Cast

Nominal composition: Al 5.5-6.5, Mn 0.24-0.6, Zn 0.22, Cu 0.01, Si 0.1, Fe 0.005, Ni 0.002, (Fe 0.005; Ni 0.002; Cu 0.010 in castings), Others: Each 0.02, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Die cast

Similar/Equivalent alloys: *USA:* UNS M10600, ASTM AM60B; *Proprietary:* Mag Corp AM60B;

Comments: Die-casting of parts needing good ductility & toughness, with moderate tensile properties. Corrosion resistance by controlling Fe-Mn ratio and impurity levels (Fe, Cu, Ni). Used in F condition. Automotive wheels. AM60A has lower corrosion resistance. Die cast properties. **Corrosion resistance:** Good **Weldability:** Not weldable.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Castings]	130	-	220	6	45		RT typical properties	(#3)
As die cast [-]	130	-	225	8	45	HB65	Typical values	(Hydro Magnesium)
As die cast [Test bars]	130	-	240	13	-		Ave., 400/cold chamber/6 cavity	(Hydro Magnesium)
Y40 [Die cast test bar (6.2mm D)]	140	-	250	10	44.5	HB60		(Valfond)

AM60SX Timminco (Canada) Cast

Proprietary composition: Al 5.7-6.3, Mn 0.25-0.4, Zn 0.02, Cu 0.002, Si 0.015, Fe 0.0024, Ni 0.001, Be 0.0005-0.0015, Others: Each 0.01 Total 0.1, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* ASTM AM60; *Proprietary:* Timminco AM60SX

Comments: Super-purity alloy with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AM60X Timminco (Canada) Cast

Proprietary composition: Al 5.7-6.3, Mn 0.25-0.4, Zn 0.02, Cu 0.005, Si 0.02, Fe 0.005, Ni 0.001, Be 0.0005-0.0015, Others: Each 0.02 Total 0.1, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* ASTM AM60; *Proprietary:* Timminco AM60X

Comments: High-purity alloy with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AM80 Timminco (Canada) Cast

No composition: -

Identified Product forms: Ingot

Comments: High-purity alloy with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AS21 ASTM (USA) Cast

Approximate composition: Al 2, Mn 0.4, Si 1, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Die cast

Similar/Equivalent alloys: *USA:* ASTM AS21; *Proprietary:* Mag.Elek AS21; Hydro Mag. AS21

Comments: Die casting alloy with good creep properties, (better than AS41 alloy). For automotive parts.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Pressure die cast]	-	110	170	4	45	HB63	Typical	(Magnesium Elektron)

AS21 Hydro Magnesium (Norway) Cast

Nominal composition: Al 1.9-2.5, Mn 0.2 min., Zn 0.15-0.25, Cu 0.008, Si 0.7-1.2, Fe 0.004, Ni 0.001, Others: Each 0.01, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* ASTM AS21; *Proprietary:* Hydro Mag. AS21; Mag.Elek AS21

Comments: Hydro Magnesium modification of ASTM AS21 composition for ingots for die casting. (Properties for die castings)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
As die cast. [-]	110	-	175	9	45	HB55	Typical values.	(Hydro Magnesium)
As die cast. [Test bars.]	120	-	220	13	-		Ave., 400/cold chamber/6 cavity	(Hydro Magnesium)

300 Magnesium Alloys

AS21X1	ASTM (USA)							Cast
Approximate composition: Al 1.7, Mn 0.4 min., Si 1.1, Magnesium rem.								
Identified Product forms: Die cast								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
Not stated [-]	-	130	240	9	-		RT typical properties (#3)	
AS41	ASTM (USA)							Cast
Proprietary composition: Al 4, Mn 0.3, Si 1, Magnesium rem. Density (kg.m ⁻³) 1800								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> ASTM AS41; <i>France:</i> G-A4S1; <i>Germany:</i> DIN AS41								
Comments: Die casting alloy with good creep properties, to 150 deg.C. For automotive parts.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
Not stated [<i>Pressure die cast</i>]	-	135	225	4.5	45	HB 75	Typical <i>(Magnesium Elektron)</i>	
AS41A	ASTM B94 (USA)							Cast
Nominal composition: Al 3.5-5, Mn 0.2-0.5, Zn 0.12, Cu 0.06, Si 0.5-1.5, Ni 0.03, Others: Total 0.03, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> UNS M10410, ASTM AS41A; <i>France:</i> G-A4S1; <i>Germany:</i> AS41; DIN 1729 Wk. 3.5470; <i>Proprietary:</i> Mag.Elek AS41								
Comments: Good tensile characteristics. Improved creep resistance to 175 deg.C than AZ91 grades and AM60A. Used in as-cast (F) condition. Corrosion resistance: Good Weldability: Not weldable								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
F [-]	-	150	220	4	-		RT typical values (#3)	
F [<i>Die castings</i>]	-	140	210	6	45		RT typical values (#3)	
AS41B	ASTM B93-94(a) (USA)							Cast
Nominal composition: Al 3.7-4.7, Mn 0.35-0.6, Zn 0.1, Cu 0.015, Si 0.6-1.4, Fe 0.0035, Ni 0.001, (Fe 0.003; Ni 0.002; Cu 0.020 in castings),. Others: Each 0.01, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Die cast, Ingot								
Similar/Equivalent alloys: <i>USA:</i> ASTM AS41B; AS41XB								
Comments: Good tensile characteristics. Improved creep resistance than some AZ91 grades. Die cast parts used in F temper. Corrosion resistance determined by Fe-Mn ratio and control of impurities (Fe, Cu, Ni). Tighter control of impurities than AS41A. Ingot for die casting. Corrosion resistance: Good								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
F [-]	-	150	220	4	-		RT typical properties (#3)	
F [<i>Die castings</i>]	-	140	210	6	45		RT typical properties (#3)	
AS41B	ASTM B94-94 (USA)							Cast
Nominal composition: Al 3.5-5, Mn 0.35-0.7, Zn 0.12, Cu 0.02, Si 0.5-1.5, Fe 0.0035, Ni 0.002, Others: Each 0.02, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Die cast								
Similar/Equivalent alloys: <i>USA:</i> UNS M10410, ASTM AS41B								
Comments: Die cast properties.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
As die cast [-]	140	-	215	6	45	HB60	Typical values. <i>(Hydro Magnesium)</i>	
As die cast [<i>Test bars.</i>]	140	-	240	15	-		Ave., 400t/cold chamber/6 cavity <i>(Hydro Magnesium)</i>	
AZ10A	ASTM (USA)							Wrought
Approximate composition: Al 1-1.5, Mn 0.2 min., Zn 0.2-0.6, Cu 0.1, Si 0.1, Fe 0.005, Ni 0.005, Ca <0.04, Magnesium rem. Density (kg.m ⁻³) 1760								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> UNS M11100, ASTM AZ10A								
Comments: Low-cost extrusion alloy. Moderate mechanical properties. High elongation. Used in as-extruded (F) temper. Weldability: Good (no stress-relieving necessary).								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
F [-]	-	145	240	10	45		RT typical properties (#3)	
F [<i>Semi-/Hollow extru.</i>]	-	145	230	8	-		RT typical properties (#3)	
F [<i>Solid extru., 6.4-38mm</i>]	-	150	240	10	-		RT typical properties (#3)	
F [<i>Solid extru., 6.4mm</i>]	-	145	240	10	-		RT typical properties (#3)	
F [<i>Tube OD<152, wall 0.7-6.4mm</i>]	-	145	230	8	-		RT typical properties (#3)	
AZ21X1	ASTM (USA)							Wrought
Nominal composition: Al 1.6-2.5, Mn 0.02-0.15, Zn 0.8-1.6, Cu 0.05, Si 0.05, Fe 0.005, Ni 0.002, Ca 0.1-0.25; other <0.3, Magnesium rem.								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <i>USA:</i> UNS M11210, ASTM AZ21X1								
Comments: For battery applications: impact-extruded anodes. Used in as-extruded (F) temper.								
AZ31	Magnesium Elektron (UK)							Wrought
Proprietary composition: Al 3, Mn 0.3, Zn 1, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Sheet/strip, Extrusion								
Similar/Equivalent alloys: <i>USA:</i> UNS M11311, ASTM B90 AZ31B-O, B107 AZ31B-F, AMS 4375H, 4382, SAE 52, 510, QQ -M-31, -M31B, -M-40, -M-44B; <i>European (AECMA):</i> MG-P-62; <i>France:</i> F3; G-A3Z1; AIR 9052 G-A3Z1; <i>Germany:</i> DIN 9715 MgAl3Zn; Wk. 3.5312; LW3504; LW3.5315; <i>UK:</i> BS 3370 MAG-S-1110, BS 3373 MAG-E-111M; DTD 742; <i>Others:</i> USA WW-T825; <i>Proprietary:</i> Mag. Elek. W15 (welding rod); F3; Otto Fuchs MA39								
Comments: General purpose alloy. Medium strength, good forming characteristics. Properties without heat-treatment. Commercial uses. Weldability: Fully weldable - TIG.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> <u>(Source)</u>	
Soft [<i>sheet 0.5-6mm</i>]	-	120	220	10	-	HV 60 typ.	Minimum <i>(Magnesium Elektron)</i>	
Extruded [<i>section <10mm</i>]	-	150	230	8	-	HV 60 typ.	Minimum <i>(Magnesium Elektron)</i>	
Extruded [<i>section 10-75mm</i>]	-	160	245	10	-	HV 55 typ.	Minimum <i>(Magnesium Elektron)</i>	

AZ31 Timminco (Canada) Cast Wrought

Proprietary composition: Al 2.5-3.5, Mn 0.2 min., Zn 0.7-1.3, Cu 0.002, Si 0.02, Fe 0.002, Ni 0.001, Others: Total 0.01, Magnesium rem.

Identified Product forms: Extrusion

Comments: Cathodic protection & anodes.

AZ31B ASTM B90, B91, B107, B217 (USA) Wrought

Nominal composition: Al 2.3-3.5, Mn 0.2 min., Zn 0.6-1.4, Cu 0.05, Si 0.1, Fe 0.003, Ni 0.005, Ca <0.04., Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1770

Identified Product forms: Plate, Sheet/strip, Tube, Structural profile, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M11311, ASTM AZ31B, AMS 4375H, 4382, 4357, 4376., SAE 52, 510, J466., QQ -M31B, -M-40, -M-44B; European (AECMA): MG-P-62; France: F3; G-A3Z1; Germany: MgAl3Zn; Wk. 3.5312; LW3.3504; UK: MAG-S-1110, MAG-E-111M; MAG-T-111M; DTD 742; Others: USA WW-T825; Proprietary: Mag. Elek. AZ31; F3; Otto Fuchs MA30

Comments: Moderate mechanical properties and high elongation. Tighter limits on impurities (for better corrosion resistance) than commercial grade AZ31C. F, O and H24 tempers. **Corrosion resistance:** Good **Weldability:** Excellent (gas-arc, resistance) + stress-relief

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [Sheet]	150	-	255	21	-	56HB	RT typical properties	(#3)
F [Forgings]	170	-	260	15	-	50HB	RT typical properties	(#3)
F [Hollow Extr./Tube]	165	-	241	16	-	46HB	RT typical properties	(#3)
F [Not stated]	-	200	260	15	45	49HB	RT typical properties	(#3)
F [Solid Extr.]	200	-	255	12	-	49HB	RT typical properties	(#3)
H24 [Sheet]	220	-	290	15	-	73HB	RT typical properties	(#3)

AZ31B Comeca (France) Wrought

Proprietary composition: Al 3, Mn 0.3, Zn 1, Magnesium rem. **Density** (kg.m⁻³) 1785

Identified Product forms: Sheet/strip, Extrusion, Bar

Similar/Equivalent alloys: USA: UNS M11311, ASTM B90 AZ31B-O, B107 AZ31B-F, AMS 4375H, 4382, SAE 52, 510, QQ -M-31, -M31B, -M-40, -M-44B; European (AECMA): MG-P-62; France: F3; G-A3Z1; AIR 9052 G-A3Z1; Germany: DIN 9715 MgAl3Zn; Wk. 3.5312; LW3504; LW3.5315; UK: BS 3370 MAG-S-1110, BS 3373 MAG-E-111M; DTD 742; Others: USA WW-T825; Proprietary: Mag. Elek. W15 (welding rod); F3; Otto Fuchs MA39

Comments: General purpose alloy. Medium strength, good forming characteristics. **Weldability:** Fully weldable - TIG.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
H24 [Bar 1 - 10mm dia.]	150	-	230	8	-	-	-	(Comeca)
H24 [Extruded bar 10-75mm dia]	160	-	245	10	-	-	-	(Comeca)
H24 [Sheet 0.5 - 6mm]	120	-	243	11	-	-	-	(Comeca)

AZ31B TP Comeca (France) Wrought

Proprietary composition: Al 2.5-4, Mn 0.08, Zn 0.7-1.7, Magnesium rem. **Density** (kg.m⁻³) 1785

Identified Product forms: Plate

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F0 [Plate 25 - 100mm]	110	-	225	12	-	-	-	(Comeca)

AZ31C ASTM B90, B107, B217 (USA) Wrought

Nominal composition: Al 2.4-3.6, Mn 0.15 min., Zn 0.5-1.5, Cu 0.1, Si 0.1, Ni 0.03, Magnesium rem. **Density** (kg.m⁻³) 1770

Identified Product forms: Tube, Structural profile, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M11312, ASTM AZ31C; France: G-A371; Germany: Wk. 3.5112; UK: MAG-111; Proprietary: Mag. Elek. AZ31

Comments: Moderate mechanical properties and high elongation. Commercial grade with lower limits on impurities than AZ31B. Used F, O and H24 tempers.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	200	260	15	45	49HB	RT typical values	(#3)

AZ61 Magnesium Elektron (UK) Wrought

Proprietary composition: Al 6, Mn 0.3, Zn 1, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M11610, ASTM B91, B107 AZ61A-F, AMS 4350K, QQ -M-31B/40B; European (AECMA): MG-P-63; France: G-A6Z1, AIR 9052 G-A6Z1.; Germany: DIN 9715 3.5612, LW 3510; UK: BS 3373 MAG-E-121M; BS 3372 MAG-F-121M; BS 3371 MAG-T-121M; BS L 512, L513, 2L503.; Others: WW-T-825B; Proprietary: M1; AZM; Otto Fuchs MA64

Comments: Medium/high strength wrought alloy. For extrusion & forging (aerospace & defence). Properties without heat-treatment **Weldability:** Fully weldable

Machinability: Excellent

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Extrusion [bar/fging stk <75mm]	-	180	270	8	-	HV 65 typ.	Minimum	(Magnesium Elektron)
Extrusion [bar/fging stk 75-150mm]	-	160	250	7	-	HV 60 typ.	Minimum	(Magnesium Elektron)
Extrusion [tube]	-	150	260	7	-	HV 65 typ.	Minimum	(Magnesium Elektron)
Not stated [Forgings]	-	160	275	7	-	HV 65 typ.	Minimum	(Magnesium Elektron)

AZ61A ASTM B91, B107, B217, B275 (USA) Wrought

Nominal composition: Al 5.8-7.2, Mn 0.15 min., Zn 0.4-1.5, Cu 0.05, Si 0.1, Fe 0.005, Ni 0.005, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Sheet/strip, Tube, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M11610, ASTM AZ61A, AMS 4350K, 4358A, SAE 520, 531, J466, QQ -M-31B, -M-40B; European (AECMA): MG-P-63; France: M1; G-A6Z1; Germany: MgAl6Zn; W3150; Wk. 3.5612; UK: BS 3373 MAG-E121M; BS 3372 MAG-F121; BS 3371MAG-T-121M; BS 2L-503, L.513, L.512; DTD259A; Others: USA WW-T-825B; Proprietary: Mag.Elek AZM, AZ61; M1; Otto Fuchs MA64

Comments: General purpose alloy. Extrusions & forgings. Good mechanical properties. Used in F temper. Sheet form for battery applications only.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	230	310	16	45	60HB	RT typical properties	(#3)
F [Forgings]	180	-	295	12	-	55HB	RT typical properties	(#3)
F [Hollow Extr./Tube]	165	-	285	14	-	50HB	RT typical properties	(#3)
F [Sheet]	220	-	305	8	-	-	RT typical properties	(#3)
F [Solid Extr.]	205	-	305	16	-	60HB	RT typical properties	(#3)

302 Magnesium Alloys

AZ63 Timminco (Canada) Cast

Proprietary composition: Al 5.5-6.5, Mn 0.2 min., Zn 2.7-3.3, Cu 0.005, Si 0.02, Fe 0.008, Ni 0.005, Others: Each 0.2 Total 0.7, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: *USA:* ASTM AZ63A; *Proprietary:* Timminco AZ63

Comments: High purity alloy with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AZ63A ASTM B80, B93 (USA) Cast

Nominal composition: Al 5.3-6.7, Mn 0.15 min., Zn 2.5-3.5, Cu 0.25, Si 0.3, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* UNS M11630, ASTM AZ63A, AMS 4420, 4422, 4424, SAE J465, QQ M-56, M-55; *Proprietary:* Mag. Elek. AZG; Timminco AZ63

Comments: Good strength, ductility and toughness. Mainly sand-castings. **Weldability:** Fair (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	97	200	6	45	50HB		(#3)
T4 [-]	-	97	275	12	-	55HB		(#3)
T5 [-]	-	105	200	4	-	55HB		(#3)
T6 [-]	-	130	275	5	-	73HB	RT typical properties	(#3)
T7 [-]	-	115	275	6	-	64HB		(#3)

AZ80 Magnesium Elektron (UK) Wrought

Proprietary composition: Al 8.5, Mn 0.15, Zn 0.5, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: *USA:* UNS M11800, ASTM B91 AZ80A, AMS 4360D, SAE 532, QQ -M-40B; *European (AECMA):* MG-P-61; *France:* AIR 9052 G-A7Z1, G-A8Z.;

Germany: DIN 9715 MgAl8Zn; LW3515; Wk. 3.5812; *UK:* 2L121, 2L122; *Proprietary:* Mag.Elek AZ80

Comments: High strength alloy for forgings of simple design. Precipitation heat treated. Aerospace, defence and commercial applications. **Weldability:** Weldable - TIG

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Precipitation [Forgings]	200	-	290	6	-	-	Typical	(#4)
T5 (Ppt. Treated) [Forgings]	-	200	290	6	-	HV 60 typ.	Minimum	(Magnesium Elektron)

AZ80A ASTM B91, B107, B275 (USA) Wrought

Nominal composition: Al 7.8-9.2, Mn 0.12 min., Zn 0.2-0.8, Cu 0.05, Si 0.1, Fe 0.005, Ni 0.005, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: *USA:* UNS M11800, ASTM AZ80A, AMS 4360D, SAE 523, 532: J466, QQ -M40B, M-31B; *European (AECMA):* MG-P-61; *France:* G-A7Z1, G-

A8Z; *Germany:* MgAl8Zn; LW3515; Wk. 3.5812; *UK:* 2L121, 2L122, 88C; *Others:* USA WW-T-825.; *Proprietary:* Mag.Elek AZ80, AZ855

Comments: Heat-treatable alloy. Extruded & press-forged parts. **Weldability:** Good (gas-arc, resistance) + stress relief.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Extrusion]	250	-	340	11	-	67HB	RT typical values	(#3)
F [Forgings]	230	-	330	11	-	69HB	RT typical values	(#3)
T5 [-]	-	275	380	7	45	82HB	RT typical values	(#3)
T5 [Extrusion]	275	-	380	7	-	80HB	RT typical values	(#3)
T5 [Forgings]	250	-	345	6	-	72HB	RT typical values	(#3)
Not stated [Forgings]	208	-	293	8	-	65-75VPN	RT typical values	(#5)

AZ80F ASTM B91 (USA) Wrought

Approximate composition: Al 8, Zn, Magnesium rem.

Similar/Equivalent alloys: *Germany:* Wk. 3.5812; LW3.5714; *UK:* DTD88C; AZ855; *Proprietary:* AZ855; Otto Fuchs MA84

AZ81 ASTM (USA) Cast

Proprietary composition: Al 8, Mn 0.2, Zn 0.7, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Sand cast, Die cast

Similar/Equivalent alloys: *USA:* ASTM AZ81; *France:* G-A9; *Germany:* MgAl8Zn1; *UK:* MAG1, MAG2, A8 (welding rod); *Proprietary:* Mag.Elek AZ81, W14(welding rod)

Comments: General purpose casting alloy. For tool housings & covers, brackets, computer parts.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Sand cast]	-	100	190	4	45	HB 57	Typical	(Magnesium Elektron)
T4 [Sand cast]	-	105	260	10	45	HB 57	Typical	(Magnesium Elektron)
Not stated [Pressure Die cast]	-	150	220	2	45	HB 72	Typical	(Magnesium Elektron)

AZ81A ASTM B80, B93, B199, B403 (USA) Cast

Nominal composition: Al 7.8-1, Mn 0.13 min., Zn 0.4-1, Cu 0.1, Si 0.3, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: *USA:* UNS M11810, ASTM AZ81A, SAE 505; J465, QQ M-56; M-55; *European (AECMA):* MG-C-61; *France:* FT; AIR G-A9; *Germany:*

MgAl8Zn1; Wk. 3.5812; *UK:* MAG1, MAG2; 3L.122; *Proprietary:* Mag.Elek A8, AZ81; Mag Corp AZ81A

Comments: Good strength, ductility and toughness. Heat-treatable, weldable. Easily cast (sand, permanent mould) with low micro-shrinkage. Used in T4 condition.

Weldability: Good (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [-]	-	83	275	15	45	55HB	RT typical properties	(#3)

AZ91 Magnesium Elektron (UK) Cast

Proprietary composition: Al 9, Mn 0.2, Zn 0.7, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Sand cast, Die cast

Similar/Equivalent alloys: *USA:* ASTM AZ91; *France:* G-A9Z1; *Germany:* MgAl19Zn1; *UK:* MAG7, MAG3; *Proprietary:* Mag.Elek AZ91, W18(welding rod)

Comments: General purpose casting alloy. For tool housings & covers, brackets, computer parts.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Sand Cast]	-	105	190	3.5	45	-	Typical	(Magnesium Elektron)
T4 [Sand Cast]	-	125	260	9	45	-	Typical	(Magnesium Elektron)
T6 [Sand Cast]	-	170	270	4.5	45	-	Typical	(Magnesium Elektron)
Not stated [HP Die-Cast]	-	160	225	2	45	-	Typical	(Magnesium Elektron)

AZ91A ASTM B93, B94 (USA) Cast

Nominal composition: Al 8.3-9.7, Mn 0.13 min., Zn 0.35-1, Cu 0.1, Si 0.5, Ni 0.03, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Die cast

Similar/Equivalent alloys: USA: UNS M11910, ASTM AZ91A, AMS 4490., SAE 501; J465, QQ M-38; France: G-A9Z1; Germany: 3.5912; UK: MAG3; Proprietary: Mag. Elek. AZ91

Comments: Die-casting alloy. Used in F condition. **Weldability:** Not weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Die castings]	-	150	230	3	45	63HB	RT typical properties	(#3)

AZ91B ASTM B93, B94 (USA) Cast

Nominal composition: Al 8.3-9.7, Mn 0.13 min., Zn 0.35-1, Cu 0.35, Si 0.5, Ni 0.03, (Cu 0.30 in castings), Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Die cast

Similar/Equivalent alloys: USA: UNS M11912, ASTM AZ91B, AMS 4490E, SAE 501A; J465, MIL M38B; France: G-A9Z1; Germany: 3.5912; UK: MAG3; Proprietary: Mag. Elek. AZ91

Comments: Die-casting alloy used in F condition. **Weldability:** Not weldable.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Die castings]	-	150	230	3	45	63HB	RT typical properties	(#3)

AZ91C ASTM B80, B93, B199, B403 (USA) Cast

Nominal composition: Al 8.1-9.3, Mn 0.13 min., Zn 0.4-1, Cu 0.1, Si 0.3, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: UNS M11914, ASTM AZ91C, AMS 4437A, SAE 505: J465, MIL M-46062, QQ M-55; M56; France: F10; G-A9Z1; Germany: LW 3.5194; UK: MAG3; 3L.125, 3L.124.; Proprietary: Mag. Elek. AZ91; RIMA AZ91C

Comments: Sand/permanent mould casting alloys. **Weldability:** Weldable (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Castings]	-	90	275	15	45	55HB	RT typical properties	(#3)
T6 [Castings]	-	145	275	6	45	66HB	RT typical properties	(#3)

AZ91C RIMA (Brazil) Cast

Proprietary composition: Al 8.1-9.3, Mn 0.13 min., Zn 0.4-1, Cu 0.1, Si 0.3, Cu 10ppm max.; Ni 100ppm max.; Fe 150ppm max.; Ca 400ppm max., Magnesium rem.

Similar/Equivalent alloys: USA: UNS M11914, ASTM AZ91C, AMS 4437A, SAE 505: J465, MIL M-46062, QQ M-55; M56; France: F10; G-A9Z1; Germany: LW 3.5194; UK: MAG3; 3L.125, 3L.124.; Proprietary: Mag. Elek. AZ91; RIMA AZ91C

AZ91D ASTM B93-94(a) (USA) Cast

Nominal composition: Al 8.5-9.5, Mn 0.17-0.4, Zn 0.45-0.9, Cu 0.025, Si 0.05, Fe 0.004, Ni 0.001, Others: Each 0.01, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Ingot

Similar/Equivalent alloys: USA: ASTM AZ91D; European (ISO): Mg-Al9Zn; France: F10, G-A9Z1; Germany: LW 3.5194; Wk. 3.5912; Mg-Al9Zn; UK: MAG3; 3L.124, 3L.125; AZ91; Proprietary: Mag.Elek AZ91; Timminco AZ91X, AZ91UX

Comments: Ingots for die casting.

AZ91D ASTM B94-94, B199, B403 (USA) Cast

Nominal composition: Al 8.3-9.7, Mn 0.15-0.5, Zn 0.35-1, Cu 0.03, Si 0.1, Fe 0.005, Ni 0.002, (Fe 0.005; Ni 0.002; Cu 0.03 in castings), Others: Each 0.02, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Sand cast, Die cast

Similar/Equivalent alloys: USA: UNS M11916, ASTM AZ91D, AMS 4437A, SAE J465; European (ISO): Mg-Al9Zn; France: F10, G-A9Z1; Germany: LW 3.5194; Wk. 3.5912; Mg-Al9Zn; UK: MAG3; 3L.124, 3L.125; AZ91; Proprietary: Mag.Elek AZ91; Timminco AZ91X, AZ91UX

Comments: High-purity, widely used die-casting alloy, used in F condition. Die-cast properties. **Corrosion resistance:** Excellent **Weldability:** Not weldable.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Castings]	-	150	230	3	45	HB63	RT typical values	(#3)
As die cast [-]	160	-	240	3	45	HB70	Typical values.	(Hydro Magnesium)
As die cast [Test bar]	160	-	250	7	-	-	Ave., 400t/cold chamber/6 cavity	(Hydro Magnesium)
Y20 [Sand cast test bar (13.8mm D)]	110	-	160	3	44.5	HB50		(Valfond)
Y23 (T6) [Sand cast test bar (13.8mm D)]	145	-	270	3	44.5	HB75		(Valfond)
Y40 [Die cast test bar (6.2mm D)]	170	-	280	8	44.5	HB70		(Valfond)
Y43 (T6) [Die cast test bar (6.2mm D)]	150	-	300	12.5	44.5	HB65		(Valfond)

AZ91E ASTM B80, B199, B403 (USA) Cast

Nominal composition: Al 8.1-9.3, Mn 0.17-0.35, Zn 0.4-0.7, Cu 0.015, Si 0.2, Fe 0.005, Ni 0.001, (Fe 0.005; Ni 0.0010; Cu 0.015 in castings), Others: Each 0.01 Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Sand cast, Permanent mould cast, Ingot

Similar/Equivalent alloys: USA: UNS M11921, ASTM AZ91E, AMS 4446, SAE J465; France: G-A9Z1; Germany: Wk. 3.5912; UK: MAG3; Proprietary: Mag Corp AZ91E; Timminco AZ91X, AZ91UX

Comments: High-purity, good tensile characteristics. Pressure-tight castings. High corrosion resistance. **Corrosion resistance:** Excellent **Weldability:** Good (gas-arc).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T4 [Castings]	-	90	275	15	45	55HB	RT typical properties	(#3)
T6 [Castings]	-	145	275	6	45	66HB	RT typical properties	(#3)

AZ91HP RIMA (Brazil) Cast

Proprietary composition: Al 8-9.5, Mn 0.1-0.3, Zn 0.3-1, Cu 0.1, Cu 150ppm max.; Ni 10ppm max.; Fe 150ppm max., Magnesium rem.

Similar/Equivalent alloys: Proprietary: RIMA AZ91HP; Timminco AZ91X

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AZ91UX Timminco (Canada) Cast

Proprietary composition: Al 8.5-9.5, Mn 0.17-0.4, Zn 0.45-0.9, Cu 0.001, Si 0.01, Fe 0.0015, Ni 0.001, Pb 0.001, Sn 0.001, Be 0.0005-0.0015, Ca 0.001. Others: Total 0.01, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: USA: ASTM AZ91D; AZ91E; Proprietary: Timminco AZ91UX

Comments: Ultra-purity grade with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AZ91X Timminco (Canada) Cast

Proprietary composition: Al 8.5-9.5, Mn 0.17 min., Zn 0.45-0.9, Cu 0.003, Si 0.015, Fe 0.004, Ni 0.001, Pb 0.002, Sn 0.002, Be 0.0005-0.0015, Ca 0.002. Others: Total 0.01, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: USA: ASTM AZ91D; AZ91E; Proprietary: Timminco AZ91X

Comments: High-purity grade with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AZ92 Timminco (Canada) Cast

Proprietary composition: Al 8.9-9.5, Mn 0.13 min., Zn 1.7-2.3, Cu 0.005, Si 0.01, Ni 0.01, Others: Each 0.05 Total 0.15, Magnesium rem.

Identified Product forms: Ingot

Similar/Equivalent alloys: USA: ASTM AZ92A; Proprietary: Timminco AZ92

Comments: High purity alloy with improved corrosion resistance. Reduced Fe, Ni & Cu impurity levels.

AZ92A ASTM B80, B93, B199, B403 (USA) Cast

Nominal composition: Al 8.3-9.7, Mn 0.1 min., Zn 1.6-2.4, Cu 0.25, Si 0.3, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: UNS M11920, ASTM AZ92A, AMS 4434; 4453; 4484, SAE 500; J465, MIL M-46062, QQ M-56; M-55; Proprietary: Timminco AZ92

Comments: Pressure-tight castings. Good tensile properties. **Weldability:** Good (gas-arc)+stress relief.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Sand cast test bar]	-	97	170	3	45	65HB	RT typical properties	(#3)
T4 [Sand cast test bar]	-	97	275	10	-	63HB	RT typical properties	(#3)
T5 [Sand cast test bar]	-	115	170	1	-	-	RT typical properties	(#3)
T6 [Sand cast test bar]	-	150	275	3	45	84HB	RT typical properties	(#3)
T7 [Sand cast test bar]	-	145	275	3	-	78HB	RT typical properties	(#3)

AZM Magnesium Elektron (UK) Wrought

Approximate composition: Al 6, Mn 0.3, Zn 1, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Tube, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: UK: MAG-E-121M, MAG-F-121M; L512, L513, L503.

Comments: General purpose alloy. **Weldability:** Fair (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
M [Extru. Bar/section (<75mm)]	180	-	270	8	-	60-70VPN	Typical properties	(#4)
M [Extru. Bar/section (75-150mm)]	160	-	250	7	-	55-65VPN	Typical properties	(#4)
M [Extru. Tube]	150	-	260	7	-	60-70VPN	Typical properties	(#4)
M [Forgings]	160	-	275	7	-	60-70VPN	Typical properties	(#4)

Elektron EQ21 Magnesium Elektron (UK) Cast

Proprietary composition: Zr 0.7, Ag 1.5, Cu 0.075, Nd-rich Rare Earth 2.25, Magnesium rem. **Density** (kg.m⁻³) 1810

Similar/Equivalent alloys: USA: UNS M18330, ASTM B80, 90 EQ22A-T6, AMS 4417; European (AECMA): MG-C64001; UK: BS 2970 MAG13-TF

Comments: High temperature casting alloy. Highly stressed components, where high stress needed to 200 deg.C (aerospace, automotive, military). Cheaper version than QE22 alloy. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Cast Test Bars]	-	195	261	4	44.1	HB 70-90	Typical	(Magnesium Elektron)

Elektron EZ33 Magnesium Elektron (UK) Cast

Proprietary composition: Zn 2.5, Zr 0.6, Rare Earth 3, Magnesium rem. **Density** (kg.m⁻³) 1800

Similar/Equivalent alloys: USA: UNS M12330, ASTM B80, 90 EZ33A-T5, AMS 4442D, QQ -M-56B; European (ISO): 2119, 3115, (AECMA): MG-C-91; France: G-TR3Z2, AIR 3380 ZRE1; Germany: DIN 1729, 3.5103, LW 3.6204; UK: BS 2970 MAG6-TE, BS 2L126; Proprietary: ZRE1

Comments: Creep-resistant casting alloy (to 250 deg.). Low-stressed complicated castings. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [Test Cast Bars]	-	96	161	4.5	44.1	HB 50-60	Typical	(Magnesium Elektron)

Elektron QE22 Magnesium Elektron (UK) Cast

Proprietary composition: Zr 0.6, Ag 2.5, Nd-rich Rare Earth 2., Magnesium rem. **Density** (kg.m⁻³) 1820

Similar/Equivalent alloys: USA: UNS M18220, ASTM B80, 90 QE22A-T6, AMS 4418E, MIL -M-46062A, QQ -M-56B; Germany: DIN 3.5106, LW 3.5164; UK: DTD 5055; Proprietary: Mag. Elek. MSR

Comments: High temperature casting alloy. Highly stressed components, where high stress needed to 200 deg.C (aerospace, automotive, military). **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Cast test bar]	-	205	266	4	44.1	HB 70-90	Typical	(Magnesium Elektron)

Elektron WE43 Magnesium Elektron (UK) Cast Wrought

Proprietary composition: Zr 0.5, Y 4, Rare Earth 1, Nd 2.25, Magnesium rem. **Density** (kg.m⁻³) 1840

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M18430, ASTM WE43A-T6, AMS 4427; European (AECMA): MG-C96002; Others: MAM 4427,

Comments: High temperature corrosion resistant alloy. Although developed as a casting alloy, also used in wrought condition. Temperatures to 300 deg. C; long-term exposure to 250 deg. C. Mechanical properties (wrought) more isotropic than conventional Mg-alloys. Range of heat-treatments. **Corrosion resistance:** Excellent corrosion resistance **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [Extruded]	-	195	270	15	44	HB 78-95	Typical	(Magnesium Elektron)
T5 [Forging]	-	180	300	10	44	HB 78-95	Typical	(Magnesium Elektron)
T6 [Cast test bar]	-	190	252	7	44.1	HB 75-95	Typical	(Magnesium Elektron)
T6 [Extruded]	-	160	260	15	44	HB 78-95	Typical	(Magnesium Elektron)
T6 [Forged]	-	180	280	7	44	HB 78-95	Typical	(Magnesium Elektron)

Elektron WE54 Magnesium Elektron (UK) Cast Wrought

Proprietary composition: Zr 0.5, Y 5.1, Rare Earth 1.5, Nd 1.75, Magnesium rem. **Density** (kg.m⁻³) 1850

Identified Product forms: Extrusion, Forging stock/Billet, Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: UNS M18410, ASTM B80 WE54A-T6, AMS 4426; European (AECMA): MG-C96001; UK: BS 2970 MAG14-T6/TF; Proprietary: Mag. Elek. WE54, W23 (welding rod)

Comments: High temperature, corrosion-resistant alloy for highly-stressed components (cast or wrought). Properties stable to 300 deg. C. Developed for castings, used in T6 condition, but also good properties & wrought characteristics (more isotropic mechanical properties, than other wrought Mg-alloys). Range of heat-treatments (extrusions & forgings). Under evaluation for pistons in high-performance racing car engines. **Corrosion resistance:** Excellent corrosion resistance **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [Extruded]	-	215	315	10	44	HB 80-90	Typical	(Magnesium Elektron)
T5 [Forged]	-	210	320	8	44		Typical	(Magnesium Elektron)
T6 [Cast test bar]	-	205	280	4	44.1	HB 80-90	Typical	(Magnesium Elektron)
T6 [Chill cast test bar]	185	-	255	2	-		Typical	(#4)
T6 [Extruded]	-	190	275	10	44		Typical	(Magnesium Elektron)
T6 [Forged]	-	195	295	6	44		Typical	(Magnesium Elektron)
T6 [Sand cast test bar]	185	-	255	2	-	HB 80-90	Typical	(#4)

Elektron ZC63 Magnesium Elektron (UK) Cast

Proprietary composition: Mn 0.5, Zn 6, Cu 2.7, Magnesium rem. **Density** (kg.m⁻³) 1870

Similar/Equivalent alloys: USA: UNS M16631, ASTM B80, 90 ZC63A-T6; UK: ZCM630; Proprietary: Mag. Elek. W21 (welding rod)

Comments: Commercial automotive casting alloy. Temperature to 150 deg. C. Good casting, with no grain-refinement treatment needed. Medium-volume production.

Weldability: Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Cast Test Bars]	-	158	242	4.5	44.1	HB 55-65	Typical	(Magnesium Elektron)

Elektron ZE41 Magnesium Elektron (UK) Cast

Proprietary composition: Zn 4.3, Zr 0.6, Rare Earth 1.3, Magnesium rem. **Density** (kg.m⁻³) 1840

Similar/Equivalent alloys: USA: UNS M16410, ASTM B80, 90 ZE41A-T5, AMS 4439C, MIL -M-46062; European (ISO): Mg-Zn RE Zr 2119/3115 (AECMA): MG-C43;

France: G-Z4TR, AIR 3380 RZ5.; Germany: DIN 1729, 3.5101, LW 3.6104; UK: BS 2970 MAG5-TE, BS 2L.128.; Others: Unavia 816-02; Proprietary: ZE41A, RZ5

Comments: Versatile & well-proven intermediate temperature casting alloy. Temperatures to 150 deg. C (aerospace, automotive, electrical, military). **Weldability:** Weldable.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [Cast Test Bar]	-	148	218	4.5	44.1	HB 55-70	Typical	(Magnesium Elektron)

Elektron ZM21 Magnesium Elektron (UK) Wrought

Proprietary composition: Mn 1, Zn 2, Magnesium rem. **Density** (kg.m⁻³) 1780

Identified Product forms: Plate, Sheet/strip, Extrusion

Similar/Equivalent alloys: UK: BS 3370 MAG-S-1310/M, BS 3373 MAG-F-131M, BS 3373 MAG-E-131M, DTD 5091A, DTD 5101A

Comments: Medium strength. Easily formed. Low-cost alloying elements. Heat treatment not required for properties. Complex extrusions (computer parts). **Weldability:** Fully weldable **Machinability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Soft [Sheet]	-	120	220	10	43.4		Minimum	(Magnesium Elektron)
Extrusion [section <10mm]	-	150	230	8	43.4	HV 60 typ.	Minimum	(Magnesium Elektron)
Extrusion [section 10-75mm]	-	160	245	10	43.4	HV 55 typ.	Minimum	(Magnesium Elektron)
Half-hard [Sheet]	-	165	250	5	43.4		Minimum	(Magnesium Elektron)
Not stated [Forgings]	-	125	200	9	43.4		Minimum	(Magnesium Elektron)
Not stated [Plate 6-25mm]	-	120	220	8	43.4		Minimum	(Magnesium Elektron)

EQ21A ASTM B80, B199, B403 (USA) Cast

Nominal composition: Zr 0.4-1, Ag 1.3-1.7, Cu 0.05-0.1, Ni 0.01, 1.75-2.5 Nd-rich rare earth, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1810

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: UNS M16330, ASTM EQ21A, AMS 4417, MIL M-46062; European (AECMA): MG-C64001; UK: MAG13-T6; DTD 5055; Proprietary: Mag.Elek EQ21, W19 (welding rod)

Comments: Good short-term elevated temperature properties; high yield to 200 deg.C. Pressure-tight, weldable castings. Used in T6 condition. **Weldability:** Weldable (gas-arc).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T6 [-]	-	175	235	2	45	65-85HB	RT typical properties	(#3)
T6 [Chill cast test bar]	175	-	240	2	-	70-90HB	Typical properties	(#4)
T6 [Sand cast test bar]	175	-	240	2	-	70-90HB	Typical properties	(#4)

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EZ33A	ASTM B80, B199, B403 (USA)	Cast
<p>Nominal composition: Zn 2-3.1, Zr 0.5-1, Cu 0.1, Ni 0.01, Rare Earth 2.5-4.0, Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1830</p> <p>Identified Product forms: Sand cast, Permanent mould cast</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M12230, ASTM EZ33A, AMS 4442B, SAE 506: J465, MIL R-6944, QQ M-56; M-55; <u>European (CEN):</u> MG-C-91 (<u>AECMA</u>): MG-C-91; <u>France:</u> ZRE1, G-TR32Z; <u>Germany:</u> LW 3.6204; Wk. 3.5103; <u>UK:</u> MAG6-TE; 2L.126; DTD 708; <u>Proprietary:</u> Mag.Elek. ZRE1, EZ33, W6 (welding rod); ZRE1</p> <p>Comments: Good strength to 260 deg.C. Pressure-tight castings with very low microporosity. Used in T5 temper. Weldability: V. Good (gas-arc) + post-heat treatment</p>		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) EI (%) E (GPa) Hardness Notes	(Source)
T5 [Sand cast test bar]	- 110 160 3 - 50HB	RT typical properties (#3)
T5 [Sand cast test bar]	- 76 145 20 - 50HB	200°C typical properties (#3)
T5 [Sand cast test bar]	- 55 83 50 - 50HB	315°C typical properties (#3)
G-A3Z1	NF A65-717 (France)	Cast
<p>Approximate composition: Al 2.6-3.6, Mn 0.2 min., Zn 0.5-1.5, Cu 0.1, Si 0.1, Fe 0.03, Ni 0.005, Ca <0.04, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> ASTM AZ31B; <u>European (AECMA):</u> MG-P-62; <u>France:</u> F3; <u>Germany:</u> MgAl3Zn; Wk. 3.5312, LW.3504.; <u>UK:</u> MAG-S-1110; MAG-E-111M; DTD742; <u>Proprietary:</u> Mag. Elek. AZ31</p>		
G-A6Z1	NF A65-717 (France)	Wrought
<p>Approximate composition: Al 5.5-6.5, Mn 0.15-0.4, Zn 0.5-1.5, Cu 0.1, Si 0.1, Fe 0.03, Ni 0.005, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M11610, ASTM AZ61A-F, AMS 4350K, 4358A, QQ -M-31B, -M-40B; <u>European (AECMA):</u> MG-P-63; <u>France:</u> M1; G-A6Z1; <u>Germany:</u> MgAl6Zn; W3150; Wk. 3.5612; <u>UK:</u> BS 3373 MAG-E121M; BS 3372 MAG-F121; BS 3371MAG-T-121M; BS 2L.503, L.513, L.512; DTD259A; <u>Others:</u> USA WW-T-825B; <u>Proprietary:</u> Mag.Elek AZM; M1; Otto Fuchs MA64</p>		
G-A7Z1	NF (France)	Wrought
<p>Nominal composition: Al 6.5-8.5, Mn 0.12 min., Zn 0.5-1.5, Cu 0.05, Si 0.3, Fe 0.007, Ni 0.005, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M11800, ASTM AZ80A, AMS 4360D, SAE 532, QQ -M40B; <u>European (AECMA):</u> MG-P-61; <u>France:</u> G-A7Z1, G-A8Z; <u>Germany:</u> MgAl8Zn; LW3515; Wk. 3.5812; <u>UK:</u> 2L121, 2L122; <u>Proprietary:</u> Mag.Elek AZ80</p>		
G-A8Z	NF A 65-717 (France)	Wrought
<p>Nominal composition: Al 7.5-9.2, Mn 0.1-0.4, Zn 0.2-1, Cu 0.05, Si 0.1, Fe 0.005, Ni 0.005, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M11800, ASTM AZ80A, AMS 4360D, SAE 532, QQ -M40B; <u>European (AECMA):</u> MG-P-61; <u>France:</u> G-A7Z1, G-A8Z; <u>Germany:</u> MgAl8Zn; LW3515; Wk. 3.5812; <u>UK:</u> 2L121, 2L122; <u>Proprietary:</u> Mag.Elek AZ80</p>		
G-A9	NF (France)	Cast
<p>Approximate composition: Al 8, Mn 0.3, Zn 0.7, Magnesium rem.</p> <p>Identified Product forms: Sand cast, Permanent mould cast</p> <p>Similar/Equivalent alloys: <u>USA:</u> ASTM AZ81A; <u>European (AECMA):</u> MG-C-61; <u>France:</u> FT, G-A9; <u>Germany:</u> MgAl8Zn1; Wk. 3.5812; <u>UK:</u> MAG1, MAG2; 3L.122; <u>Proprietary:</u> Mag.Elek A8, AZ81; Mag Corp AZ81A</p>		
G-A9Z1	NF (France)	Cast
<p>Approximate composition: Al 10, Mn 0.3, Zn 0.7, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M11914, ASTM AZ91D, AMS 4437A; <u>France:</u> F10, G-A9Z1; <u>Germany:</u> LW 3.5194; Wk. 3.5912; <u>UK:</u> MAG3; 3L.124, 3L.125; <u>Proprietary:</u> Mag.Elek AZ91</p>		
G-Ag2.5TR	NF (France)	Cast
<p>Approximate composition: Zr 0.6, Ag 2.5, Rare Earth 2.5, Magnesium rem.</p> <p>Identified Product forms: Sand cast, Permanent mould cast</p> <p>Similar/Equivalent alloys: <u>European (CEN):</u> MG-C-51 (<u>AECMA</u>): MG-C-51; <u>France:</u> G-Ag2.5TR; <u>UK:</u> BS2970 MAG12-TF; DTD5035; <u>Proprietary:</u> Mag. Elek. MSR-B</p>		
G-Z4TR	NF (France)	Cast
<p>Approximate composition: Zn 4.2, Zr 0.7, Rare Earth 1.2, Magnesium rem.</p> <p>Identified Product forms: Sand cast, Permanent mould cast</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M16410, ASTM ZE41A, AMS 4439A; <u>European (CEN):</u> MG-C-43 (<u>ISO</u>): MgZnReZr (<u>AECMA</u>): MG-C-43; <u>France:</u> RZ5, G-Z4TR; <u>Germany:</u> LW3.6104; Wk. 3.5101; <u>UK:</u> MAG5-TE; 2L.128; <u>Others:</u> Unavia 816.02; <u>Proprietary:</u> Mag.Elek RZ5, ZE41, W7(welding rod); RZ5, ZE41A</p>		
G-Z5Zr	NF A 65-717 (France)	Wrought
<p>Nominal composition: Al 0.02, Mn 0.15, Zn 4.8-6.2, Zr 0.45-0.8, Cu 0.3, Si 0.01, Fe 0.01, Ni 0.005, Magnesium rem.</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS M16600, ASTM ZK60A, AMS 4352, 4362, QQ -M-31, -M-40; <u>France:</u> G-Z5Zr; <u>Germany:</u> MgZn6Zr; Wk. 3.5161; <u>UK:</u> MAG-E-161; DTD5041A; <u>Others:</u> USA WW-T-825; <u>Proprietary:</u> Mag.Elek ZW6</p>		
Galvomag	Dow Magnesium (USA)	Wrought
<p>Proprietary composition: Al 0.01, Mn 0.5-1.3, Cu 0.02, Fe 0.03, Ni 0.001, Others: Each 0.05 Total 0.3, Magnesium rem.</p> <p>Identified Product forms: Extrusion</p> <p>Comments: Extruded anodes for cathodic protection.</p>		
Galvorod	Dow Magnesium (USA)	Wrought
<p>Proprietary composition: Al 2.5-3.5, Mn 0.2-1, Zn 0.7-1.3, Cu 0.01, Si 0.05, Fe 0.002, Ni 0.001, Ca 0.04, Others: Each 0.01 Total 0.3, Magnesium rem.</p> <p>Identified Product forms: Extrusion</p> <p>Comments: Extruded anodes for cathodic protection.</p>		
Grade 9980A	Mag Corp (USA)	Cast
<p>Proprietary composition: Mn 0.1, Cu 0.02, Ni 0.001, Pb 0.01, Sn 0.01, Na 0.006, Others: Each 0.05, Magnesium 99.8 min.</p> <p>Identified Product forms: Ingot</p>		

Grade 9990A Mag Corp (USA) Cast**Proprietary composition:** Al 0.005, Mn 0.005, Si 0.005, Fe 0.04, Ni 0.001, Sn 0.01, Others: Each 0.01, Magnesium 99.9 min.**Identified Product forms:** Ingot**High Purity Magnesium** Timminco (Canada) Cast Wrought**Approximate composition:** Al 0.004, Mn 0.002, Zn 0.006, Cu 0.0005, Si 0.003, Fe 0.002, Ni 0.0005, Pb 0.001, Sn 0.001, Ca 0.003; Others: <0.02, Magnesium rem.**Identified Product forms:** Extrusion, Ingot**Comments:** High-purity magnesium with control of tramp elements (shown in composition). Individual control of impurities to meet specialised requirements.**HK31A** ASTM B80, B90, B199, B403 (USA) Cast Wrought**Nominal composition:** Zn 0.3, Zr 0.4-1, Cu 0.1, Ni 0.01, Th 2.5-4.0, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1800**Identified Product forms:** Plate, Sheet/strip, Sand cast, Permanent mould cast**Similar/Equivalent alloys:** USA: UNS M13310, ASTM HK31A, AMS 4384E; 4445, SAE 507; J465, MIL M-26075; M-46062, QQ M-56; M-55; Proprietary: Mag. Elek. HK31, MTZ**Comments:** High strength alloy at high temperatures (wrought to 315 deg. C; sand castings to 345 deg. C). Used in wrought and cast forms. **Corrosion resistance:** Moderate **Weldability:** V.Good (gas-arc, resistance).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
O [-]	-	140	230	23	45	55HR	RT typical properties	(#3)
H24 [-]	-	205	260	9	45	68HR	RT typical properties	(#3)
H24 [Sheet/Plate]	-	200	255	9	-	68HB	RT typical properties	(#3)
T6 [Castings]	-	105	220	8	45	55HB	RT typical properties	(#3)

HM21A ASTM B90, B91 (USA) Wrought**Nominal composition:** Mn 0.45-1.1, Th 1.5-2.5, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1780**Identified Product forms:** Plate, Sheet/strip, Forging stock/Billet**Similar/Equivalent alloys:** USA: UNS M13210, ASTM HM21A, AMS 4363, 4383, 4390, MIL M-8917, QQ-M-40**Comments:** High temperature (to 343 deg.C) alloy. Heat treatable. Used in T5 & T8 condition. **Weldability:** V. good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [Forgings]	55	-	76	-	-	-	370°C typical properties	(#3)
T5 [Forgings]	140	-	230	15	-	-	RT typical properties	(#3)
T5 [Forgings]	90	-	110	-	-	-	200°C typical properties	(#3)
T8 [Sheet]	170	-	235	11	45	-	RT typical properties	(#3)
T8 [Sheet]	115	-	125	30	-	-	200°C typical properties	(#3)
T8 [Sheet]	165	-	247	9	-	-	RT typical properties	(#5)
T8 [Sheet]	55	-	76	50	-	-	370°C typical properties	(#3)

HM31A ASTM (USA) Wrought**Approximate composition:** Mn 1.2 min., Th 2.5-3.5, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1800**Identified Product forms:** Tube, Structural profile, Extrusion**Similar/Equivalent alloys:** USA: UNS M13312, ASTM HM31A, AMS 4388, 4389, SAE J466, MIL M-8916**Comments:** High temperature (to 315 deg.C), weldable alloy. Used in F or T5 condition. **Weldability:** V. Good (gas-arc, resistance). No stress relief

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	230	290	10	45	-	RT typical properties	(#3)
T5 [Extru. Bar/section]	227	-	287	8	-	-	RT typical properties	(#5)
Not stated [Extru. (<2600 sq.mm)]	160	-	165	32	40	-	200 C typical properties	(#3)
Not stated [Extru. (<2600 sq.mm)]	230	-	283	10	45	-	RT typical properties	(#3)
Not stated [Extru. (<2600 sq.mm)]	110	-	115	22	39	-	315 C typical properties	(#3)

HZ32A ASTM B80 (USA) Cast**Nominal composition:** Zn 1.7-2.5, Zr 0.5-1, Cu 0.1, Ni 0.01, Th 2.5-4.0, Rare Earth <0.10., Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830**Identified Product forms:** Sand cast, Permanent mould cast**Similar/Equivalent alloys:** USA: UNS M13320, ASTM HZ32A, AMS 4447B, MIL M-46062, QQ M-56; European (AECMA): MG-C-81; France: ZT1, G-Th3Z2; Germany: LW 3.6254; Wk. 3.5105; UK: MAG8-T5/TE; DTD 5005A; Proprietary: Mag. Elek. ZT1**Comments:** Moderate strength alloy, optimised for medium- to long-term use at >260 deg.C. Pressure-tight castings (mainly sand), used in T5 condition. **Weldability:** Fair (gas-arc) + stress relief (thick csa).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	-	90	185	4	45	55HB	RT typical properties	(#3)

K1A ASTM B80 (USA) Cast**Nominal composition:** Zr 0.4-1, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1740**Identified Product forms:** Sand cast, Permanent mould cast**Similar/Equivalent alloys:** USA: UNS M18010, ASTM K1A**Comments:** High damping capacity alloy. Used in as-cast (F) condition. **Weldability:** Good (also soldered).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Die-cast]	-	83	165	8	-	-	RT typical properties	(#3)
F [Sand cast]	-	55	180	19	-	-	RT typical properties	(#3)

LA141 ASTM B270 (USA)**Nominal composition:** Al 0.05, Mn 1.5, Cu 0.05, Si 0.5-0.6, Li 12-15, Fe 0.005, Ni 0.005, Na <0.005, Magnesium rem.**Similar/Equivalent alloys:** USA: UNS M14142, ASTM B270 - LA141, MIL -M-46130**Comments:** Contains Li.**LAZ933** Ballette (Origin unknown)**Proprietary composition:** Al 3, Zn 3, Li 9, Magnesium rem.**Comments:** "Ballette Mem. Institute"

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M-1 Hi-Potential	Timminco (Canada)	Cast Wrought						
<p>Proprietary composition: Al 0.01, Mn 1.2-2, Zn 0.01, Cu 0.002, Si 0.01, Fe 0.003, Ni 0.001, Others: Total 0.01, Magnesium rem. Identified Product forms: Extrusion, Ingot Comments: Cathodic protection & anodes.</p>								
M14142	UNS (USA)							
<p>Nominal composition: Al 0.05, Mn 1.5, Cu 0.05, Si 0.5-0.6, Li 12-15, Fe 0.005, Ni 0.005, Na 0.005, Magnesium rem. Similar/Equivalent alloys: <u>USA:</u> UNS M14142, ASTM B270 - LA141, MIL -M-46130 Comments: Contains Li.</p>								
M1C	ASTM B843 (USA)	Cast						
<p>Nominal composition: Al 0.01, Mn 0.5-1.3, Cu 0.02, Si 0.05, Fe 0.03, Ni 0.001, Others: Each 0.05, Magnesium rem. Similar/Equivalent alloys: <u>Proprietary:</u> Mag Corp 'MAXMAG'; Comments: High potential anodes for cathodic protection</p>								
MA25	Otto Fuchs (Germany)	Wrought						
<p>Approximate composition: Al 2, Zn, Magnesium rem.</p>								
MAG-CAL	Timminco (Canada)	Cast						
<p>Proprietary composition: Ca 30, Magnesium 70 min. Identified Product forms: Ingot Comments: Specialist alloy used in the refining of lead for removal of bismuth.</p>								
MAG-E-121M	BS 3373 (UK)	Wrought						
<p>Approximate composition: Al 6, Mn 0.25, Si 0.1, Magnesium rem. Similar/Equivalent alloys: <u>USA:</u> UNS M11610, ASTM AZ61A-F, AMS 4350K, 4358A, QQ-M-31B, -M-40B; <u>European (AECMA):</u> MG-P-63; <u>France:</u> M1; G-A6Z1; <u>Germany:</u> MgAl6Zn; W3150; Wk. 3.5612; <u>UK:</u> BS 3373 MAG-E121M; BS 3372 MAG-F121; BS 3371MAG-T-121M; BS 2L.503, L.513, L.512; DTD259A; <u>Others:</u> USA WW-T-825B; <u>Proprietary:</u> Mag. Elek AZM; M1; Otto Fuchs MA64</p>								
MAG-S-1110	BS 3370 (UK)	Cast						
<p>Approximate composition: Al 2.5-3.5, Mn 0.15-0.7, Zn 0.6-1.4, Cu 0.05, Si 0.3, Fe 0.005, Ni 0.005, Ca <0.3, Magnesium rem. Similar/Equivalent alloys: <u>USA:</u> ASTM AZ31B, AZ31C; <u>European (AECMA):</u> MG-P-62; <u>France:</u> F3; G-A3Z1; <u>Germany:</u> MgAl3Zn; Wk. 3.5312; LW.3504; <u>UK:</u> MAG-S-1110, MAG-E-111M; DTD742; <u>Proprietary:</u> Mag. Elek. AZ31</p>								
MAG-x-101	BS 3370, 3373 (UK)	Wrought						
<p>Approximate composition: Mn 1.5, Magnesium rem. Identified Product forms: Sheet/strip, Tube, Extrusion, Forging stock/Billet Similar/Equivalent alloys: <u>USA:</u> ASTM MIA; <u>UK:</u> MAG-S-101M, MAG-E-101M; DTD118C, 142B, 737.; <u>Proprietary:</u> Mag. Elek. AM503. Comments: where: x = S = sheet; E = extrusion (bar or tube). See: MIA.</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [Extru. Bar]	162	-	263	7	-	45-55VPN	RT typical properties	(#5)
M [Extru. Tube]	154	-	247	6	-	45-55VPN	RT typical properties	(#5)
M [Sheet]	100	-	232	6	-	35-45VPN	RT typical properties	(#5)
MAG-x-111	BS 3370, 3373 (UK)	Wrought						
<p>Approximate composition: Al 3, Mn 0.3, Zn 1, Magnesium rem. Identified Product forms: Sheet/strip, Extrusion, Forging stock/Billet Similar/Equivalent alloys: <u>USA:</u> ASTM AZ31; <u>UK:</u> MAG-S-1110, MAG-S-111M, MAG-E-111M; <u>Proprietary:</u> Mag. Elek. AZ31 Comments: where: x = S = sheet; E = extrusion (bar, section). See: AZ31.</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
O [Sheet]	131	-	232	13	-	60-60VPN	RT typical properties	(#5)
M [Extru. Bar/section]	162	-	255	11	-	50-60VPN	RT typical properties	(#5)
M [Sheet]	170	-	263	10	-	55-70VPN	RT typical properties	(#5)
MAG-x-121	BS 3370, 3372, 3373 (UK)	Wrought						
<p>Approximate composition: Al 6, Mn 0.3, Zn 1, Magnesium rem. Identified Product forms: Sheet/strip, Extrusion, Forging stock/Billet Similar/Equivalent alloys: <u>USA:</u> ASTM AZ61; <u>UK:</u> MAG-F-121M, MAG-E-121M; 2L503, 2L.512, 2L.513.; <u>Proprietary:</u> Mag. Elek. AZ61, AZM Comments: where: x = F = forgings; E = extrusion (bar, section, tube). See: AZ61.</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
M [Extru. Bar/section]	183	-	293	8	-	55-70VPN	RT typical properties	(#5)
M [Extru. Tube]	170	-	278	8	-	60-70VPN	RT typical properties	(#5)
M [Forgings]	183	-	293	8	-	60-70VPN	RT typical properties	(#5)
MAG-x-131	BS 3370, 3373 (UK)	Wrought						
<p>Approximate composition: Mn 1, Zn 2, Magnesium rem. Identified Product forms: Sheet/strip, Extrusion Similar/Equivalent alloys: <u>USA:</u> ASTM ZM21; <u>UK:</u> MAG-S-1310, MAG-S-131M, MAG-E-131M; DTD 5091, 5101.; <u>Proprietary:</u> Mag. Elek. ZM21 Comments: where: x = S = sheet; E = extrusion (bar, section). See: ZM21.</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
O [Sheet]	131	-	232	13	-		RT typical properties	(#5)
M [Extru. Bar/section]	162	-	255	11	-		RT typical properties	(#5)
M [Sheet]	170	-	263	10	-		RT typical properties	(#5)

MAG-x-141 BS 3370, 3373 (UK) Wrought

Approximate composition: Zn 1, Zr 0.6, Magnesium rem.

Identified Product forms: Sheet/strip, Extrusion

Similar/Equivalent alloys: UK: MAG-S-141M, MAG-E-141M; 2L.508, 2L.509, 2L.515; *Proprietary*: Mag. Elek. ZW1

Comments: where: x = S = sheet; E = extrusion (bar, section, tube).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
M [Extru. Bar/section]	208	-	293	13	-	60-70VPN	RT typical properties	(#5)
M [Extru. Tube]	193	-	278	7	-	60-70VPN	RT typical properties	(#5)
M [Sheet]	178	-	263	10	-	55-70VPN	RT typical properties	(#5)

MAG-x-151 BS 3370, 3373 (UK) Wrought

Approximate composition: Zn 3, Zr 0.6, Magnesium rem.

Identified Product forms: Sheet/strip, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: *European (AECMA)*: MG-P-43; UK: MAG-S-151M, MAG-F-151M, MAG-E-151M; 2L.504, 2L.514, 2L.505. DTD 5081, 626B, 619, 622A, 729.;

Proprietary: Mag. Elek. ZW3

Comments: where: x = F = forgings; S = sheet; E = extrusion (bar, section). See: ZW3

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
M [Extru. Bar/section]	239	-	309	18	-	65-75VPN	RT typical properties	(#5)
M [Forgings]	224	-	309	8	-	60-80VPN	RT typical properties	(#5)
M [Sheet]	185	-	270	8	-	60-70VPN	RT typical properties	(#5)

MAG-x-161 BS 3373 (UK) Wrought

Approximate composition: Zn 5.5, Zr 0.6, Magnesium rem.

Identified Product forms: Extrusion

Similar/Equivalent alloys: USA: UNS M16600, ASTM ZK60A, AMS 4352, 4362, QQ -M-31, -M-40; France: G-Z5Zr; Germany: MgZn6Zr; Wk. 3.5161; UK: MAG-E-161; DTD5041A; Others: USA VVV-T-825; *Proprietary*: Mag. Elek. ZW6

Comments: where x = E = extrusion (bars, sections). See: ZK60A

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Extru. Bar/section]	270	-	340	10	-	60-80VPN	RT typical properties	(#5)

MAG1 BS 2970 (UK) Cast

Nominal composition: Al 7.5-9, Mn 0.15-0.4, Zn 0.3-1, Cu 0.15, Si 0.3, Fe 0.05, Ni 0.01, Cu+Si+Fe+Ni 0.40, Magnesium rem. Density (kg.m⁻³) 1810

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: ASTM AZ81A, QQ M56B; *European (AECMA)*: MG-C-61; France: FT; G-A9; Germany: MgAl8Zn1; Wk. 3.5812; UK: MAG1, MAG2; 3L.122; *Proprietary*: Mag. Elek. A8, AZ81; Mag Corp. AZ81A

Comments: General purpose engineering alloy. Used in M/F & TB/T4 condition. Good ductility/shock resistance in T4 (TB) temper. Applications: engineering vehicle wheels.

Corrosion resistance: Moderate Weldability: Good (Argon-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
M (as-cast) [Chill cast]	85	-	185	4	-	-	RT typical properties	(#5)
M (as-cast) [Sand cast]	85	-	140	2	-	-	RT typical properties	(#5)
TB (solution treated) [Chill cast]	80	-	230	10	-	-	RT typical properties	(#5)
TB (solution treated) [Sand cast]	80	-	200	6	-	-	RT typical properties	(#5)

MAG2 BS 2970 (UK) Cast

Nominal composition: Al 7.5-9, Mn 0.15-0.4, Zn 0.3-1, Cu 0.005, Si 0.01, Fe 0.003, Ni 0.001, Magnesium rem. Density (kg.m⁻³) 1810

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: ASTM AZ81A; *European (AECMA)*: MG-C-61; France: FT, G-A9; Germany: MgAl8Zn1; Wk. 3.5812; UK: MAG1, MAG2, 3L.122. DTD684A, 690A; *Proprietary*: Mag. Elek. A8, AZ81; Mag Corp. AZ81A

Comments: Special purpose, high-purity engineering alloy. Special melting technique required. Used in M & TB condition. Corrosion resistance: Excellent Weldability: Good (Argon-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
M (as-cast) [Chill cast]	85	-	185	4	-	-	RT typical properties	(#5)
M (as-cast) [Sand cast]	85	-	140	2	-	-	RT typical properties	(#5)
TB (solution treated) [Chill cast]	80	-	230	10	-	-	RT typical properties	(#5)
TB (solution treated) [Sand cast]	80	-	200	6	-	-	RT typical properties	(#5)

MAG3 BS 2970 (UK) Cast

Nominal composition: Al 9-10.5, Mn 0.15-0.4, Zn 0.3-1, Cu 0.15, Si 0.3, Fe 0.05, Ni 0.01, Cu+Si+Fe+Ni 0.40, Magnesium rem. Density (kg.m⁻³) 1830

Identified Product forms: Sand cast, Permanent mould cast, Die cast

Similar/Equivalent alloys: USA: UNS M11914, ASTM AZ91D, AMS 4437A; *European (ISO)*: Draft; France: F10, G-A9Z1; Germany: LW 3.5194; Wk. 3.5812; UK: MAG3; 3L.124, 3L.125; *Proprietary*: Mag. Elek. AZ91

Comments: General purpose engineering alloy. For pressure-tight applications. Higher strength in T6/TF condition. Corrosion resistance: Moderate Weldability: Good (except die-castings)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
M (as-cast) [Chill cast]	100	-	170	2	-	-	RT typical properties	(#5)
M (as-cast) [Sand cast]	95	-	125	-	-	-	RT typical properties	(#5)
TB (solution treated) [Chill cast]	85	-	215	5	-	-	RT typical properties	(#5)
TB (solution treated) [Sand cast]	85	-	200	4	-	-	RT typical properties	(#5)
TF (ST+precipitation) [Chill cast]	130	-	215	2	-	-	RT typical properties	(#5)
TF (ST+precipitation) [Sand cast]	130	-	200	-	-	-	RT typical properties	(#5)

310 Magnesium Alloys

MAG4	BS 2970 (UK)	Cast						
Nominal composition: Zn 3.5-5.5, Zr 0.4-1, Cu 0.03, Ni 0.005, Others: Total 0.3, Magnesium rem. Density (kg.m ⁻³) 1810 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16510, ASTM ZK51A, AMS 4443, SAE 509; J465, MIL M-46062, QQ M-56A; <u>France:</u> Z5Z; <u>UK:</u> MAG4; 2L.127; <u>Proprietary:</u> Mag. Elek. Z5Z Comments: General purpose engineering alloy. High strength, good ductility. Not suitable for complex, thin-section components. Corrosion resistance: Moderate Weldability: Not recommended								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Chill cast]	154	-	245	7	-	-	RT typical properties	(#5)
TE (precipitation) [Sand cast]	145	-	230	5	-	-	RT typical properties	(#5)
MAG5	BS 2970 (UK)	Cast						
Nominal composition: Zn 3.5-5.5, Zr 0.4-1, Cu 0.03, Ni 0.005, Rare Earth 0.75-1.75, Magnesium rem. Density (kg.m ⁻³) 1840 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16410, ASTM ZE41A, AMS 4439A; <u>European (CEN):</u> MG-C-43 (<u>ISO</u>): MgZnReZr (<u>AECMA</u>): MG-C-43; <u>France:</u> RZ5, G-Z4TR; <u>Germany:</u> LW3.6104; Wk. 3.5101; <u>UK:</u> MAG5-T5/TE; 2L.128; <u>Others:</u> Unavia 816.02; <u>Proprietary:</u> Mag. Elek. RZ5, ZE41, W7(welding rod); RZ5, ZE41A Comments: Special purpose alloy. High strength, pressure-tight applications. Corrosion resistance: Moderate Weldability: Fair (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Chill cast]	135	-	215	4	-	-	RT typical properties	(#5)
TE (precipitation) [Sand cast]	135	-	200	3	-	-	RT typical properties	(#5)
MAG6	BS 2970 (UK)	Cast						
Nominal composition: Zn 0.8-3, Zr 0.4-1, Cu 0.03, Ni 0.005, Rare Earth 2.5-4.0, Magnesium rem. Density (kg.m ⁻³) 1800 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M12230, ASTM EZ33A, AMS 4442B, QQ M-56B; <u>European (CEN):</u> MG-C-91 (<u>AECMA</u>): MG-C-91; <u>France:</u> ZRE1, G-TR3Z2; <u>Germany:</u> LW 3.6204; Wk. 3.5103; <u>UK:</u> MAG6-TE; 2L.126; DTD 708; <u>Proprietary:</u> Mag. Elek. ZRE1, EZ33, W6 (welding rod); ZRE1 Comments: Special purpose engineering alloy. High level of pressure-tightness at RT & elevated temperatures. Corrosion resistance: Moderate Weldability: V. Good (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Chill cast]	110	-	155	3	-	-	RT typical properties	(#5)
TE (precipitation) [Sand cast]	95	-	140	3	-	-	RT typical properties	(#5)
MAG7	BS 2970 (UK)	Cast						
Nominal composition: Al 7.5-9.5, Mn 0.15-0.8, Zn 0.3-1.5, Cu 0.35, Si 0.4, Fe 0.05, Ni 0.02, Cu+Si+Fe+Ni 0.75, Magnesium rem. Density (kg.m ⁻³) 1820 Identified Product forms: Sand cast, Permanent mould cast, Die cast Similar/Equivalent alloys: <u>USA:</u> ASTM AZ91; <u>France:</u> G-A9Z1; <u>Germany:</u> MgAl19Zn1; Wk.3.5912; <u>UK:</u> MAG7, MAG3; <u>Proprietary:</u> Mag. Elek. AZ91, W18(welding rod), C-alloy. Comments: General purpose, widely used engineering alloy. Used in F/M, T4/TB, T6/TF condition. Corrosion resistance: Moderate Weldability: Good (except die-castings)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
M (as-cast) [Chill cast]	85	-	170	2	-	-	RT typical properties	(#5)
M (as-cast) [Sand cast]	85	-	125	-	-	-	RT typical properties	(#5)
TB (solution treated) [Chill cast]	80	-	215	5	-	-	RT typical properties	(#5)
TB (solution treated) [Sand cast]	80	-	185	4	-	-	RT typical properties	(#5)
TF (ST+precipitation) [Chill cast]	110	-	215	2	-	-	RT typical properties	(#5)
TF (ST+precipitation) [Sand cast]	110	-	185	-	-	-	RT typical properties	(#5)
MAG8	BS 2970 (UK)	Cast						
Nominal composition: Mn 0.15, Zn 1.7-2.5, Zr 0.4-1, Cu 0.03, Si 0.01, Fe 0.01, Ni 0.005, Th 2.5-4.0; Rare Earth 0.10, Magnesium rem. Density (kg.m ⁻³) 1850 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M13320, ASTM HZ32A, AMS 4447B, QQ M-56A; <u>European (AECMA):</u> MG-C-81; <u>France:</u> ZT1, G-Th3Z2; <u>Germany:</u> LW 3.6254; Wk. 3.5105; <u>UK:</u> MAG8-T6/TE; DTD 5005A Comments: Special purpose, creep-resistant alloy. Corrosion resistance: Moderate Weldability: V. Good (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Chill cast]	85	-	185	5	-	-	RT typical properties	(#5)
TE (precipitation) [Sand cast]	85	-	185	5	-	-	RT typical properties	(#5)
MAG9	BS 2970 (UK)	Cast						
Nominal composition: Mn 0.15, Zn 5-6, Zr 0.4-1, Cu 0.03, Si 0.01, Fe 0.01, Ni 0.005, Th 1.5-2.3, Rare Earth 0.20, Magnesium rem. Density (kg.m ⁻³) 1870 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16620, ASTM ZH62A, AMS 4438B, MIL M-46062B, QQ M-56B; <u>European (AECMA):</u> MG-C-41; <u>France:</u> TZ6; <u>Germany:</u> LW 3.5114; Wk. 3.5102; <u>UK:</u> MAG9-T5/TE; DTD 5015A; <u>Proprietary:</u> Mag. Elek. TZ6 Comments: Special purpose alloy for heavy-duty, structural applications. Corrosion resistance: Moderate Weldability: Fair (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
TE (precipitation) [Chill cast]	155	-	255	5	-	-	RT typical properties	(#5)
TE (precipitation) [Sand cast]	155	-	255	5	-	-	RT typical properties	(#5)
MAG12	BS 2970 (UK)	Cast						
Approximate composition: Zr 0.6, Ag 2.5, Rare Earth 2.5, Magnesium rem. Similar/Equivalent alloys: <u>European (CEN):</u> MG-C-51 (<u>AECMA</u>): MG-C-51; <u>France:</u> MSR-B; G-Ag2.5 TR; <u>UK:</u> MAG-12-T6; DTD 5035A; <u>Proprietary:</u> Mag. Elek. MSR-B								
MAG13	BS 2970 (UK)	Cast						
No composition: - Similar/Equivalent alloys: <u>USA:</u> ASTM QE22A, AMS 4418C, MIL M-46062A, QQ M-56B; <u>Germany:</u> LW3.5164, Wk. 3.5106; <u>Proprietary:</u> Mag. Elek. QE22 (MSR)								

MAG14	BS 2970 (UK)	Cast
<p>No composition: - Similar/Equivalent alloys: <i>USA:</i> ASTM WE54; <i>Proprietary:</i> Mag. Elek. WE54 Comments: Used in T6 condition. See: WE54</p>		
MELRAM072	Magnesium Elektron (UK)	Wrought
<p>Proprietary composition: 12 Vol.% Silicon Carbide, Magnesium rem. Density (kg.m⁻³) 2000 Comments: High strength, high modulus MMC (development) alloy. 12% vol. silicon carbide particles; mean particle size 10 microns. Matrix based on ZC71. Heat-treatable. Max. YS in T6 condition. For use in applications needing high strength & rigidity. Weldability: Weldable (ZC71 filler rod).</p>		
Condition [Form]	PS (MPa)	YS (MPa)
Not stated [Not stated]	-	370
	UTS (MPa)	EI (%)
	398	1.5
	E (GPa)	Hardness
	63	HV 87
	Notes	Typical
		(Source)
		(Magnesium Elektron)
MELRAM072TS	Magnesium Elektron (UK)	Wrought
<p>Proprietary composition: 12 Vol.% Silicon Carbide, Magnesium rem. Density (kg.m⁻³) 2000 Identified Product forms: Tube Comments: Metal Matrix Composite. 12 vol.% silicon carbide, mean particle size 10 microns in Mg-alloy. High strength, high modulus MMC (development) alloy for thin-walled tube. Max. properties in T5. Applications (bicycles, frame-structures). Weldability: weldable (ZM21 filler rod)</p>		
Condition [Form]	PS (MPa)	YS (MPa)
Not stated [Not stated]	-	311
	UTS (MPa)	EI (%)
	344	4
	E (GPa)	Hardness
	63	HV 87
	Notes	Typical
		(Source)
		(Magnesium Elektron)
MG Metal	RIMA (Brazil)	Cast
<p>Proprietary composition: Al 0.01, Mn 0.15, Zn 0.003, Si 0.07, Cu 10ppm max.; Ni 20ppm max.; Fe 100ppm max.; Ca 200ppm max.; Na 15ppm max., Magnesium 99.8 min.</p>		
MG-C-43	AECMA (Europe)	Cast
<p>Approximate composition: Zn 4.5, Zr 0.7, Rare Earth 1.2, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> UNS M16410, ASTM ZE41A, AMS 4439A; <i>European (CEN):</i> MG-C-43 (<i>ISO:</i> MgZnReZr (<i>AECMA:</i> MG-C-43; <i>France:</i> RZ5, G-Z4TR; <i>Germany:</i> LW3.6104; Wk. 3.5101; <i>UK:</i> MAG5-T5/TE; 2L.128; <i>Others:</i> Unavia 816.02; <i>Proprietary:</i> Mag.Elek RZ5, ZE41, W7(welding rod); RZ5, ZE41A</p>		
MG-C-51	AECMA (Europe)	Cast
<p>Approximate composition: Zr 0.6, Ag 2.5, Rare Earth 2.5, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>European (CEN):</i> MG-C-51 (<i>AECMA:</i> MG-C-51; <i>France:</i> G-Ag2.5TR; <i>UK:</i> BS2970 MAG12-TF; DTD5035; <i>Proprietary:</i> Mag. Elek. MSR-B</p>		
MG-C-61	AECMA (Europe)	Cast
<p>Approximate composition: Al 8, Mn 0.3, Zn 0.7, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> ASTM AZ81A; <i>European (AECMA):</i> MG-C-61; <i>France:</i> FT, G-A9; <i>Germany:</i> MgAl8Zn1; Wk. 3.5812; <i>UK:</i> MAG1, MAG2; 3L.122; <i>Proprietary:</i> Mag.Elek A8, AZ81; Mag Corp AZ81A</p>		
MG-C-91	AECMA (Europe)	Cast
<p>Approximate composition: Zn 2.3, Zr 0.6, Rare Earth 3.0, Magnesium rem. Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <i>USA:</i> UNS M12230, ASTM EZ33A, AMS 4442B; <i>European (CEN):</i> MG-C-91 (<i>AECMA:</i> MG-C-91; <i>France:</i> ZRE1, G-TR3Z2; <i>Germany:</i> LW 3.6204; Wk. 3.5103; <i>UK:</i> MAG6-T5/TE; 2L.126; DTD 708; <i>Proprietary:</i> Mag.Elek. ZRE1, EZ33, W6 (welding rod); ZRE1</p>		
MG-P-43	AECMA (Europe)	Wrought
<p>Approximate composition: Zn 3, Zr 0.6, Magnesium rem. Similar/Equivalent alloys: <i>European (AECMA):</i> MG-P-43; <i>UK:</i> MAG-E-151M, MAG-F-151M, MAG-S-151. DTD 5081, DTD626B, DTD 619, 622A, 729. BS L.514, L.504, 2L.505.; <i>Proprietary:</i> Mag. Elek. ZW3</p>		
MG-P-61	CEN (Europe)	Wrought
<p>Approximate composition: Al 8, Mn 0.3, Zr 0.7, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11800, ASTM AZ80A, AMS 4360D, SAE 532, QQ -M40B; <i>European (CEN):</i> EN MG-P-61 (<i>AECMA:</i> MG-P-61; <i>France:</i> G-A7Z1, G-A8Z; <i>Germany:</i> MgAl8Zn; LW3515; Wk. 3.5812; <i>UK:</i> 2L121, 2L122; <i>Proprietary:</i> Mag.Elek AZ80</p>		
MG-P-63	AECMA (Europe)	Wrought
<p>Approximate composition: Al 6, Mn 0.3, Zn 1, Magnesium rem. Similar/Equivalent alloys: <i>USA:</i> UNS M11610, ASTM AZ61A-F, AMS 4350K, 4358A, QQ -M-31B, -M-40B; <i>European (AECMA):</i> MG-P-63; <i>France:</i> M1; G-A6Z1; <i>Germany:</i> MgAl6Zn; W3150; Wk. 3.5612; <i>UK:</i> BS 3373 MAG-E121M; BS 3372 MAG-F121; BS 3371MAG-T-121M; BS 2L.503, L.513, L.512; DTD259A; <i>Others:</i> USA WW-T-825B; <i>Proprietary:</i> Mag.Elek AZM; M1; Otto Fuchs MA64</p>		

312 Magnesium Alloys

MIA		ASTM B107, B217, B275 (USA)						Wrought
Approximate composition: Mn 1.2 min., Cu 0.05, Si 0.1, Ni 0.01, Ca <0.3, Others: Total 0.3, Magnesium rem. Density (kg.m ⁻³) 1770								
Identified Product forms: Sheet/strip, Tube, Extrusion, Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> UNS M15100, ASTM MIA, SAE 51, 522, 533; J466, QQ M-31; M-54; <i>Germany:</i> W3501; Wk. 3.5200; <i>UK:</i> BS 3371 MAG-E-101M; BS 3373 MAG-T-101M; DTD142A; DTD137; DTD118C; AM503; <i>Others:</i> USA WW-T-825.; <i>Proprietary:</i> Mag. Elek. W2 (welding rod); AM503; Otto Fuchs MG20								
Comments: Non heat-treatable alloy. Moderate mechanical properties. Corrosion resistance: V. Good Weldability: V. Good (gas-arc, resistance). No stress relief.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
O [Sheet]	125	-	230	17	-	48HB	RT typical properties (#3)	
F [-]	-	180	255	12	45	44HB	RT typical properties (#3)	
Hard rolled [Sheet]	180	-	240	7	-	54HB	RT typical properties (#3)	
Not stated [Forgings]	160	-	250	7	-	47HB	RT typical properties (#3)	
Not stated [Hollow Extr.]	145	-	240	9	-	42HB	RT typical properties (#3)	
Not stated [Solid Extr.]	180	-	255	12	-	44HB	RT typical properties (#3)	
MSR-A		Magnesium Elektron (UK)						Cast
Approximate composition: Zr 0.6, Ag 2.5, Nd-rich Rare Earth 1.6, Magnesium rem. Density (kg.m ⁻³) 1810								
Identified Product forms: Sand cast, Permanent mould cast								
Similar/Equivalent alloys: <i>UK:</i> DTD 5025A; <i>Proprietary:</i> Mag. Elek. MSR-A, QE22								
Comments: High strength thick & thin section castings. Best strength & fatigue properties for short-term, elevated temperature (to 250 deg. C) exposure of Mg-casting alloys. Corrosion resistance: Moderate Weldability: V. Good (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
Not stated [Chill cast]	170	-	240	4	-	-	RT typical properties (#5)	
Not stated [Sand cast]	170	-	240	4	-	-	RT typical properties (#5)	
MSR-B		Magnesium Elektron (UK)						Cast
Proprietary composition: Zr 0.6, Ag 2.5, Nd-rich Rare Earth 2.5, Magnesium rem. Density (kg.m ⁻³) 1820								
Identified Product forms: Sand cast, Permanent mould cast								
Similar/Equivalent alloys: <i>European (CEN):</i> MG-C-51 (<i>AECMA</i>): MG-C-51; <i>France:</i> G-Ag2.5TR; <i>UK:</i> MAG12-TF; DTD 5035A.; <i>Proprietary:</i> Mag. Elek. MSR-B, W13 (welding rod), QE22A								
Comments: high strength thick & thin section castings. Best strength & fatigue properties for short-term, elevated temperature (to 250 deg. C) exposure of Mg-casting alloys. Corrosion resistance: Moderate Weldability: V. Good (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
Not stated [Chill cast]	185	-	240	2	-	-	RT typical properties (#5)	
Not stated [Sand cast]	185	-	240	2	-	-	RT typical properties (#5)	
PE		ASTM (USA)						Wrought
Nominal composition: Al 2.5-4, Mn 0.08, Zn 0.7-1.6, Cu 0.05, Si 0.05, Fe 0.005, Ni 0.005, Ca 0.04, Others: Total 0.03, Magnesium rem. Density (kg.m ⁻³) 1760								
Identified Product forms: Plate, Sheet/strip								
Comments: Photoengraving grade. Higher impurity levels affect etch quality.								
Pure Magnesium Ingot		Ayrton & Partners (UK)						Cast
Proprietary composition: Al 0.02, Mn 0.03, Cu 0.004, Si 0.009, Fe 0.04, Ni 0.001, Na 0.04, Magnesium 99.9 min.								
Identified Product forms: Ingot								
Comments: Originating in Russia and the Ukraine. 8 kg ingots on 800 kg pallets. Also supply standard magnesium casting alloys of Russian and Chinese origin.								
Pure Magnesium Ingot		Ayrton & Partners (UK)						Cast
Proprietary composition: Al 0.01, Mn 0.03, Cu 0.002, Si 0.02, Fe 0.03, Ni 0.001, Cl 0.005, Magnesium 99.95 min.								
Identified Product forms: Ingot								
Comments: Originating in China. 8 kg ingots on 1000 kg pallets. Also supply standard magnesium casting alloys of Russian and Chinese origin.								
Pure Magnesium T-bars		Ayrton & Partners (UK)						Cast
Proprietary composition: Al 0.02, Mn 0.03, Cu 0.004, Si 0.009, Fe 0.04, Ni 0.001, Na 0.04, Magnesium 99.9 min.								
Identified Product forms: Ingot								
Comments: Originating in Russia. T-bars 250/500 kgs. Also supply standard magnesium casting alloys of Russian and Chinese origin.								
QE22A		ASTM B80, B199, B403 (USA)						Cast
Nominal composition: Zr 0.4-1, Ag 2-3, Cu 0.1, Ni 0.01, Nd-rich Rare Earth 1.75-2.5, Others: Total 0.3, Magnesium rem. Density (kg.m ⁻³) 1800								
Identified Product forms: Sand cast, Permanent mould cast								
Similar/Equivalent alloys: <i>USA:</i> UNS M18220, ASTM QE22A, AMS 4418C, MIL M-46062B, QQ M-56B; M-55; <i>European (AECMA):</i> MG-C-51; <i>France:</i> MSR-B; G-Ag2.5TR; <i>Germany:</i> LW3.5164; Wk. 3.5106; <i>UK:</i> MAG12-T6; DTD 5035A; <i>Proprietary:</i> Mag. Elek. QE22 (MSR), QE22A (MSR-B), W8 (welding rod)								
Comments: High strength at elevated temperatures (~200 deg. C) for short-term exposure. Pressure-tight, weldable castings used in T6 condition. Weldability: V. Good (argon-arc)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)	
T6 [-]	-	195	260	3	45	65-85HB	RT typical properties (#3)	
T6 [Chill cast test bar]	175	-	240	2	-	70-90HB	Typical properties (#4)	
T6 [Sand cast test bar]	175	-	240	2	-	70-90HB	Typical properties (#4)	
Not stated [Chill casting]	175	-	240	2	-	-	RT typical properties (#5)	
Not stated [Sand casting]	-	166	193	-	-	-	200°C typical values (#3)	
Not stated [Sand casting]	175	-	240	2	-	-	RT typical properties (#5)	

QH21A ASTM (USA) Cast

Nominal composition: Zn 0.2, Zr 0.4-1, Ag 2-3, Cu 0.1, Ni 0.01, Th 0.6-1.6; Nd-rich rare earth 0.6-1.5. Th+RE 1.6-2.2., Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* ASTM QH21A; *Proprietary:* Mag. Elek. QH21A

Comments: Highly-stressed, high temperature (~250 deg. C) components. Pressure-tight castings used in T6 condition. Applications: aircraft, aerospace.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Cast test bar]	-	207	276	4	-	-	RT typical properties	(#3)
T6 [Castings]	-	205	284	8	-	-	After 500h/200°C	(#3)
T6 [Castings]	-	200	282	8	-	-	After 1000h/200°C	(#3)

WE43A ASTM B80, B93, B199 (USA) Cast Wrought

Nominal composition: Mn 0.15, Zn 0.2, Zr 0.4-1, Cu 0.03, Si 0.01, Li 0.2, Ni 0.005, Y 3.7-4.0; Rare Earth* 2.4-4.0, Magnesium rem. **Density** (kg.m⁻³) 1840

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* UNS M18430, ASTM WE43A, AMS 4427; *European (AECMA):* MG-C-960, MG-C96002; *Others:* USA MAM4427; *Proprietary:* Mag Elek WE43

Comments: Alloy for long-term exposure at high temperatures (e.g. 5000hrs at ~250 deg. C). Pressure-tight, weldable castings used in T6 condition. Note * casting composition: Rare earth (RE) 2.0-2.5 Nd, with rest being heavy rare earth (HRE), principally Tb, Er, Dy, Gd. Y content to HRE content: 80Y-20HRE. **Weldability:** Fair (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Castings]	-	165	250	2	44.2	75-95HB	RT typical properties	(#3)
Not stated [Cast plate]	160	-	240	8	39	-	200°C Min. values	(#3)
Not stated [Cast plate]	150	-	210	15	36	-	250°C Min. values	(#3)

WE54A ASTM B80, B199, B403 (USA) Cast Wrought

Nominal composition: Mn 0.15, Zn 0.2, Zr 0.4-1, Cu 0.03, Si 0.01, Li 0.2, Ni 0.005, Y 4.75-5.5; Rare Earth* 2.0-4.0, Magnesium rem. **Density** (kg.m⁻³) 1850

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* UNS M18410, ASTM WE54A, AMS 4426; *European (AECMA):* MG-C-960, MG-C96001; *UK:* MAG14-TF/T6; *Proprietary:* Mag Elek WE54

Comments: High temperature (~300 deg. C), short-term exposure (<1000hrs). Pressure-tight weldable castings, used in T6 condition. Note * casting composition: Rare earth (RE) 1.5-2.0 Nd, with rest being heavy rare earth (HRE), principally Tb, Er, Dy, Gd. Y content to HRE content: 80Y-20HRE. **Weldability:** Fair (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Castings]	-	172	250	2	-	75-95HB	RT typical properties	(#3)

ZC63A ASTM B80, B199, B403 (USA) Cast

Nominal composition: Mn 0.25-0.75, Zn 5.5-6.5, Cu 2.4-3, Si 0.2, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1870

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: *USA:* UNS M16631, ASTM ZC63A; *Proprietary:* Mag. Elek ZC63

Comments: Improved properties & castability than AZ91C. Pressure-tight castings used in T6 condition. **Weldability:** Fair (gas-arc)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
T6 [Castings]	-	125	210	4	46	55-65HB	RT typical properties	(#3)

ZC71 ASTM B107 (USA) Wrought

Nominal composition: Mn 0.5-1, Zn 6-7, Cu 1-1.5, Si 0.2, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: *USA:* UNS M16710, ASTM ZC71; *European (CEN):* MG-C71; *France:* Mg-C71; *UK:* ZC71, ZCM711; *Proprietary:* Mag. Elek. W22 (welding rod)

Comments: Heat-treatable extrusion alloy. Good mechanical properties, high elongation. Used in T5 or T6 condition. **Weldability:** Possible (Gas-arc).

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
F [-]	-	340	360	5	44.2	70-80HB	RT typical properties	(#3)
F [Extru. Bar 125mm dia.]	190	-	275	15	-	-	RT typical. Max. values	(#3)
F [Extru. Bar 16mm dia.]	190	-	290	13	-	-	RT typical. Max. values	(#3)
As extruded [Extru. Bar/section]	160	-	240	7	-	-	Typical properties	(#4)
T5 [Extru. Bar 125mm dia.]	235	-	295	10	-	-	RT typical. Max. values	(#3)
T5 [Extru. Bar 16mm dia.]	265	-	320	10	-	-	RT typical. Max. values	(#3)
T6 [Extru. Bar 125mm dia.]	335	-	360	7	-	-	RT typical. Max. values	(#3)
T6 [Extru. Bar 16mm dia.]	250	-	375	6	-	-	RT typical. Max. values	(#3)
Fully HT [Extru. Bar/section]	300	-	325	3	-	-	Typical properties	(#4)
Precipitation [Extru. Bar/section]	200	-	250	5	-	-	Typical properties	(#4)

ZC71 Magnesium Elektron (UK) Wrought

Proprietary composition: Mn 0.75, Zn 6.5, Cu 1.25, Magnesium rem. **Density** (kg.m⁻³) 1870

Identified Product forms: Extrusion

Similar/Equivalent alloys: *USA:* UNS M16710, ASTM ZC71A-T6; *European (CEN):* MG-C71; *France:* Mg-C71; *UK:* ZC71; *Proprietary:* Mag. Elek ZC71

Comments: Highest strength commercial wrought alloy. Extrusion. Highly stressed components to 150 deg. C. Range of conditions, max. in T6 (aerospace, automotive, defence, etc.) **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
As extruded [10mm bar]	-	185	285	11.5	-	-	Typical	(Magnesium Elektron)
As extruded [125mm bar]	-	180	265	14	-	-	Typical	(Magnesium Elektron)
Fully heat-treated [10mm bar]	-	345	368	5	-	-	Typical	(Magnesium Elektron)
Fully heat-treated [125mm bar]	-	325	350	6	-	-	Typical	(Magnesium Elektron)
Precipitation treated [10mm bar]	-	253	313	8	-	-	Typical	(Magnesium Elektron)
Precipitation treated [125mm bar]	-	225	285	9	-	-	Typical	(Magnesium Elektron)

314 Magnesium Alloys

ZC71A	ASTM (UK)						Cast Wrought
<p>Approximate composition: Mn 0.7, Zn 6.5, Cu 1.2, Magnesium rem. Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> UNS M16710, ASTM ZC71A; <u>European (CEN):</u> MG-C71; <u>France:</u> MG-C71; <u>UK:</u> ZC71; <u>Proprietary:</u> Mag.Elek ZC71</p>							
ZE41A	ASTM B80 (USA)						Cast
<p>Nominal composition: Mn 0.15, Zn 3.5-5, Zr 0.4-1, Cu 0.1, Cr 0.01, Rare Earth (mischmetal) 0.75-1.75, Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1820 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16410, ASTM ZE41A, AMS 4439A; <u>European (CEN):</u> MG-C-43 (<u>ISO:</u> MgZnReZr (<u>AECMA:</u> MG-C-43; <u>France:</u> RZ5, G-Z4TR; <u>Germany:</u> LW3.6104; Wk. 3.5101; <u>UK:</u> MAG5-TE; 2L.128; <u>Others:</u> Unavia 816.02; <u>Proprietary:</u> Mag.Elek RZ5, ZE41, W7(welding rod); RZ5, ZE41A Comments: Improved castability than ZK51A. Good strength to -90 deg.C. Pressure-tight castings, used in T5 condition. Weldability: Good (gas-arc) + stress relief Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) T5 [Castings] - 140 205 3.5 45 62HB RT typical properties (#3)</p>							
ZE63A	ASTM (USA)						Cast
<p>Approximate composition: Zn 5.5-6, Zr 0.4-1, Cu 0.1, Ni 0.01, Rare Earth 2.1-3.0, Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1870 Identified Product forms: Sand cast Similar/Equivalent alloys: <u>USA:</u> UNS M16630, ASTM ZE63A, AMS 4425, MIL M-46062B; <u>UK:</u> DTD 5045; <u>Proprietary:</u> Mag.Elek ZE63, W9 (welding rod) Comments: High strength, good ductility and fatigue characteristics. Thin-section, porosity-free castings for structural parts, e.g. aircraft components. Used in T6 condition. Special heat-treatment in hydrogen to develop properties. Corrosion resistance: Moderate Weldability: V. Good (gas-arc) before H₂ treatment. Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) Not stated [Sand castings] 170 - 275 5 - - RT typical properties (#5) T6 [-] - 190 300 10 45 60-85HB RT typical properties (#3) T6 [Sand castings] - 131 235 - - 100°C typical values (#3) T6 [Sand castings] - 97 131 - - 200°C typical values (#3)</p>							
ZH62A	ASTM B80 (USA)						Cast
<p>Nominal composition: Zn 5.2-6.2, Zr 0.5-1, Cu 0.1, Ni 0.01, Th 1.4-2.2, Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1860 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16620, ASTM ZH62A, AMS 4438B, SAE J465, MIL M-46062, QQ M-56; <u>European (AECMA):</u> MG-C-41; <u>France:</u> TZ6; <u>Germany:</u> LW 3.5114; Wk. 3.5102; <u>UK:</u> MAG-9-T5/TE; DTD 5015A; <u>Proprietary:</u> Mag.Elek TZ6 Comments: High strength alloy for RT use. Used in T5 condition. Weldability: Poor (gas-arc) Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) T5 [-] - 150 240 4 45 70HB RT typical properties (#3)</p>							
ZK21A	ASTM (USA)						Wrought
<p>Nominal composition: Zn 2-2.6, Zr 0.45-0.8, Others: Total 0.3, Magnesium rem. Identified Product forms: Extrusion Similar/Equivalent alloys: <u>USA:</u> UNS M16210, ASTM ZK21A, AMS 4387, MIL M-46039 Comments: Moderate strength, weldable extrusion alloy. Used in F condition. Weldability: Moderate (gas-arc, resistance). No stress relief. Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) F [-] - 195 260 4 - - RT typical properties (#3) F [Extru. Tube] 180 - 235 4 - - RT. Min. values (#3) F [Solid Extru.] 195 - 260 4 - - RT. Min. values (#3)</p>							
ZK40A	ASTM B107 (USA)						Wrought
<p>Nominal composition: Zn 3.5-4.5, Zr 0.45 min., Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1830 Identified Product forms: Tube, Extrusion Similar/Equivalent alloys: <u>USA:</u> UNS M16400, ASTM ZK40A; <u>Canada:</u> HG.5 ZK40A Comments: High strength, heat-treatable extrusion alloy. Used in F or T5 conditions. Possible replacement for ZK60A (easier to extrude). Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) T5 [-] - 255 276 4 45 RT typical properties (#3) T5 [Extru. Bar/shapes] 255 - 275 4 - - RT Min. values (#3) T5 [Extru. Tube] 250 - 275 4 - - RT Min. values (#3)</p>							
ZK51A	ASTM B80 (USA)						Cast
<p>Nominal composition: Zn 3.6-5.5, Zr 0.5-1, Cu 0.1, Ni 0.01, Others: Total 0.3, Magnesium rem. Density (kg.m⁻³) 1830 Identified Product forms: Sand cast, Permanent mould cast Similar/Equivalent alloys: <u>USA:</u> UNS M16510, ASTM ZK51A, AMS 4443, SAE 509; J465, MIL M-46062, QQ M-56A; <u>France:</u> Z5Z; <u>UK:</u> MAG4; 2L.127; <u>Proprietary:</u> Mag. Elek. Z5Z Comments: High strength, good ductility castings for highly-stressed, simple geometry parts. Used in T5 condition. Weldability: Fair (gas-arc)+post heat-treatment Condition [Form] PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes (Source) T5 [Cast test bar] - 180 275 8 - 65HB RT typical properties (#3) T5 [Cast test bar] - 145 205 12 - 95°C typical values (#3) T5 [Cast test bar] - 90 115 17 - 205°C typical values (#3)</p>							

ZK60A ASTM B91, B107, B217, B275 (USA) Wrought

Approximate composition: Zn 4.8-6.2, Zr 0.45 min., Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Tube, Extrusion, Forging stock/Billet

Similar/Equivalent alloys: USA: UNS M16600, ASTM ZK60A, AMS 4352, 4362, SAE 524; J466, QQ M-31, M-40; France: G-Z5Zr; Germany: MgZn6Zr; Wk. 3.5161; UK: MAG-E-161; DTD5041A; Others: USA WW-T-825; Proprietary: Mag.Elek ZW6

Comments: High strength, good elongation. Heat-treatable alloy. Extruded and press-forged parts. Used in T5 condition. **Weldability:** Resistance. Not gas-arc (hot-shortness)

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
F [Hollow Extr./Tube]	235	-	315	12	-	84HB	RT typical properties	(#3)
F [Solid Extr.]	260	-	340	11	-	75HB	RT typical properties	(#3)
T5 [-]	-	305	365	11	45	88HB	RT typical properties	(#3)
T5 [Forgings]	215	-	305	16	-	65HB	RT typical properties	(#3)
T5 [Hollow Extr./Tube]	275	-	345	11	-	88HB	RT typical properties	(#3)
T5 [Solid Extr.]	285	-	350	11	-	82HB	RT typical properties	(#3)

ZK61A ASTM B80, B403 (USA) Cast

Nominal composition: Zn 5.5-6.5, Zr 0.6-1, Cu 0.1, Ni 0.01, Others: Total 0.3, Magnesium rem. **Density** (kg.m⁻³) 1830

Identified Product forms: Sand cast, Permanent mould cast

Similar/Equivalent alloys: USA: UNS M16610, ASTM ZK61A, SAE J465, QQ M-56B; France: G-Z5Zr; Germany: MgZn6Zr; Wk. 3.5161; UK: MAG-E-161; DTD 5041A; Proprietary: Mag.Elek ZW6

Comments: Highly stressed, uniform cross-section castings. Intricate castings suffer from microporosity & shrinkage cracking. Used in T5 or T6 condition. **Weldability:** Not weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
T5 [-]	-	185	310	-	-	68HB	RT typical properties	(#3)
T6 [-]	-	195	310	10	-	70HB	RT typical properties	(#3)

ZM21 ASTM (USA) Wrought

No composition: -

Similar/Equivalent alloys: USA: ASTM ZM21; UK: MAG-S-1310, MAG-S-131M, MAG-E-131M, MAG-F-131M; DTD5051A; Proprietary: Mag.Elek ZM21, W5 (welding rod)

ZTY Magnesium Elektron (UK) Wrought

Approximate composition: Zn 0.6, Th 0.8, Magnesium rem. **Density** (kg.m⁻³) 1760

Identified Product forms: Forging stock/Billet

Similar/Equivalent alloys: UK: DTD 5111

Comments: Creep resistant to 350 deg. C. Fully weldable. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Extru. Forging stock <25mm]	130	-	230	6	-	50-60VPN	Typical	(#4)
Not stated [Extru. Forging stock >50mm]	95	-	200	8	-	50-60VPN	Typical	(#4)
Not stated [Extru. Forging stock 25-50mm]	110	-	200	8	-	50-60VPN	Typical	(#4)
Not stated [Forgings]	130	-	230	6	-	50-65VPN	Typical	(#4)

ZW3 Magnesium Elektron (UK) Wrought

Proprietary composition: Zn 3.25, Zr 0.6, Magnesium rem. **Density** (kg.m⁻³) 1800

Identified Product forms: Extrusion, Forging stock/Billet

Similar/Equivalent alloys: European (AECMA): MG-P-43; UK: BS 3373/3372 MAG151M, MAG-E-151M, MAG-F-151M, MAG-S-151; L.514, L.504, 2L.505; DTD 5081, DTD 626B, DTD 619, DTD 622A, DTD 729; Proprietary: Mag.Elek ZW3

Comments: Aerospace & high-technology uses (airframe, aircraft wheels, gear-housings). High strength alloy for extrusions and forgings. Heat-treatment not required for properties, but can be stress relieved. For stressed components not normally above 150°C. **Weldability:** Not recommended.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Extruded [forge stk 10-100mm]	-	205	290	8	44.1	HV 70	Minimum	(Magnesium Elektron)
Extruded [forge-stk <10mm]	-	195	280	8	44.1		Minimum	(Magnesium Elektron)
Extruded [section <10mm]	-	200	280	8	44.1		Typical	(Magnesium Elektron)
Extruded [section 10-100mm]	-	225	305	8	44.1		Minimum	(Magnesium Elektron)
Not stated [forgings]	-	205	290	7	44.1	HV 70	Minimum	(Magnesium Elektron)

Titanium Alloys

2TA1 BS (UK) Wrought

Nominal composition: Fe 0.2, H₂ 0.012, O+N 0.07, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: *European (CEN):* Ti P99001 (*AECMA:* Ti P99001 (was Ti P01); *France:* T 35; *Germany:* LW. 3.7024; *UK:* Ti P99001 (was Ti P01); DTD 5073; BS 2TA1; *Proprietary:* IMI 115; Ti 115; Timetal 35A

Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Rod]	220	-	370	40	-	-	Typical (IMI 115)	(#5)
Annealed [Sheet]	255	-	370	33	-	-	Typical (IMI 115)	(#5)
Annealed [Wire]	-	-	390	38	-	-	Typical (IMI 115)	(#5)
Not stated [-]	220	-	345	35	112.5	-	Typical (Timetal 35A)	(Timetal)

2TA10 BS (UK) Wrought

Nominal composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, H₂ 0.025, O+N 0.25 max, C 0.1 max, Titanium rem. **Density** (kg.m⁻³) 4420

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: *USA:* UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical); AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046/T9047: AB1, AB2 (ELI), T81556, T81915; *European (CEN):* Ti P63 (*AECMA:* Ti P64001 (was Ti-P63 / C63); *France:* TA6V; NF L14-633 Ti P64001; *Germany:* TiAl6V4; Wk. 3.7165; LW. 3.7164; *UK:* BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; *Others:* AWS A5-16 (USA); *Proprietary:* IMI 318; Ti 318A; Timetal 6-4

Comments: BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59. Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106	-	Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-	-	Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-	-	Typical (IMI 318)	(#5)
Aged [Rod]	1050	-	1140	15	-	-	Typ. (IMI 318) Fastener Stock	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Not stated [Fastener Stock]	1075	-	1205	14	-	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5	-	Typical (Timetal 6-4)	(Timetal)

2TA21 BS (UK) Wrought

Approximate composition: Cu 2.5, Titanium rem. **Density** (kg.m⁻³) 4560

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: *European (CEN):* Ti P11 (*AECMA:* Ti P9001 (was Ti P11); *France:* T-U2; *Germany:* DIN TiCu2; Wk. 3.7124; *UK:* BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263; *Proprietary:* De.Titan Tikrutan LT 25; Timetal 230; IMI 230

Comments: BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263. RT phase type: Alpha. Useful properties to ~350°C. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	510	-	620	25	112.5	-	Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-	-	Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125	-	Typical (IMI 230)	(#5)
STA [-]	600	-	760	20	112.5	-	Typical (Timetal 230)	(Timetal)
Aged [Rod]	580	-	740	20	125	-	Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-	-	Typical (IMI 230)	(#5)

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3-2.5	Timetal (USA)	Wrought						
<p>Approximate composition: Al 3, V 2.5, Titanium rem. Density (kg.m⁻³) 4510</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Forging stock/Billet, Rod, Bar, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS R56320, ASTM B337 3Al-2.5V; Grade 9, AMS 4943, 4944; <u>European (CEN):</u> Ti P69 (<u>AECMA</u>): Ti P69; Ti P609; <u>France:</u> T-A3V2, T-A3V5; <u>Germany:</u> LW. 3.7194, Wk. 3.7195; <u>Proprietary:</u> Timetal 3-2.5; IMI 325</p> <p>Comments: Alpha-Beta phase alloy. Normally used in cold-worked stress-relieved condition. Honeycomb foil, hydraulic tubing, pressure vessels. Weldability: Weldable</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [-]	553	-	655	20	107		Typical (3Al-2.5V)	(#3)
Not stated [-]	550	-	650	15	112.5		Typical (Timetal 3-2.5)	(Timetal)
3.7025 (Wk)	DIN (Germany)	Wrought						
<p>Proprietary composition: Fe 0.15, O₂ 0.12, N₂ 0.05, H₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium 99.5 min. Density (kg.m⁻³) 4500</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 1; <u>European (CEN):</u> Ti P01 (<u>AECMA</u>): Ti P99001 (was Ti P01); <u>France:</u> T 35; <u>Germany:</u> DIN Ti 1, LW 3.7024; <u>Japan:</u> JIS Class 2: H4600, 4630, 4650, 4670; <u>UK:</u> BS: TA1; DTD 5013; <u>Proprietary:</u> De.Titan Tikrutan RT 12; Otto Fuchs T2</p> <p>Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [Rod]	220	-	370	40	-		Typical (IMI 115)	(#5)
Annealed [Sheet]	255	-	370	33	-		Typical (IMI 115)	(#5)
Annealed [Wire]	-	-	390	38	-		Typical (IMI 115)	(#5)
3.7035 (Wk)	DIN (Germany)	Wrought						
<p>Proprietary composition: Fe 0.2, O₂ 0.18, N₂ 0.05, H₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium 99.4 min. Density (kg.m⁻³) 4500</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 2, AMS 4902, 4941, 4942, 4951; <u>European (CEN):</u> Ti P02 (<u>AECMA</u>): Ti P02; <u>France:</u> T 40; <u>Germany:</u> DIN Ti 2, LW 3.7034; <u>Japan:</u> JIS Class 3: H4600, 4630, 4650, 4670; <u>UK:</u> BS: TA2, TA3, TA4, TA5; <u>Proprietary:</u> De.Titan Tikrutan RT 15; Otto Fuchs T3; IMI 125</p> <p>Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [Rod]	305	-	460	28	-		Typical (IMI 125)	(#5)
Annealed [Sheet]	340	-	460	30	-		Typical (IMI 125)	(#5)
Annealed [Tube]	325	-	480	35	-		Typical (IMI 125)	(#5)
3.7055 (Wk)	DIN (Germany)	Wrought						
<p>Proprietary composition: Fe 0.25, O₂ 0.25, N₂ 0.05, H₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m⁻³) 4500</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS R50500, ASTM B265, 337, 338, 348, 367, 381; Grade 3, AMS 4900, MIL -T-9046; <u>France:</u> T 50; <u>Germany:</u> DIN Ti 3; LW 3.7055; <u>UK:</u> DTD 5003B, 5023C, 5193, 5283, 5293; <u>Proprietary:</u> De.Titan Tikrutan RT 18; IMI 130; Timetal 65A</p> <p>Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [Rod]	360	-	540	24	105		Typical (IMI 130)	(#5)
Annealed [Sheet]	420	-	540	25	-		Typical (IMI 130)	(#5)
Annealed [Wire]	-	-	550	24	-		Typical (IMI 130)	(#5)
Hard drawn [Wire]	-	-	700	11.5	-		Typical (IMI 130)	(#5)
3.7065 (Wk)	DIN (Germany)	Wrought						
<p>Proprietary composition: Fe 0.3, O₂ 0.35, N₂ 0.05, H₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium 99.2 min. Density (kg.m⁻³) 4500</p> <p>Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS R50700, ASTM B265 Grade 4, AMS 4901, 4921, MIL -T-9046, -T-9047; <u>European (CEN):</u> Ti P99003 (<u>AECMA</u>): Ti P99003 (was Ti P04); <u>France:</u> T 60; <u>Germany:</u> DIN Ti 4, LW 3.7064, Wk. 3.7065; <u>UK:</u> BS: 2TA6; <u>Proprietary:</u> De.Titan Tikrutan RT 20; Otto Fuchs T6; IMI 155; Timetal 75A</p> <p>Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good</p>								
3.7105 (Wk)	DIN (Germany)	Cast Wrought						
<p>Proprietary composition: Mo 0.2-0.4, Fe 0.25, O₂ 0.25, N₂ 0.03, H₂ 0.013, Ni 0.6-0.9, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m⁻³) 4500</p> <p>Identified Product forms: Sheet/strip, Tube, Pipe, Extrusion, Wire</p> <p>Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 12; <u>Germany:</u> DIN TiNiMo083; <u>Proprietary:</u> De.Titan Tikrutan LT 27; IMI Code 12; Timetal Code 12</p> <p>Comments: Better corrosion resistance and strength than CP titanium grades. Chemical industry. Corrosion resistance: Very good Weldability: Good</p>								
3.7110 (Wk)	DIN (Germany)	Wrought						
<p>Proprietary composition: Al 4.5-5.5, Fe 2-3, O₂ 0.2, N₂ 0.05, H₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m⁻³) 4450</p> <p>Similar/Equivalent alloys: <u>Germany:</u> DIN TiAl5Fe2.5; <u>Proprietary:</u> De.Titan Tikrutan LT 35; Otto Fuchs TL35</p> <p>Comments: RT phase type: Alpha + Beta.</p>								
3.7115 (Wk)	DIN 17851 (Germany)	Wrought						
<p>Nominal composition: Al 4-6, Sn 2-3, Fe 0.5, O₂ 0.2, N₂ 0.05, H₂ 0.02, C 0.08, Titanium rem. Density (kg.m⁻³) 4500</p> <p>Similar/Equivalent alloys: <u>USA:</u> UNS R54520, ASTM B265, 348, 367, 381; Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; <u>European (AECMA):</u> Ti P65; <u>France:</u> TA 5E; <u>Germany:</u> DIN 17851 Wk. 3.7115; <u>UK:</u> DTD 5083, 5093; <u>Others:</u> China: 3620-TA7; <u>Proprietary:</u> IMI 317</p> <p>Comments: Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. Weldability: Good</p>								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)

3.7124 (LW) DIN (Germany) Wrought**Proprietary composition:** Cu 2-3, Fe 0.2, O₂ 0.2, N₂ 0.05, H₂ 0.015, C 0.1, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4560**Identified Product forms:** Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** *European (CEN):* Ti P11 (*AECMA*): Ti P9001; *France:* T-U2; *Germany:* DIN TiCu2; Wk. 3.7124; *UK:* BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263; *Proprietary:* De.Titan Tikrutan LT 25; Timetal 230; IMI 230**Comments:** RT phase type: Alpha. Useful properties to ~350°C. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	510	-	620	25	112.5		Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-		Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125		Typical (IMI 230)	(#5)
STA [-]	600	-	760	20	112.5		Typical (Timetal 230)	(Timetal)
Aged [Rod]	580	-	740	20	125		Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-		Typical (IMI 230)	(#5)

3.7144 (LW) DIN (Germany) Wrought**Approximate composition:** Al 6, Sn 2, Zr 4, Mo 2, Titanium rem.**Similar/Equivalent alloys:** *USA:* UNS R54620, AMS 4919, 4975, 4976; *Proprietary:* Otto Fuchs TL62; IMI 624**Comments:** Near alpha alloy. Good creep strength. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	863	-	940	15	114	HRC32	Typical (6Al-2Sn-4Zr-2Mo)	(#3)

3.7145 (Wk) DIN (Germany) Wrought**Approximate composition:** Al 5.5-6.5, Sn 1.8-2.2, Zr 3.6-4.4, Mo 1.8-2.2, Si 0.06-0.12, Fe 0.25, O₂ 0.15, N₂ 0.05, H₂ 0.015, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4550**Similar/Equivalent alloys:** *USA:* AMS 4976, 4975; *Germany:* DIN TiAl6Sn2Zr4Mo2, LW 3.7144; *Proprietary:* De.Titan Tikrutan LT 24; IMI 624**Comments:** RT phase type: Alpha (+ Beta). Good creep strength. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	863	-	940	15	114	HRC32	Typical (6Al-2Sn-4Zr-2Mo)	(#3)

3.7155 (Wk) DIN (Germany) Wrought**Proprietary composition:** Al 5.7-6.3, Zr 4-6, Mo 0.25-0.75, Si 0.1-0.4, Fe 0.2, O₂ 0.19, N₂ 0.05, H₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4450**Similar/Equivalent alloys:** *European (CEN):* Ti P67 (*AECMA*): Ti P67; *France:* T-A6Zr5D; *Germany:* DIN TiAl6Zr5Mo0.5Si; Wk. 3.7155; LW 3.7154; *UK:* BS: TA43, TA44; *Proprietary:* De.Titan Tikrutan LT 26; Timetal 685; IMI 685**Comments:** Near alpha alloy. Medium strength alloy. Useful creep resistance to ~520°C. Good forging characteristics. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Beta ht + OQ + Age 550°C/24hr. [-]	787	-	900	8	125		Typical (IMI 685)	(#3)
Fully heat-treated [Rod]	920	-	1020	11	124		Typical (IMI 685)	(#5)

3.7164 (LW) DIN (Germany) Wrought**Approximate composition:** Al 6, V 4, Titanium rem. **Density** (kg.m⁻³) 4500**Identified Product forms:** Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** *USA:* UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical), AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; *European (CEN):* Ti P63 (*AECMA*): Ti P64001 (was Ti-P63 / C63); *France:* TA6V; NF L14-633 Ti P64001; *Germany:* TiAl6V4; Wk. 3.7165; LW. 3.7164; *UK:* BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; *Others:* AWS A5-16 (USA); *Proprietary:* IMI 318; Ti 318A; Timetal 6-4**Comments:** Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106		Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-		Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-		Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-		Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-		Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5		Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5		Typical (Timetal 6-4)	(Timetal)

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3.7165 (Wk) DIN 17851 (Germany) Wrought

Proprietary composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, O₂ 0.2, N₂ 0.05, H₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4430

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: *USA:* UNS R56400, ASTM Grade 5, AMS 4906, 4907, 4911, 4928, 4930, 4932, 4934, 4935, 4954, 4965, 4967, MIL F83142, T-9046, T-9047, T81556, T81915; *European (CEN):* Ti-P63 (*AECMA:* Ti P64001 (was Ti-P63 / C63); *France:* TA6V; NF L14-633 Ti P64001; *Germany:* DIN TiAl6V4; Wk. 3.7165; LW 3.7164; *UK:* BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; *Others:* AWS A5-16 (USA); *Proprietary:* De.Titan Tikrutan LT 31; Otto Fuchs TL64; IMI 318; Ti 318A; Timetal 6-4

Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106		Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-		Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-		Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-		Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-		Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5		Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5		Typical (Timetal 6-4)	(Timetal)

3.7174 (LW) DIN (Germany) Wrought

Approximate composition: Al 6, Sn 2, V 6, Titanium rem.

Similar/Equivalent alloys: *USA:* UNS R56620, AMS 4971A, 4979, MIL -T-9047, F83142; *European (CEN):* Ti P64 (*AECMA:* Ti P64; *Germany:* LW 3.7174; *Proprietary:* Otto Fuchs TL66; Timetal 6-6-2; IMI 662

Comments: RT phase type: Alpha + Beta. Greater strength than Ti-6Al-4V but reduced fracture toughness and fatigue properties. Useful to 315°C. Rocket motor case, airframe and forged applications. **Weldability:** Limited

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	1005	-	1090	10	115		Typical (Timetal 6-6-2)	(Timetal)
Annealed [-]	985	-	1050	14	110	HRC38	Typical (6Al-6V-2Sn)	(#3)
STA [-]	1105	-	1205	8	115		Typical (Timetal 6-6-2)	(Timetal)
STA [-]	1172	-	1276	10	-	HRC42	Typical (6Al-6V-2Sn)	(#3)

3.7175 (Wk) DIN (Germany) Wrought

Proprietary composition: Al 5-6, Sn 1.5-2.5, V 5-6, Cu 0.35-1, Fe 0.35-1, O₂ 0.2, N₂ 0.04, H₂ 0.015, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4540

Similar/Equivalent alloys: *USA:* UNS R56620; *European (CEN):* Ti P64 (*AECMA:* Ti P64; *Germany:* DIN TiAl6V6Sn2; Wk. 3.7175; LW 3.7174; *Proprietary:* De.Titan Tikrutan LT 33; Timetal 6-6-2; IMI 662

Comments: RT phase type: Alpha + Beta. Greater strength than Ti-6Al-4V but reduced fracture toughness and fatigue properties. Useful to 315°C. Rocket motor case, airframe and forged applications. **Weldability:** Limited

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	985	-	1050	14	110	HRC38	Typical (6Al-6V-2Sn)	(#3)
Annealed [-]	1005	-	1090	10	115		Typical (Timetal 6-6-2)	(Timetal)
STA [-]	1172	-	1276	10	-	HRC42	Typical (6Al-6V-2Sn)	(#3)
STA [-]	1105	-	1205	8	115		Typical (Timetal 6-6-2)	(Timetal)

3.7184 (LW) DIN (Germany) Wrought

Approximate composition: Al 4, Sn 2, Mo 4, Titanium rem.

Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar

Similar/Equivalent alloys: *European (CEN):* Ti P68 (*AECMA:* Ti P68; *France:* TA4DE; *Germany:* DIN TiAl4Mo4Sn2Si; Wk. 3.7185; LW 3.7184; *UK:* BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD 5103, 5153, 5203; *Proprietary:* Otto Fuchs TL44; De.Titan Tikrutan LT 34; Timetal 550; IMI 550; Ti550

Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
ST [-]	930	-	1080	12	115		Typical (Timetal 550)	(Timetal)
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115		Typical (IMI 550)	(#3)
STA [-]	1070	-	1200	14	115		Typical (Timetal 550)	(Timetal)
Fully heat-treated [Rod]	1070	-	1200	14	116		Typical (IMI 550)	(#5)

3.7185 (Wk) DIN (Germany) Wrought

Proprietary composition: Al 3-5, Sn 1.5-2.5, Mo 3-5, Si 0.3-0.7, Fe 0.2, O₂ 0.25, N₂ 0.05, H₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4600

Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar

Similar/Equivalent alloys: *European (CEN):* Ti P68 (*AECMA:* Ti P68; *France:* TA4DE; *Germany:* DIN TiAl4Mo4Sn2Si; Wk. 3.7185; LW 3.7184; *UK:* BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD 5103, 5153, 5203; *Proprietary:* Otto Fuchs TL44; De.Titan Tikrutan LT 34; Timetal 550; IMI 550; Ti550

Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Fully heat-treated [Rod]	1070	-	1200	14	116		Typical (IMI 550)	(#5)
ST [-]	930	-	1080	12	115		Typical (Timetal 550)	(Timetal)
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115		Typical (IMI 550)	(#3)
STA [-]	1070	-	1200	14	115		Typical (Timetal 550)	(Timetal)

3.7225 (Wk) DIN (Germany) Wrought

Proprietary composition: Fe 0.15, O₂ 0.12, N₂ 0.05, H₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500

Similar/Equivalent alloys: *USA:* ASTM Grade 11; *Germany:* DIN Ti 1 Pd; *Proprietary:* De.Titan Tikrutan RT 12 Pd; IMI 260

Comments: Pd additions increase corrosion resistance to certain media. **Corrosion resistance:** Very good **Weldability:** Good

3.7235 (Wk) DIN (Germany) Wrought

Proprietary composition: Fe 0.2, O₂ 0.18, N₂ 0.05, H₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500
Similar/Equivalent alloys: *USA:* ASTM Grade 7; *Germany:* DIN Ti 2 Pd; *Proprietary:* De.Titan Tikrutan RT 15 Pd; IMI 262
Comments: Pd additions increase corrosion resistance to certain media. **Corrosion resistance:** Very good **Weldability:** Good

3.7255 (Wk) DIN (Germany) Wrought

Proprietary composition: Fe 0.25, O₂ 0.25, N₂ 0.05, H₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500
Similar/Equivalent alloys: *Germany:* DIN Ti 3 Pd; *Proprietary:* De.Titan Tikrutan RT 18 Pd
Comments: Pd additions increase corrosion resistance to certain media. **Corrosion resistance:** Very good **Weldability:** Good

3AI-2.5V ASTM B337 (USA) Wrought

Nominal composition: Al 2.5-3.5, V 2-3, Fe 0.25, O₂ 0.12, N₂ 0.02, H₂ 0.013, C 0.05 max., Titanium rem.
Similar/Equivalent alloys: *USA:* UNS R56320, ASTM Grade 9, AMS 4943, 4944; *European (CEN):* Ti P69 (*AECMA:* Ti P69; Ti P609; *France:* T-A3V2, T-A3V5; *Germany:* LW. 3.7194, Wk. 3.7195; *Proprietary:* Timetal 3-2.5; IMI 325

Comments: Alpha-Beta phase alloy. Normally used in cold-worked stress-relieved condition. Honeycomb foil, hydraulic tubing, pressure vessels. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	553	-	655	20	107		Typical (3AI-2.5V)	(#3)
Not stated [-]	550	-	650	15	112.5		Typical (Timetal 3-2.5)	(Timetal)

6-2-4-2 Timetal (USA) Wrought

Approximate composition: Al 6, Sn 2, Zr 4, Mo 2, Si 0.08, Titanium rem.
Similar/Equivalent alloys: *USA:* UNS R56260; *European (CEN):* Ti P610 (*AECMA:* Ti P610; *Others:* Ti-6242; *Proprietary:* Timetal 6-2-4-2; Titanium Industries 6-2-4-2
Comments: Near alpha alloy. Good creep strength. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [-]	895	-	1000	12	115		Typical (Timetal 6-2-4-2)	(Timetal)

6-2-4-6 Timetal (USA) Wrought

Approximate composition: Al 6, Sn 2, Zr 4, Mo 6, Titanium rem. **Density** (kg.m⁻³) 4640
Identified Product forms: Forging stock/Billet, Bar
Similar/Equivalent alloys: *USA:* UNS R56260, AMS 4981; *Proprietary:* IMI 646; Timetal 6-2-4-6; Titanium Industries 6-2-4-6
Comments: Alpha-beta alloy. Useful properties to 450°C. Deep hardening. Forgings for intermediate temperature regions of gas turbine engines, compressor blades and disks. **Weldability:** Limited

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA [-]	1172	-	1269	10	114	HRC36 - 42	Typical (6Al-2Sn-4Zr-6Mo)	(#3)
Not stated [-]	725	-	930	15	-		Typical, at 425°C	(Timetal)
Not stated [-]	1100	-	1200	12	115		Typical, RT	(Timetal)

6-4 Timetal (USA) Cast Wrought

Approximate composition: Al 6, V 4, Titanium rem. **Density** (kg.m⁻³) 4500
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire
Similar/Equivalent alloys: *USA:* UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 5, AMS 4905, 4906, 4907, 4911, 4920, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; *European (CEN):* Ti P63 (*AECMA:* Ti P64001 (was Ti-P63 / C63); *France:* TA6V, NF L14-633 Ti P64001; *Germany:* TiAl6V4; Wk. 3.7165; LW. 3.7164; *UK:* BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; *Others:* AWS A5-16 (USA); *Proprietary:* IMI 318; Ti 318A; Timetal 6-4

Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106		Typical (IMI 318)	(#5)
Annealed [Sheef]	1110	-	1160	10	-		Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-		Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-		Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-		Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5		Typical (Timetal 6-4)	(Timetal)
Not stated [Sheef]	980	-	1035	12	112.5		Typical (Timetal 6-4)	(Timetal)

6-6-2 Timetal (USA) Wrought

Approximate composition: Al 6, Sn 2, V 6, Cu 0.5, Fe 0.5, Titanium rem.
Similar/Equivalent alloys: *USA:* UNS R56620, AMS 4971A, 4979, MIL -T-9047, F83142; *European (CEN):* Ti P64 (*AECMA:* Ti P64; *Germany:* LW. 3.7174; *Proprietary:* Timetal 6-6-2; IMI 662
Comments: Greater strength than Ti-6Al-4V but reduced fracture toughness and fatigue properties. Useful to 315°C. Rocket motor case, airframe and forged applications. **Weldability:** Limited

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	1005	-	1090	10	115		Typical (Timetal 6-6-2)	(Timetal)
STA [-]	1105	-	1205	8	115		Typical (Timetal 6-6-2)	(Timetal)

I7 ASTM B348 (USA) Wrought

Approximate composition: Al 4, Mn 4, H₂ 0.01, C 0.1, Titanium rem.
Similar/Equivalent alloys: *USA:* ASTM B348/I7, B381 F7, AMS 4925A, SAE 4AI 4Mn; *European (AECMA):* Ti P62; *France:* TA 5M; *UK:* DTD 5053, 5143; *Proprietary:* Crucible Steel Co. C130AM; IMI 314A; ICI 314A; TI314A

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8-1-1	Timetal (USA)						Wrought
Approximate composition: Al 8, Mo 1, V 1, Titanium rem.							
Similar/Equivalent alloys: <i>USA:</i> UNS R54810, AMS 4915, 4916, 4933, 4972A, 4973A., MIL R-81588; <i>European (AECMA):</i> Ti P66; <i>Proprietary:</i> Timetal 8-1-1; IMI 811							
Comments: Near alpha or alpha-beta phase alloy (depending on processing). Creep resistance to 450°C. Fan blades, jet engine forgings (compressor blades and disks), cargo flooring. Weldability: Very good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [Sheet]	930	-	1020	13	125		Typical (Timetal 8-1-1) (Timetal)
10-2-3	Timetal (USA)						Wrought
Approximate composition: Al 3, V 10, Fe 2, Titanium rem. Density (kg.m ⁻³) 4650							
Identified Product forms: Forging stock/Billet							
Similar/Equivalent alloys: <i>USA:</i> AMS 4983, 4984, 4986, 4987; <i>Proprietary:</i> Timetal 10-2-3; Titanium Industries 10-2-3							
Comments: Readily forgeable alloy with good combination of strength, ductility, fracture toughness and high cycle fatigue strength. Used for critical structural aircraft parts, e.g. undercarriage components.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Aged [Billet/bar]	1170	-	1260	10	107		Typical (Timetal)
Aged [Billet/bar]	1070	-	1170	12	108		Typical (Timetal)
Aged [Billet/bar]	970	-	1040	15	103		Typical (Timetal)
15-3	Timetal (USA)						Wrought
Approximate composition: Al 3, Sn 3, V 15, Cr 3, Titanium rem. Density (kg.m ⁻³) 4780							
Identified Product forms: Sheet/strip							
Similar/Equivalent alloys: <i>Others:</i> (USA) Ti-15-3; <i>Proprietary:</i> Timetal 15-3; Titanium Industries 15-3							
Comments: Beta phase sheet alloy. Cold formable, weldable. Aircraft ducting and pressure vessels. Fabricated sheet metal structures up to 300°C. Weldability: Weldable							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Aged [-]	1115	-	1215	9	-		Typical (Ti-15-3) (#3)
Aged 482°C [-]	1210	-	1300	9	107		Typical (Timetal)
Aged 538°C [-]	1050	-	1160	11	103		Typical (Timetal)
Annealed [-]	773	-	785	22	-		Typical (Ti-15-3) (#3)
Annealed [Sheet/strip]	780	-	825	16	70		Typical (Timetal)
17	Timetal (USA)						Cast Wrought
Approximate composition: Al 5, Sn 2, Zr 2, Mo 4, Cr 4, Titanium rem. Density (kg.m ⁻³) 4650							
Identified Product forms: Forging stock/Billet, Bar							
Comments: High-strength, deep hardening forging alloy. Good fatigue properties. Jet engine components.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Aged [Billet/bar]	1100	-	1180	10	109		Typical (Timetal)
21S	Timetal (USA)						Wrought
Approximate composition: Al 3, Mo 15, Si 0.2, Nb 3, Titanium rem. Density (kg.m ⁻³) 4940							
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Bar, Wire							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 21, AMS G92AP; <i>Proprietary:</i> Timetal 21S							
Comments: Good cold formability and weldability with very good oxidation resistance and creep strength. Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [Strip/sheet]	880	-	915	15	83		Typical (Timetal)
Aged 538°C [-]	1210	-	1310	8	102		Typical (Timetal)
Aged 598°C [-]	1035	-	1100	10	100		Typical (Timetal)
Overaged [-]	860	-	930	14	99		Typical (Timetal)
21SRx	Timetal (USA)						Wrought
No composition: -							
Comments: Development alloy based on Timetal 21S without Aluminium. For biomedical applications.							
35A	Timetal (USA)						Wrought
Nominal composition: Fe 0.2, H; 0.012, O+N 0.07, Titanium rem.							
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P99001 (<i>AECMA</i>): Ti P99001 (was Ti P01); <i>France:</i> T 35; <i>Germany:</i> LW. 3.7024; <i>UK:</i> Ti P99001 (was Ti P01); DTD 5073; BS 2TA1; <i>Proprietary:</i> IMI 115; Ti 115; Timetal 35A							
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [Rod]	220	-	370	40	-		Typical (IMI 115) (#5)
Annealed [Sheet]	255	-	370	33	-		Typical (IMI 115) (#5)
Annealed [Wire]	-	-	390	38	-		Typical (IMI 115) (#5)
Not stated [-]	220	-	345	35	112.5		Typical (Timetal 35A) (Timetal)

50A Timetal (USA) Cast Wrought**No composition:** -**Identified Product forms:** Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: UNS R50400, ASTM Grade 2, AMS 4902, 4941; European (CEN): Ti P99002 (AECMA): Ti P99002 (was Ti P02); France: T 40; Germany: LW. 3.7034; Wk. 3.7035; Japan: JIS Class 3: H4600, H4630, H4650, H4670; UK: 2TA2, 3, 4, 5; DTD 5013B, 5033B, 5183, 5293; Proprietary: IMI 125; Timetal 50A**Comments:** Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	313	-	387	28	103	HB200	Typical (Grade 2)	(#3)
Annealed [Rod]	305	-	460	28	-	-	Typical (IMI 125)	(#5)
Annealed [Sheet]	340	-	460	30	-	-	Typical (IMI 125)	(#5)
Annealed [Tube]	325	-	480	35	-	-	Typical (IMI 125)	(#5)
Heat treated [Not stated]	276	-	345	22	-	200HB	RT typ. EI sheet value	(M/O)
Not stated [-]	345	-	485	28	112.5	-	Typical (Timetal 50A)	(Timetal)

62S Timetal (USA) Wrought**Approximate composition:** Al 6, Si 0.1, Fe 2, Titanium rem. **Density** (kg.m⁻³) 4440**Identified Product forms:** Plate, Sheet/strip, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: ASTM (pending)**Comments:** Properties and processing characteristics equivalent to or better than 6-4 alloys, but with higher modulus.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	960	-	1000	16	128	-	-	(Timetal)

65A Timetal (USA) Cast Wrought**No composition:** - **Density** (kg.m⁻³) 4510**Identified Product forms:** Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: UNS R50500, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 3, AMS 4900, MIL -T-9046; France: T 50; Germany: Wk. 3.7055; UK: DTD 5003B, 5023C, 5193, 5283, 5293; Proprietary: IMI 130; Timetal 65A**Comments:** Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	414	-	484	25	103	HB225	Typical (Grade 3)	(#3)
Annealed [Rod]	360	-	540	24	105	-	Typical (IMI 130)	(#5)
Annealed [Sheet]	420	-	540	25	-	-	Typical (IMI 130)	(#5)
Annealed [Wire]	-	-	550	24	-	-	Typical (IMI 130)	(#5)
Hard drawn [Wire]	-	-	700	11.5	-	-	Typical (IMI 130)	(#5)
Heat treated [Not stated]	483	-	552	15	-	265HB	-	(M/O)
Not stated [-]	450	-	585	25	112.5	-	Typical (Timetal 65A)	(Timetal)

75A Timetal (USA) Wrought**No composition:** - **Density** (kg.m⁻³) 4510**Identified Product forms:** Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: UNS R50700, ASTM B265 Grade 4, AMS 4901, MIL -T-9046, -T-9047; European (CEN): Ti P99003 (AECMA): Ti P99003 (was Ti P04); France: T 60; Germany: LW 3.7064; Wk. 3.7065; UK: BS: 2TA6; DTD 5063B; Proprietary: IMI 155; Timetal 75A**Comments:** Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Sheet]	540	-	640	24	-	-	Typical (IMI 155)	(#5)
Annealed [-]	533	-	606	20	104	HB265	Typical (Grade 4)	(#3)
Not stated [-]	560	-	680	23	112.5	-	Typical (Timetal 75A)	(Timetal)

100A Timetal (USA) Cast Wrought**No composition:** - **Density** (kg.m⁻³) 4510**Identified Product forms:** Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: ASTM B348, 367, 381; Grade 4, AMS 4921; France: T 60; Germany: LW. 3.7064, Wk. 3.7065; UK: BS: 2TA7, 2TA8, 2TA9; Proprietary: IMI 160; Timetal 100A**Comments:** Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	533	-	606	20	104	HB265	Typical (Grade 4)	(#3)
Annealed [Sheet]	500	-	670	23	-	-	Typical (IMI 160)	(#5)
Annealed [Wire]	-	-	690	24	-	-	Typical (IMI 160)	(#5)
Not stated [-]	430	-	540	16	112.5	-	Typical (Timetal 100A)	(Timetal)

129 Transage (Origin unknown) Wrought**Approximate composition:** Al 2, Sn 2, Zr 11, V 11.5, Titanium rem.**134** Transage (Origin unknown) Wrought**Nominal composition:** Al 2-3, Sn 1.5-2.5, Zr 5.5-6.5, V 11-13, Fe 0.2, O₂ 0.15, N₂ 0.05, H₂ 0.015, C 0.08, Y 0.005, B 0.03, Others: Each 0.1 Total 0.4, Titanium rem.**Comments:** High-strength alloy.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA [Plate]	1155	-	1218	9	-	-	Typical	(#3)

324 Titanium Alloys

175	Transage (Origin unknown)							Wrought
Nominal composition: Al 2.2-3.2, Sn 6.5-7.5, Zr 1.5-2.5, V 12-14, Fe 0.2, O ₂ 0.15, N ₂ 0.05, H ₂ 0.015, C 0.08, Y 0.005, B 0.03, Others: Each 0.1 Total 0.4, Titanium rem.								
Comments: High-strength elevated-temperature alloy.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
STA [425°C]	925	-	1080	10	-	-	Typical	(#3)
STA [Extruded bar]	1250	-	1305	10	-	-	Typical	(#3)
230	Timetal (USA)							Wrought
Approximate composition: Cu 2.5, Titanium rem. Density (kg.m ⁻³) 4560								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>European (CEN):</u> Ti P11 (<u>AECMA</u>): Ti P9001 (was Ti P11); <u>France:</u> T-U2; <u>Germany:</u> DIN TiCu2; Wk. 3.7124; <u>UK:</u> BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263; <u>Proprietary:</u> De.Titan Tikutan LT 25; Timetal 230								
Comments: RT phase type: Alpha. Useful properties to ~350°C. Weldability: Good								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [-]	510	-	620	25	112.5	-	Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-	-	Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125	-	Typical (IMI 230)	(#5)
STA [-]	600	-	760	20	112.5	-	Typical (Timetal 230)	(Timetal)
Aged [Rod]	580	-	740	20	125	-	Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-	-	Typical (IMI 230)	(#5)
314A	IMI (UK)							Wrought
Approximate composition: Al 4, Mn 4, Titanium rem.								
Similar/Equivalent alloys: <u>USA:</u> ASTM B348/7, B381 F7, AMS 4925A, SAE 4AI 4Mn; <u>European (AECMA):</u> Ti P62; <u>France:</u> TA 5M; <u>UK:</u> DTD 5053, 5143; <u>Proprietary:</u> Crucible Steel Co. C130AM; IMI 314A; ICI 314A; Ti314A								
315	IMI (UK)							Wrought
Approximate composition: Al 2, Mn 2, Titanium rem.								
Similar/Equivalent alloys: <u>UK:</u> DTD 5043; <u>Proprietary:</u> IMI 315								
Comments: Alpha + Beta/Beta								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Annealed [Rod]	618	-	757	18	110	-	Typical	(#5)
367	IMI (UK)							Wrought
Approximate composition: Al 6, Nb 7, Titanium rem. Density (kg.m ⁻³) 4520								
Identified Product forms: Extrusion, Rod, Bar								
Similar/Equivalent alloys: <u>USA:</u> ASTM F 1295; <u>Proprietary:</u> IMI 367; Timetal 367								
Comments: Medium strength alloy specifically for medical implants								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Not stated [-]	800	-	900	10	105	-	Minimum (Timetal 367)	(Timetal)
367	Timetal (UK)							Wrought
Approximate composition: Al 6, Nb 7, Titanium rem. Density (kg.m ⁻³) 4520								
Identified Product forms: Extrusion, Rod, Bar								
Similar/Equivalent alloys: <u>USA:</u> ASTM F 1295; <u>Proprietary:</u> IMI 367; Timetal 367								
Comments: Medium strength alloy specifically for medical implants								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Not stated [-]	800	-	900	10	105	-	Minimum	(Timetal)
550	Timetal (USA)							Wrought
Approximate composition: Al 4, Sn 2, Mo 4, Si 0.5, Titanium rem.								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <u>European (CEN):</u> Ti P68 (<u>AECMA</u>): Ti P68; <u>France:</u> TA 4DE; <u>Germany:</u> LW. 3.7184; <u>UK:</u> BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD: 5103, 5153, 5203; <u>Proprietary:</u> Timetal 550, IMI 550, Ti 550; Titanium Industries 550								
Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
ST [-]	930	-	1080	12	115	-	Typical (Timetal 550)	(Timetal)
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115	-	Typical (IMI 550)	(#3)
STA [-]	1070	-	1200	14	115	-	Typical (Timetal 550)	(Timetal)
Fully heat-treated [Rod]	1070	-	1200	14	116	-	Typical (IMI 550)	(#5)
551	IMI (UK)							Wrought
Approximate composition: Al 4, Sn 4, Mo 4, Si 0.5, Titanium rem. Density (kg.m ⁻³) 4600								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <u>USA:</u> AMS 4974, MIL -T-9047E, -T-009047E; <u>UK:</u> BS: TA38, TA39, TA40, TA41, TA42; DTD 5223; <u>Proprietary:</u> IMI 551; Timetal 551								
Comments: RT phase type: Alpha + Beta. High strength alloy. Higher RT strength than IMI 550. Useful creep resistance to 400°C.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Fully heat-treated [Rod]	1250	-	1390	10	113	-	Typical	(#5)
Not stated [<25mm]	1210	-	1450	10	115	-	Typical (Timetal 551)	(Timetal)
Not stated [25 to 100mm]	1200	-	1310	10	115	-	Typical (Timetal 551)	(Timetal)

551	Timetal (USA)	Wrought						
Approximate composition: Al 4, Sn 4, Mo 4, Si 0.5, Titanium rem. Density (kg.m ⁻³) 4600								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <i>USA:</i> AMS 4974, MIL -T-9047E, -T-009047E; <i>UK:</i> BS: TA38, TA39, TA40, TA41, TA42; DTD 5223; <i>Proprietary:</i> Timetal 551, IMI 551								
Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C. Higher strength than Timetal 550.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [$<25\text{mm}$]	1210	-	1450	10	115		Typical (Timetal 551)	(Timetal)
Not stated [$25\text{ to }100\text{mm}$]	1200	-	1310	10	115		Typical (Timetal 551)	(Timetal)
646	IMI (UK)	Wrought						
Approximate composition: Al 6, Sn 2, Zr 4, Mo 6, Titanium rem. Density (kg.m ⁻³) 4640								
Identified Product forms: Forging stock/Billet, Bar								
Similar/Equivalent alloys: <i>USA:</i> UNS R56260, AMS 4981; <i>Proprietary:</i> IMI 646; Timetal 6-2-4-6								
Comments: Alpha-beta alloy. Useful properties to 450°C. Forgings for intermediate temperature regions of gas turbine engines, compressor blades and disks. Weldability: Limited								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [-]	1100	-	1200	12	115		Typical (Timetal 6-2-4-6)	(Timetal)
STA [-]	1172	-	1269	10	114	HRC36 - 42	Typical (6Al-2Sn-4Zr-6Mo)	(#3)
679	IMI (UK)	Wrought						
Approximate composition: Al 2.25, Sn 11, Zr 5, Mo 1, Si 0.2, Titanium rem. Density (kg.m ⁻³) 4840								
Identified Product forms: Extrusion, Rod, Bar								
Similar/Equivalent alloys: <i>USA:</i> AMS 4974; <i>UK:</i> BS: TA18, TA19, TA20, TA25, TA26, TA27; <i>Proprietary:</i> IMI 679; Timetal 679								
Comments: Alpha + Beta/Beta. High tensile strength and creep resistance to 450°C.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si)	(#3)
Air cooled/Aged [Rod]	1020	-	1095	14	108		Typical	(#5)
Quenched/Aged [-]	970	-	1110	8	105		Minima (Timetal 679)	(Timetal)
Quenched/Aged [Rod]	1050	-	1230	10	-		Typical	(#5)
679	Timetal (UK)	Wrought						
Approximate composition: Al 2.25, Sn 11, Zr 5, Mo 1, Si 0.2, Titanium rem. Density (kg.m ⁻³) 4840								
Identified Product forms: Extrusion, Rod, Bar								
Similar/Equivalent alloys: <i>USA:</i> AMS 4974; <i>UK:</i> BS: TA18, TA19, TA20, TA25, TA26, TA27; DTD 5113; <i>Proprietary:</i> IMI 679; Timetal 679								
Comments: Good tensile strength and creep resistant to 450°C.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si)	(#3)
Quenched/Aged [-]	970	-	1110	8	105		Minima (Timetal 679)	(Timetal)
680	IMI (UK)	Wrought						
Approximate composition: Al 2.25, Sn 11, Mo 4, Si 0.2, Titanium rem. Density (kg.m ⁻³) 4840								
Identified Product forms: Extrusion, Rod, Bar								
Similar/Equivalent alloys: <i>France:</i> T-E11DA; <i>UK:</i> DTD 5213; <i>Proprietary:</i> IMI 680								
Comments: Alpha + Beta/Beta								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Furnace cooled/Aged [Rod]	1030	-	1130	15	-		Typical	(#5)
Quenched/Aged [Rod]	1180	-	1330	12	106		Typical	(#5)
685	IMI (UK)	Wrought						
Approximate composition: Al 6, Zr 5, Mo 0.5, Si 0.25, Titanium rem. Density (kg.m ⁻³) 4450								
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P67 (<i>AECMA</i>): Ti P67; <i>France:</i> T-A6Zr5D; <i>Germany:</i> LW. 3.7154; <i>UK:</i> BS: TA43, TA44; <i>Proprietary:</i> Timetal 685; IMI 685								
Comments: Near alpha alloy. Medium strength alloy. Useful creep resistance to ~ 520°C. Good forging characteristics. Weldability: Weldable								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Beta ht + OQ + Age 550°C/24hr. [-]	787	-	900	8	125		Typical (IMI 685)	(#3)
Fully heat-treated [Rod]	920	-	1020	11	124		Typical (IMI 685)	(#5)
Not stated [-]	900	-	1030	10	125		Typical (Timetal 685)	(Timetal)
685	Timetal (USA)	Wrought						
Approximate composition: Al 6, Zr 5, Mo 0.5, Si 0.25, Titanium rem.								
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P67 (<i>AECMA</i>): Ti P67; <i>France:</i> T-A6Zr5D; <i>Germany:</i> LW. 3.7154; <i>UK:</i> BS: TA43, TA44; <i>Proprietary:</i> Timetal 685; IMI 685								
Comments: Near alpha alloy. Medium strength alloy. Useful creep resistance to ~ 520°C. Good forging characteristics. Weldability: Weldable								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Beta ht + OQ + Age 550°C/24hr. [-]	787	-	900	8	125		Typical (IMI 685)	(#3)
Fully heat-treated [Rod]	920	-	1020	11	124		Typical (IMI 685)	(#5)
Not stated [-]	900	-	1030	10	125		Typical (Timetal 685)	(Timetal)
700	IMI (UK)	Wrought						
Approximate composition: Al 6, Zr 5, Mo 4, Cu 1, Si 0.2, Titanium rem.								

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829	IMI (UK)						Wrought
Approximate composition: Al 5.6, Sn 3.5, Zr 3, Mo 0.25, Si 0.3, Nb 1, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Extrusion, Rod, Bar							
Similar/Equivalent alloys: <i>Proprietary:</i> IMI 829; Timetal 829							
Comments: Near alpha alloy. Medium strength. Creep resistant to 540°C. Weldability: Weldable							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Beta ht + AC + Age 625°C/24hr. [-]	820	-	930	9	-		Minimum (IMI 829) (#3)
Not stated [-]	860	-	980	10	120		Typical (Timetal 6-2-4-6) (Timetal)
829	Timetal (USA)						Wrought
Proprietary composition: Al 5.6, Sn 3.5, Zr 3, Mo 0.25, Si 0.3, Nb 1.0, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Extrusion, Rod, Bar							
Similar/Equivalent alloys: <i>Proprietary:</i> Timetal 829; IMI 829							
Comments: Near alpha alloy. Medium strength. Creep resistant to 540°C. Weldability: Weldable							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Beta ht + AC + Age 625°C/24hr. [-]	820	-	930	9	-		Minimum (IMI 829) (#3)
Fully heat-treated [Rod]	895	-	1028	10.5	119		Typical (#5)
Not stated [-]	860	-	980	10	120		Typical (Timetal 829) (Timetal)
834	IMI (UK)						Wrought
Approximate composition: Al 5, Sn 4, Zr 3.8, Mo 0.05, Si 0.35, Nb 0.7 C 0.06, Titanium rem.							
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar							
Similar/Equivalent alloys: <i>France:</i> TA6EZr4Nb; <i>Proprietary:</i> IMI 834; Timetal 834							
Comments: High temperature alloy (590°C) with improved fatigue performance. Weldability: Weldable							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Alpha/Beta processed [-]	910	-	1030	6	-		Minimum (IMI 834) (#3)
Not stated [-]	930	-	1050	11	120		Typical (Timetal 834) (Timetal)
834	Timetal (USA)						Wrought
Proprietary composition: Al 5.8, Sn 4, Zr 3.5, Mo 0.5, Si 0.35, Nb 0.7, C 0.06, Titanium rem. Density (kg.m ⁻³) 4550							
Similar/Equivalent alloys: <i>Proprietary:</i> Timetal 834; IMI 834							
Comments: High temperature alloy (590°C) with improved fatigue performance. Weldability: Weldable							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Alpha/Beta processed [-]	910	-	1030	6	-		Minimum (IMI 834) (#3)
Not stated [-]	930	-	1050	11	120		Typical (Timetal 834) (Timetal)
1000	Timetal (USA)						Wrought
Proprietary composition: Al 6, Sn 2.7, Zr 4, Mo 0.4, Si 0.45, Titanium rem.							
Comments: Not included in 1996 Timetal literature.							
1100	Timetal (USA)						Wrought
Proprietary composition: Al 6, Sn 2.7, Zr 4, Mo 0.4, Si 0.45, Titanium rem. Density (kg.m ⁻³) 4500							
Identified Product forms: Sheet/strip, Forging stock/Billet, Bar							
Comments: Near alpha alloy. High temperature creep resistant alloy (600°C) with very good combination of strength, fracture toughness and fatigue performance.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Not stated [-]	980	-	1100	8	120		Typical (RT) (Timetal)
Not stated [-]	480	-	620	11	-		Typical (600°C) (Timetal)
3620-TA7	(China)						Cast Wrought
Nominal composition: Al 4-6, Sn 2-3, Si 0.15, Fe 0.3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.1, Titanium rem. Density (kg.m ⁻³) 4500							
Identified Product forms: Plate, Extrusion, Bar, Wire							
Similar/Equivalent alloys: <i>USA:</i> UNS R54520, ASTM B265, 348, 367, 381; Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; <i>European (AECMA):</i> Ti P65; <i>France:</i> TA 5E; <i>UK:</i> DTD 5083, 5093; <i>Others:</i> China: 3620-TA7; <i>Proprietary:</i> IMI 317							
Comments: Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn) (#3)
4905	AMS (USA)						Wrought
Nominal composition: Al 5.6-6.3, V 3.6-4.4, Fe 0.25, O ₂ 0.12, N ₂ 0.03, H ₂ 0.0125, C 0.05 max, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem.							
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <i>USA:</i> UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 5, AMS 4905, 4906, 4911, 4920, 4928L, 4934, 4954, 4967, MIL F83142, T9046, T9047, T81556, T81915; <i>European (CEN):</i> Ti P63 (AECMA); Ti P64001 (was Ti-P63 / C63); <i>France:</i> TA6V; NF L14-633 Ti P64001; <i>Germany:</i> TiAl6V4; Wk. 3.7165; LW. 3.7164; <i>UK:</i> BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; <i>Others:</i> AWS A5-16 (USA); <i>Proprietary:</i> IMI 318; Ti 318A; Timetal 6-4							
Comments: Product forms: AMS; 4905 plate; 4906 sheet/strip; 4911 sheet/plate/strip; 4920, 4928L, 4934 & 4967 rings/forgings/wires; 4954 wires. Compositional limits vary slightly with form (those given are for 4905 plate). Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. Weldability: Fair							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>El (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V) (#3)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V) (#3)

4907 AMS (USA) Wrought

Nominal composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.25, O₂ 0.13, N₂ 0.05, H₂ 0.0125, C 0.08 max, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Wire

Similar/Equivalent alloys: USA: UNS R56401, ASTM F135, F 467, F468, AMS 4907, 4930, 4996

Comments: ELI - Extra-low Interstitial grade. Composition for AMS; 4907 & 4930. AMS 4996 has slightly different limits for billets. Improved toughness and ductility. Cryogenic and fracture critical applications.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)

4909 AMS (USA) Cast Wrought

Nominal composition: Al 4.5-5.75, Sn 2-3, Fe 0.25, O₂ 0.12, N₂ 0.035, H₂ 0.0125, C 0.05, O+Fe 0.32, Y 0.005, Others: Each 0.05 Total 0.3, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Extrusion, Wire

Similar/Equivalent alloys: USA: UNS R54521, AMS 4909, 4924; Russia (CIS): VT51

Comments: Extra-low interstitial (ELI) grade. Improved ductility and toughness. Pressure vessels for liquefied gases and cryogenic service. Also castable.

4910 AMS (USA) Wrought

Nominal composition: Al 4.5-5.75, Sn 2-3, Fe 0.5, O₂ 0.2, N₂ 0.05, H₂ 0.02, C 0.08, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500

Identified Product forms: Plate, Sheet/strip

Similar/Equivalent alloys: USA: UNS R54520, ASTM B265, 348, 367, 381; Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; European (AECMA): Ti P65; France: TA 5E; Germany: DIN 17851 Wk. 3.7115; UK: DTD 5083, 5093; Others: China: 3620-TA7; Proprietary: IMI 317

Comments: Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)

4915 AMS (USA) Wrought

Nominal composition: Al 7.35-8.35, Mo 0.75-1.25, V 0.75-1.25, Fe 0.3, O₂ 0.12, N₂ 0.05, H₂ 0.015, C 0.08, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4360

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Bar, Wire

Similar/Equivalent alloys: USA: UNS R54810, AMS 4915, 4916, 4933, 4972A, 4973A, MIL R-81588; European (AECMA): Ti P66; France: TA8DV; Proprietary: Timetal 8-1-1; IMI 811

Comments: AMS 4915, 4916, 4933, 4972, 4973: Product forms. Near alpha or alpha-beta phase alloy (depending on processing). Creep resistance to 450 C. Fan blades, jet engine forgings (compressor blades and disks), cargo flooring. **Weldability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Sheet]	930	-	1020	13	125		Typical (Timetal 8-1-1)	(Timetal)
Duplex annealed [-]	891	-	950	15	124	HRC35	Typical (8Al-1Mo-1V))	(#3)

4917 AMS (USA) Wrought

Nominal composition: Al 2.5-3.5, V 12.5-14.5, Cr 10-12, Fe 0.35, O₂ 0.17, N₂ 0.05, H₂ 0.025, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Wire

Similar/Equivalent alloys: USA: UNS R58010, AMS 4917, 4959, MIL -T-9046, T-9047, T81588, F83142; Others: AWS A5; Proprietary: Crucible Steel Co. B 120 VCA

Comments: Beta phase high strength alloy. Product forms: AMS 4917, 4959 wire. Composition limits vary slightly for 4959 wire. High strength airframe and missile applications. Little used. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA(1) [-]	1136	-	1195	8	101		Typical (13V-11Cr-3Al)	(#3)
STA(2) [-]	1207	-	1276	8	-	HRC40	Typical (13V-11Cr-3Al)	(#3)

4918 AMS (USA) Wrought

Nominal composition: Al 5-6, Sn 1.5-2.5, V 5-6, Cu 0.35-1, Fe 0.35-1, O₂ 0.2, N₂ 0.04, H₂ 0.015, C 0.05, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4530

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Bar, Wire

Similar/Equivalent alloys: USA: UNS R56620, AMS 4918, 4936, 4971, 4978, 4979, MIL -T-9047, F83142; European (CEN): Ti P64 (AECMA): Ti P64; Germany: LW. 3.7174, Wk. 3.7175; Proprietary: Timetal 6-6-2; IMI 662

Comments: Product forms: AMS 4918, 4936, 4971, 4978, 4979. Composition limits slightly different for 4979 bars/forgings. Greater strength than Ti-6Al-4V but reduced fracture toughness and fatigue properties. Useful to 315°C. Rocket motor case, airframe and forged applications. **Weldability:** Limited

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	985	-	1050	14	110	HRC38	Typical (6Al-6V-2Sn)	(#3)
Annealed [-]	1005	-	1090	10	115		Typical (Timetal 6-6-2)	(Timetal)
STA [-]	1105	-	1205	8	115		Typical (Timetal 6-6-2)	(Timetal)
STA [-]	1172	-	1276	10	-	HRC42	Typical (6Al-6V-2Sn)	(#3)

4919 AMS (USA) Wrought

Nominal composition: Al 5.5-6.5, Sn 1.8-2.2, Zr 3.6-4.4, Mo 1.8-2.2, Si 0.1, Fe 0.25, O₂ 0.15, N₂ 0.05, H₂ 0.0125, C 0.05, Y 0.005, Others: Each 0.1 Total 0.3, Titanium rem.

Identified Product forms: Sheet/strip, Forging stock/Billet, Bar, Wire

Similar/Equivalent alloys: USA: UNS R54260, AMS 4919, 4975, 4976; Proprietary: Otto Fuchs TL62; IMI 624

Comments: AMS 4919, 4975, 4976: Product forms. Near alpha alloy. Good creep strength. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	863	-	940	15	114	HRC32	Typical (6Al-2Sn-4Zr-2Mo)	(#3)

4924 AMS (USA) Cast Wrought

Nominal composition: Al 4.7-5.6, Sn 2-3, Fe 0.25, O₂ 0.12, N₂ 0.035, H₂ 0.0125, C 0.05, O+Fe 0.32, Others: Each 0.1 Total 0.4, Titanium rem.

Identified Product forms: Forging stock/Billet, Bar

Similar/Equivalent alloys: USA: UNS R54521, AMS 4909, 4924; Russia (CIS): VT51

Comments: Extra-low interstitial (ELI) grade. Improved ductility and toughness. Pressure vessels for liquefied gases and cryogenic service. Also castable.

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4926 AMS (USA) Cast Wrought

Nominal composition: Al 4-6, Sn 2-3, Fe 0.5, O₂ 0.2, N₂ 0.05, H₂ 0.02, C 0.08, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500

Identified Product forms: Forging stock/Billet, Bar

Similar/Equivalent alloys: USA: UNS R54520, ASTM B265, 348, 367, 381; Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; European

(AECMA): Ti P65; France: TA 5E; Germany: DIN 17851 Wk. 3.7115; UK: DTD 5083, 5093; Others: China: 3620-TA7; Proprietary: IMI 317

Comments: Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)

4974 AMS (USA) Wrought

Nominal composition: Al 2-2.5, Sn 10.5-11.5, Zr 4-6, Mo 0.8-1.2, Si 0.15-0.27, Fe 0.12, O₂ 0.15, N₂ 0.04, H₂ 0.0125, C 0.04, Y 0.005, Others: Each 0.1 Total 0.4, Titanium rem.

Identified Product forms: Plate, Forging stock/Billet, Bar

Similar/Equivalent alloys: USA: UNS R54790, AMS 4974 (bar, forging); UK: BS: TA18, TA19, TA20, TA25, TA26, TA27

Comments: Bar & forgings. Ti 679. Near alpha alloy. Jet engine blades and disks, large forgings.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si)	(#3)

5053 DTD (UK) Wrought

Approximate composition: Al 4, Mn 4, Titanium rem.

Similar/Equivalent alloys: USA: ASTM B348/7, B381 F7, AMS 4925A, SAE 4Al 4Mn; European (AECMA): Ti P62; France: TA 5M; UK: DTD 5053, 5143; Proprietary: Crucible Steel Co. C130AM; IMI 314A; ICI 314A; T314A

5083 DTD (UK) Wrought

Approximate composition: Al 5, Sn 2.5, Titanium rem. **Density** (kg.m⁻³) 4500

Similar/Equivalent alloys: USA: UNS R54520, ASTM B265, 348, 367, 381 Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; European

(AECMA): Ti P65; France: TA 5E; UK: DTD 5083, 5093; Proprietary: IMI 317

Comments: DTD 5083, 5093. Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)
Annealed [Sheef]	820	-	860	16	-	-	Typical (IMI 317)	(#5)

5111 Timetal (USA) Wrought

No composition: -

Comments: Near alpha development alloy. Excellent seawater stress corrosion cracking resistance and high dynamic toughness. **Weldability:** Excellent

5163 DTD (UK) Wrought

Approximate composition: Al 6.1, V 4, H₂ 0.012, Titanium rem. **Density** (kg.m⁻³) 4500

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: USA: UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical);, AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; European (CEN): Ti P63 (AECMA): Ti P64001 (was Ti-P63 / C63); France: TA6V; NF L14-633 Ti P64001; Germany: TiAl6V4; Wk. 3.7165; LW. 3.7164; UK: BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; Others: AWS A5-16 (USA); Proprietary: IMI 318; Ti 318A; Timetal 6-4

Comments: DTD 5163, 5173, 5303, 5313, 5323, 5363. Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106	-	Typical (IMI 318)	(#5)
Annealed [Sheef]	1110	-	1160	10	-	-	Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-	-	Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-	-	Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Sheef]	980	-	1035	12	112.5	-	Typical (Timetal 6-4)	(Timetal)

Allvac 3-2.5 Teledyne (USA) Wrought

Approximate composition: Al 3, V 3, Titanium rem.

Identified Product forms: Sheet/strip, Forging stock/Billet, Bar

Allvac 5-2.5 Teledyne (USA) Wrought

Approximate composition: Al 5, Sn 3, Titanium rem.

Identified Product forms: Sheet/strip, Forging stock/Billet, Bar

Allvac 6-2-4-2 Teledyne (USA) Wrought

Proprietary composition: Al 6, Sn 2, Zr 4, V 2, Titanium rem.

Identified Product forms: Sheet/strip, Forging stock/Billet, Bar

Similar/Equivalent alloys: USA: UNS R54620, AMS 4975, MIL T-9047 C-11; Germany: 3.7114; Proprietary: Teledyne Allvac 6-2-4-2

Allvac 6-2-4-6	Teledyne (USA)	Wrought
Proprietary composition: Al 6, Sn 2, Zr 4, V 6, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R56260, AMS 4981, MIL T-9047 C-14; <u>Germany:</u> 3.7144; <u>Proprietary:</u> Teledyne Allvac 6-2-4-6		
Allvac 6-4	Teledyne (USA)	Wrought
Proprietary composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.0125, C 0.1, Others: Each 0.1 Total 0.4, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R56400, ASTM B348 Grade 5, B381 Grade F5, F1472, AMS 4928, 4965, 4967, MIL T-9047 C-6; <u>European (ISO):</u> 5832-3; <u>Germany:</u> 3.7164; <u>Proprietary:</u> Teledyne Allvac 6-4		
Allvac 6-4 ELI	Teledyne (USA)	Wrought
Approximate composition: Al 6, V 4, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R56401, ASTM F136, AMS 4930, 4931, MIL T-9047 ELI C-7; <u>European (ISO):</u> 5832-3; <u>Proprietary:</u> Teledyne Allvac 6-4 ELI Comments: Extra low interstitial.		
Allvac 6-6-2	Teledyne (USA)	Wrought
Proprietary composition: Al 5-6, Sn 1.5-2.5, V 5-6, Cu 0.35-1, Fe 0.35-1, O ₂ 0.2, N ₂ 0.04, H ₂ 0.015, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R56620, AMS 4971, 4978, 4979; <u>Germany:</u> 3.7145; <u>Proprietary:</u> Teledyne Allvac 6-6-2		
Allvac 6-7	Teledyne (USA)	Wrought
No composition: Similar/Equivalent alloys: <u>USA:</u> UNS R56700, ASTM F1295; <u>European (ISO):</u> 5832-11; <u>Proprietary:</u> Teledyne Allvac 6-7		
Allvac 8-1-1	Teledyne (USA)	Wrought
Approximate composition: Al 8, Mo 1, V 1, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R54810, AMS 4972, MIL C-5; <u>Germany:</u> 3.7134; <u>Proprietary:</u> Teledyne Allvac 8-1-1		
Allvac 30	Teledyne (USA)	Wrought
Proprietary composition: Fe 0.2, O ₂ 0.18, N ₂ 0.03, H ₂ 0.01, C 0.1 (H 0.0125 - billets), Others: Each 0.05 Total 0.3, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R50250, ASTM F67, B348 Grade 1, MIL T-81556; <u>European (ISO):</u> 5832-2; <u>Germany:</u> 3.7025; <u>Proprietary:</u> Teledyne Allvac 30 Comments: Commercial purity.		
Allvac 40	Teledyne (USA)	Wrought
Proprietary composition: Fe 0.3, O ₂ 0.25, N ₂ 0.03, H ₂ 0.01, C 0.1 (H 0.0125 - billets), Others: Each 0.05 Total 0.3, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R50400, ASTM F67, B348 Grade 2, MIL T-81556; <u>European (ISO):</u> 5832-2; <u>Germany:</u> 3.7035; <u>Proprietary:</u> Teledyne Allvac 40 Comments: Commercial purity.		
Allvac 40+Pd	Teledyne (USA)	Wrought
Proprietary composition: Fe 0.3, O ₂ 0.25, N ₂ 0.05, H ₂ 0.01, C 0.1, Pd 0.12-0.25 (H 0.0125 - billets), Others: Each 0.05 Total 0.3, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 7; <u>Proprietary:</u> Teledyne Allvac 40+Pd Comments: Commercial purity.		
Allvac 50	Teledyne (USA)	Wrought
Proprietary composition: Fe 0.3, O ₂ 0.35, N ₂ 0.05, H ₂ 0.01, C 0.1 (H 0.0125 - billets), Others: Each 0.05 Total 0.3, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> ASTM B348 Grade 3; <u>Proprietary:</u> Teledyne Allvac 50 Comments: Commercial purity.		
Allvac 55	Teledyne (USA)	Wrought
No composition: Similar/Equivalent alloys: <u>USA:</u> UNS R50550, ASTM F67, B348 Grade 3, MIL T-81556; <u>European (ISO):</u> 5832-2; <u>Germany:</u> 3.7064; <u>Proprietary:</u> Teledyne Allvac 55 Comments: Commercial purity.		
Allvac 70	Teledyne (USA)	Wrought
Proprietary composition: Fe 0.5, O ₂ 0.4, N ₂ 0.05, H ₂ 0.01, C 0.1 (H 0.0125 - billets), Others: Each 0.05 Total 0.3, Titanium rem. Identified Product forms: Sheet/strip, Forging stock/Billet, Bar Similar/Equivalent alloys: <u>USA:</u> UNS R50700, ASTM F67, B348 Grade 4, AMS 4921, MIL Ti-CP-70 C-1; <u>European (ISO):</u> 5832-2; <u>Germany:</u> 3.7065; <u>Proprietary:</u> Teledyne Allvac 70 Comments: Commercial purity.		

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B 120 VCA Crucible Steel Co. (USA) Wrought

Nominal composition: Al 3, V 13, Cr 11, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Wire

Similar/Equivalent alloys: USA: UNS R58010, AMS 4917, 4959, MIL -T-9046, T-9047, T81588, F83142; Others: AWS A5; Proprietary: Crucible Steel Co. B 120 VCA

Comments: High-strength beta-phase alloy. High strength airframe and missile applications. Little used. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA(1) [-]	1136	-	1195	8	101		Typical (13V-11Cr-3Al)	(#3)
STA(2) [-]	1207	-	1276	8	-	HRC40	Typical (13V-11Cr-3Al)	(#3)

Beta C (USA) Cast Wrought

Nominal composition: Al 3-4, Zr 3.5-4.5, Mo 3.5-4.5, V 7.5-8.5, Fe 0.3, O₂ 0.12, N₂ 0.05, H₂ 0.015, C 0.05, Others: Total 0.4, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Bar, Wire

Similar/Equivalent alloys: USA: UNS R58640, MIL T-9046, T-9047, F-83142; Others: Beta C

Comments: Beta phase alloy. Excellent ductility and cold working characteristics. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	830	-	883	15	-		Minimum (Beta C)	(#3)
STA [-]	1379	-	1448	7	106		Typical (Beta C)	(#3)

Beta III (USA) Wrought

Nominal composition: Sn 3.75-5.25, Zr 4.5-7.5, Mo 10-13, Fe 0.35, O₂ 0.18, N₂ 0.05, H₂ 0.02, C 0.1, Others: Total 0.4, Titanium rem.

Similar/Equivalent alloys: USA: ASTM B265, B337, B338, B348, AMS 4977, 4980; Others: Beta III

Comments: Beta phase alloy. Excellent forgeability and cold working. (No longer produced) **Weldability:** Very good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	620	-	690	-	-		Minimum (Beta III)	(#3)
STA [-]	1317	-	1386	11	103		Typical (Beta III)	(#3)

BT1-0 GOST (Russia) Wrought

Nominal composition: Fe 0.3, O₂ 0.2, N₂ 0.04, H₂ 0.01, C 0.07, Others: Total 0.3, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	390	20	-		Typical/Minimum	(#3)
Not stated. [-]	-	-	540	20	-		Typical/Maximum	(#3)

BT1-00 GOST (Russia) Wrought

Nominal composition: Fe 0.2, O₂ 0.1, N₂ 0.04, H₂ 0.008, C 0.05, Others: Total 0.1, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	-	295	20	-		Typical	(#3)

C130AM Crucible Steel Co. (USA) Wrought

Approximate composition: Al 4, Mn 4, Titanium rem.

Similar/Equivalent alloys: USA: ASTM B348/7, B381 F7, AMS 4925A, SAE 4Al 4Mn; European (AECMA): Ti P62; France: TA 5M; UK: DTD 5053, 5143; Proprietary: Crucible Steel Co. C130AM; IMI 314A; ICI 314A; Ti314A

Class 1 JIS (Japan) Wrought

Nominal composition: Fe 0.2, O₂ 0.15, N₂ 0.05, H₂ 0.015, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: Japan: JIS Class 1: Forms H3331, H4600, H4630, H4631, H4650, H4670

Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	165	410	27	-		Typical/Maximum.	(#3)
Not stated. [-]	-	165	275	27	-		Typical/Minimum.	(#3)

Class 2 JIS (Japan) Wrought

Nominal composition: Fe 0.25, O₂ 0.2, N₂ 0.05, H₂ 0.015, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: Japan: JIS Class 2: Forms H3331, H4600, H4630, H4631, H4650, H4670

Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	215	343	23	-		Typical/Minimum.	(#3)
Not stated. [-]	-	215	510	23	-		Typical/Maximum.	(#3)

Class 3	JIS (Japan)	Wrought						
Nominal composition: Fe 0.3, O ₂ 0.3, N ₂ 0.07, H ₂ 0.015, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>Japan:</i> JIS Class 3; Forms H3331, H4600, H4630, H4631, H4650, H4670								
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	343	480	18	-	-	Typical/Minimum.	(#3)
Not stated. [-]	-	343	617	18	-	-	Typical/Maximum.	(#3)
Code 12	Timetal (USA)	Cast Wrought						
Nominal composition: Mo 0.2-0.4, Fe 0.3, O ₂ 0.25, N ₂ 0.03, H ₂ 0.015, Ni 0.6-0.9, C 0.1, Titanium rem. Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Tube, Extrusion, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM B265, 337, 338, 348, 367, 381; <i>Grade 12; Proprietary:</i> Timetal Code 12; IMI Code 12								
Comments: Better corrosion resistance and strength than CP titanium grades. Chemical industry. Corrosion resistance: Good Weldability: Highly weldable.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	460	-	600	22	112.5	-	Typical	(Timetal)
F7	ASTM B381 (USA)	Wrought						
Approximate composition: Al 4, Mn 4, H ₂ 0.012, C 0.1, Titanium rem.								
Identified Product forms: Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> ASTM B348/7, B381 F7, AMS 4925A, SAE 4Al 4Mn; <i>European (AECMA):</i> Ti P62; <i>France:</i> TA 5M; <i>UK:</i> DTD 5053, 5143; <i>Proprietary:</i> Crucible Steel Co. C 130AM; IMI 314A; ICI 314A; Ti314A								
GR-1	Titanium Industries (USA)	Wrought						
No composition: - Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 1, MIL T-9046/9047: CP4; <i>Germany:</i> 3.7025; <i>UK:</i> TA1								
Comments: Commercially pure titanium, used primarily for corrosion resistance. Strength increases with GR number. See: ASTM Grade 1. Weldability: Excellent								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	170	-	240	24	-	-	Typical Min. values	(Titanium Industries)
GR-12	Titanium Industries (USA)	Wrought						
No composition: - Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 12								
Comments: Industrial alloy with superior corrosion resistance. See: ASTM Grade 12 Weldability: Excellent								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	345	-	483	18	-	-	Typical Min. values	(Titanium Industries)
GR-2	Titanium Industries (USA)	Cast Wrought						
Nominal composition: Fe 0.2, N ₂ 0.05, H ₂ 0.015, C 0.08 max., Titanium rem. Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 2, AMS 4902, 4941, 4942, 4951, MIL T-9046/9047: CP3; <i>Germany:</i> 3.7035; <i>UK:</i> TA2, 3, 4, 5								
Comments: Commercially pure titanium, alpha structure, used primarily for corrosion resistance. Good formability combined with moderate strength Strength increases with GR number. Main uses: airframe applications, chemical industry. See: ASTM Grade 2 Weldability: Excellent								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	275	-	345	20	-	-	Typical Min. values	(Titanium Industries)
GR-3	Titanium Industries (USA)	Cast Wrought						
No composition: - Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 3, AMS 4900, MIL T-9046/9047: CP2; <i>Germany:</i> 3.7055								
Comments: Commercially pure titanium, used primarily for corrosion resistance. Strength increases with GR number. See: ASTM Grade 3 Weldability: Excellent								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	380	-	450	18	-	-	Typical Min. values	(Titanium Industries)
GR-4	Titanium Industries (USA)	Cast Wrought						
Nominal composition: Fe 0.3, N ₂ 0.05, H ₂ 0.015, C 0.08 max., Titanium rem. Density (kg.m ⁻³) 4510								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 4, AMS 4901, MIL T-9046/9047: CP1, CP-70; <i>Germany:</i> 3.7065; <i>UK:</i> TA 6, 7, 8, 9								
Comments: Commercially pure titanium, alpha structure, used primarily for corrosion resistance. Strength increases with GR number. Main uses: airframe, chemical, marine and similar applications. See: ASTM Grade 4 Weldability: Excellent								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	485	-	550	15	-	-	Typical Min. values	(Titanium Industries)
GR-5	Titanium Industries (USA)	Cast Wrought						
Nominal composition: Al 5.75-6.75, V 3.5-4.5, Fe 0.25, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.08 max., Titanium rem. Density (kg.m ⁻³) 4420								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 5, AMS 4911, 4928, MIL T-9046/9047 AB1, AB2; <i>Germany:</i> 3.7165; <i>UK:</i> TA 10, 11, 12, 28, 56								
Comments: Popular alpha-beta, medium strength alloy (Ti-6-4). Main uses airframe and turbine engine parts (blades, discs, wheels, spacer rings); ordnance equipment; pressure vessels; rocket motor cases. ELI grade used for surgical appliances, implants, pressure vessels & airframes. See: ASTM Grade 5 Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	830	-	895	10	-	-	Typical Min. values	(Titanium Industries)

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GR-7	Titanium Industries (USA)						Cast Wrought
Approximate composition: Pd 2, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Plate, Sheet/strip, Tube, Forging stock/Billet, Bar, Wire							
Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 7, Grade 11							
Comments: Industrial alloy with superior corrosion resistance. See ASTM Grade 7 & 11. Weldability: Excellent							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
[Not stated]	275	-	345	20	-	-	Typical Min. values (Titanium Industries)
Grade 1	ASTM (USA)						Wrought
Nominal composition: Fe 0.2, H ₂ 0.01, O+N 0.05, C 0.1 max, Titanium rem. Density (kg.m ⁻³) 4500							
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <u>USA:</u> UNS R50250, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical), MIL T-9046/9047: CP4; <u>France:</u> T 30; <u>Germany:</u> Wk. 3.7025; <u>Japan:</u> JIS Class 1: H4600, H4630, H4650, H4670; <u>UK:</u> TA1; <u>Proprietary:</u> IMI 110; Titanium Industries GR-1							
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	206	-	286	30	103	HB120	Typical (Grade 1) (#3)
Heat treated [Not stated]	172	-	241	25	103	120HB	RT typical properties (MIO)
Grade 2	ASTM (USA)						Wrought
Nominal composition: Fe 0.2, H ₂ 0.01, O+N 0.13, C 0.1 max, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <u>USA:</u> UNS R50400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 2, AMS 4902, 4941, 4942, 4951, MIL T-9046/9047: CP3; <u>European (CEN):</u> Ti P99002 (<u>AECMA</u>): Ti P99002 (was Ti P02); <u>France:</u> T 40; <u>Germany:</u> LW. 3.7034, Wk. 3.7035; <u>Japan:</u> JIS Class 3: H4600, H4630, H4650, H4670; <u>UK:</u> BS: 2TA2, 2TA3, 2TA4, 2TA5; DTD 5013B, 5033B, 5183, 5293; <u>Proprietary:</u> IMI 125; Timetal 50A; Titanium Industries GR-2							
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	313	-	387	28	103	HB200	Typical (Grade 2) (#3)
Annealed [Rod]	305	-	460	28	-	-	Typical (IMI 125) (#5)
Annealed [Sheet]	340	-	460	30	-	-	Typical (IMI 125) (#5)
Annealed [Tube]	325	-	480	35	-	-	Typical (IMI 125) (#5)
Heat treated [Not stated]	276	-	345	22	-	200HB	RT typ. EI sheet value (MIO)
Not stated [-]	345	-	485	28	112.5	-	Typical (Timetal 50A) (Timetal)
Not stated [Not stated]	276	-	345	22	103	-	RT Min. values (GR-2) (Titanium Industries)
Grade 3	ASTM (USA)						Wrought
Nominal composition: Fe 0.2, H ₂ 0.01, O+N 0.2, C 0.1 max, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <u>USA:</u> UNS R50500, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 3, AMS 4900, MIL 9046/9047: CP2; <u>France:</u> T 50; <u>Germany:</u> Wk. 3.7055; <u>UK:</u> DTD 5003B, 5023C, 5193, 5283, 5293; <u>Proprietary:</u> IMI 130; Timetal 65A; Titanium Industries GR-3							
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	414	-	484	25	103	HB225	Typical (Grade 3) (#3)
Annealed [Rod]	360	-	540	24	105	-	Typical (IMI 130) (#5)
Annealed [Sheet]	420	-	540	25	-	-	Typical (IMI 130) (#5)
Annealed [Wire]	-	-	550	24	-	-	Typical (IMI 130) (#5)
Hard drawn [Wire]	-	-	700	11.5	-	-	Typical (IMI 130) (#5)
Heat treated [Not stated]	483	-	552	15	-	265HB	(#3)
Not stated [-]	450	-	585	25	112.5	-	Typical (Timetal 65A) (Timetal)
Grade 4	ASTM B265 (USA)						Wrought
Nominal composition: Fe 0.2, H ₂ 0.01, O+N 0.28, C 0.1 max, Titanium rem. Density (kg.m ⁻³) 4510							
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire							
Similar/Equivalent alloys: <u>USA:</u> UNS R50700, ASTM B265 Grade 4, AMS 4901, MIL -T-9046, -T-9047; <u>European (CEN):</u> Ti P99003 (<u>AECMA</u>): Ti P99003 (was Ti P04); <u>France:</u> T 60; <u>Germany:</u> LW 3.7064; Wk. 3.7065; <u>UK:</u> BS: 2TA6; DTD 5063B; <u>Proprietary:</u> IMI 155; Timetal 75A							
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability.							
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)
Annealed [-]	533	-	606	20	104	HB265	Typical (Grade 4) (#3)
Annealed [Sheet]	540	-	640	24	-	-	Typical (IMI 155) (#5)
Not stated [-]	560	-	680	23	112.5	-	Typical (Timetal 75A) (Timetal)

Grade 4 ASTM B348, 367, 381 (USA) Cast Wrought**Nominal composition:** Fe 0.2, H₂ 0.01, O+N 0.30, C 0.1 max, Titanium rem. **Density** (kg.m⁻³) 4510**Identified Product forms:** Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: ASTM B348, 367, 381; Grade 4, AMS 4921, MIL T-9046/9047:CP1, CP-70; France: T 60; Germany: LW. 3.7064, Wk. 3.7065; UK: BS: TA6, 2TA7, 2TA8, 2TA9; Proprietary: IMI 160; Timetal 100A; Titanium Industries GR-4**Comments:** Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	533	-	606	20	104	HB265	Typical (Grade 4)	(#3)
Annealed [Sheet]	500	-	670	23	-	-	Typical (IMI 160)	(#5)
Annealed [Wire]	-	-	690	24	-	-	Typical (IMI 160)	(#5)
Not stated [-]	430	-	540	16	112.5	-	Typical (Timetal 100A)	(Timetal)
Not stated [Not stated]	483	-	552	22	104	-	RT Min. values (GR-4)	(Titanium Industries)

Grade 5 ASTM (USA) Wrought**Nominal composition:** Al 5.5-6.75, V 3.5-4.5, Fe 0.4, O₂ 0.2, N₂ 0.05, H₂ 0.015, C 0.1 max, Titanium rem. **Density** (kg.m⁻³) 4500**Identified Product forms:** Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire**Similar/Equivalent alloys:** USA: UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 5, AMS 4905, 4906, 4907, 4911, 4920, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; T-9046/9047: AB1, AB2; European (CEN): Ti P63 (AECMA); Ti P64001 (was Ti-P63 / C63); France: TA6V; NF L14-633 Ti P64001; Germany: TiAl6V4; Wk. 3.7165; LW. 3.7164; UK: BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; Others: AWS A5-16 (USA); Proprietary: IMI 318; Ti 318A; Timetal 6-4; Titanium Industries GR-5**Comments:** Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106	-	Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-	-	Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-	-	Typical (IMI 318)	(#5)
Heat treated [Not stated]	830	-	895	10	-	-	RT typical properties	(MIO)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-	-	Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Not stated]	793	-	827	10	114	30-34RC	RT Min. values (GR-5, Ti-6-4 ELI)	(Titanium Industries)
Not stated [Not stated]	827	-	896	10	114	30-34RC	RT Min. values (GR-5, Ti-6-4)	(Titanium Industries)
Not stated [Rod]	885	-	985	15	112.5	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5	-	Typical (Timetal 6-4)	(Timetal)

Grade 6 ASTM (USA) Wrought**Nominal composition:** Al 4-6, Sn 2-3, Fe 0.4, O₂ 0.2, N₂ 0.05, H₂ 0.0125, C 0.1 (for plate, sheet & strip; H 0.02), Others: Each 0.1 Total 0.4, Titanium rem. **Density** (kg.m⁻³) 4500**Similar/Equivalent alloys:** USA: UNS R54520, ASTM B265, 348, 367, 381; Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al 2.5Sn, MIL -T-9046; European (AECMA): Ti P65; France: TA 5E; UK: DTD 5083, 5093; Others: China: 3620-TA7; Proprietary: IMI 317**Comments:** Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)
Annealed [Sheet]	820	-	860	16	-	-	Typical (IMI 317)	(#5)

Grade 7 ASTM (USA) Wrought**Nominal composition:** Fe 0.3, O₂ 0.25, N₂ 0.03, H₂ 0.01-0.015, Pd 0.12-0.25, C 0.10, Titanium rem.**Identified Product forms:** Sheet/strip, Bar**Similar/Equivalent alloys:** USA: UNS R52400, ASTM B265, 337, 338, 348, 367, 381; Grade 7; Germany: Wk. 3.7235; Proprietary: IMI 262; Titanium Industries GR-7**Comments:** Permissible hydrogen content depends on form. Pd additions increase corrosion resistance to certain media. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	275	343	20	-	-	Typical/Minimum	(#3)
Not stated. [-]	-	410	343	20	-	-	Typical/Maximum	(#3)

Grade 9 ASTM (USA) Wrought**Nominal composition:** Al 2.5-3.5, V 2-3, Fe 0.25, O₂ 0.12, N₂ 0.02, H₂ 0.013, C 0.05 max., Titanium rem.**Similar/Equivalent alloys:** USA: UNS R56320, ASTM B337 3Al-2.5V; Grade 9, AMS 4943, 4944; European (CEN): Ti P69 (AECMA); Ti P69; Ti P609; France: T-A3V2, T-A3V5; Germany: LW. 3.7194, Wk. 3.7195; Proprietary: Timetal 3-2.5; IMI 325**Comments:** Alpha-Beta phase alloy. Normally used in cold-worked stress-relieved condition. Honeycomb foil, hydraulic tubing, pressure vessels. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	553	-	655	20	107	-	Typical (3Al-2.5V)	(#3)
Not stated [-]	550	-	650	15	112.5	-	Typical (Timetal 3-2.5)	(Timetal)

Grade 11 ASTM (USA) Wrought**Nominal composition:** Mo 0.2-0.4, Fe 0.2, O₂ 0.18, N₂ 0.03, H₂ 0.01-0.015, Ni 0.6-0.9, Pd 0.12-0.25, C 0.10, Titanium rem.**Identified Product forms:** Sheet/strip, Bar**Similar/Equivalent alloys:** USA: UNS R52250, ASTM B265, 337, 338, 348, 381; Grade 11; Germany: Wk. 3.7225; Proprietary: IMI 260; Titanium Industries GR-7**Comments:** Permissible hydrogen content depends on form. Pd additions increase corrosion resistance to certain media. **Corrosion resistance:** Very good **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated. [-]	-	170	240	24	-	-	Typical/Minimum	(#3)
Not stated. [-]	-	310	240	24	-	-	Typical/Maximum	(#3)

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Grade 12	ASTM (USA)						Cast Wrought	
Nominal composition: Mo 0.2-0.4, Fe 0.3, O ₂ 0.25, N ₂ 0.03, H ₂ 0.015, Ni 0.6-0.9, C 0.1, Titanium rem. Density (kg.m ⁻³) 4510								
Identified Product forms: Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> ASTM B265, 337, 338, 348, 367, 381; Grade 12; <i>Proprietary:</i> Timetal Code 12; IMI Code 12; Titanium Industries GR-12								
Comments: Better corrosion resistance and strength than CP titanium grades. Chemical industry. Corrosion resistance: Good Weldability: Highly weldable.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	414	-	499	25	-		Typical (Grade 12)	(#3)
Not stated. [-]	460	-	600	22	112.5		Typical (Code 12)	(Timetal)
Grade 23	ASTM (USA)						Wrought	
Approximate composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.25, O ₂ 0.13, N ₂ 0.05, H ₂ 0.0125, C 0.08, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Bar								
Similar/Equivalent alloys: <i>USA:</i> UNS R56401, ASTM F135, F467, F468; Grade 23, AMS 4907, 4930, 4931; <i>France:</i> T-A6VELI; <i>Proprietary:</i> IMI 318ELI								
Comments: ELI = Extra Low Interstitial. F135 bar, F467 nuts, F468 bolts. Composition limits vary slightly with form - that given is for F135 bar. Greater ductility and toughness than straight 6-4 alloys. Cryogenic and fracture critical applications.								
LCB	Timetal (USA)						Wrought	
No composition: -								
Identified Product forms: Rod, Bar								
Comments: Development alloy. Metastable beta phase. For springs and other high strength applications.								
R54790	UNS (USA)						Wrought	
Nominal composition: Al 2.25, Sn 11, Zr 5, Mo 1, Si 0.2, Fe 0.12, O ₂ 0.17, N ₂ 0.04, H ₂ 0.008, C 0.04, Titanium rem.								
Identified Product forms: Plate, Forging stock/Billet, Bar								
Similar/Equivalent alloys: <i>USA:</i> UNS R54790, AMS 4974 (bar, forging); <i>UK:</i> BS: TA18, TA19, TA20, TA25, TA26, TA27								
Comments: Ti 679. Near alpha alloy. Jet engine blades and disks, large forgings.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si)	(#3)
R56080	UNS (USA)						Wrought	
Approximate composition: Mn 8, Fe 0.5, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.08, Titanium rem.								
Identified Product forms: Plate, Sheet/strip								
Similar/Equivalent alloys: <i>USA:</i> UNS R56080, AMS 4908								
Comments: Aircraft sheet and structural parts. Little used.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	811	-	903	15	113		Typical (8Mn)	(#3)
R56210	UNS (USA)						Wrought	
Nominal composition: Al 6, Mo 0.8, Fe 0.12, O ₂ 0.1, N ₂ 0.02, H ₂ 0.0125, C 0.03, Nb 2, Ta 1, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Rod, Bar, Wire								
Comments: Naval shipbuilding applications. Submersible hulls, pressure vessels, etc. High toughness.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
As-rolled [25mm plate]	724	-	823	13	114	HRC30	Typ. (6Al-2Nb-1Ta-1Mo)	(#3)
R56260	UNS (USA)						Wrought	
Approximate composition: Al 6, Sn 2, Zr 4, Mo 6, Fe 0.15, O ₂ 0.15, N ₂ 0.04, H ₂ 0.0125, C 0.04, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Bar								
Similar/Equivalent alloys: <i>USA:</i> UNS R56260; <i>Proprietary:</i> Otto Fuchs TL62; IMI 646; Timetal 6-2-4-6								
Comments: Ti-6246. Alpha-beta alloy. Useful properties to 450°C. Forgings for intermediate temperature regions of gas turbine engines, compressor blades and disks. Weldability: Limited								
R56740	UNS (USA)						Wrought	
Approximate composition: Al 7, Mo 4, Fe 0.3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.013, C 0.1, Titanium rem.								
Identified Product forms: Forging stock/Billet, Bar								
Similar/Equivalent alloys: <i>USA:</i> UNS R56740, AMS 4970								
Comments: Turbine disks and blades. Little used.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	970	-	1030	-	-		Minimum (7Al-4Mo)	(#3)
STA [-]	1034	-	1103	16	114	HRC38	Typical (7Al-4Mo)	(#3)
R81588	MIL (USA)						Wrought	
Nominal composition: Al 7.35-8.35, Mo 0.75-1.25, V 0.75-1.25, Fe 0.2, O ₂ 0.12, N ₂ 0.015, H ₂ 0.005, C 0.035, Y 0.005, Others: Total 0.3, Titanium rem. Density (kg.m ⁻³) 4360								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> UNS R54810, AMS 4915, 4916, 4933, 4972A, 4973A., MIL R-81588; <i>European (AECMA):</i> Ti P66; <i>France:</i> TA8DV; <i>Proprietary:</i> Timetal 8-1-1; IMI 811								
Comments: Ring and wire forms. Low interstitial. Near alpha or alpha-beta phase alloy (depending on processing). Creep resistance to 450°C. Fan blades, jet engine forgings (compressor blades and disks), cargo flooring. Weldability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	891	-	950	15	124	HRC35	Typical (8Al-1Mo-1V)	(#3)

R58640	UNS (USA)						Wrought	
Nominal composition: Al 3-4, Zr 3.5-4.5, Mo 3.5-4.5, V 7.5-8.5, Fe 0.3, O ₂ 0.12, N ₂ 0.05, H ₂ 0.015, C 0.05, Others: Total 0.4, Titanium rem.								
Similar/Equivalent alloys: USA: UNS R58640, MIL T-9046, T-9047, F-83142; Others: Beta C								
Comments: Beta phase alloy. Excellent ductility and cold working characteristics. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	830	-	883	15	-		Minimum (Beta C)	(#3)
STA [-]	1379	-	1448	7	106		Typical (Beta C)	(#3)
R58820	UNS (USA)						Wrought	
Nominal composition: Al 2.6-3.4, Mo 7.5-8.5, V 7.5-8.5, Fe 1.6-2.4, O ₂ 0.16, N ₂ 0.05, H ₂ 0.015, C 0.05, Others: Total 0.4, Titanium rem.								
Identified Product forms: Sheet/strip, Forging stock/Billet, Rod, Wire								
Similar/Equivalent alloys: USA: UNS R58820, MIL T-9046, T-9047, F-83142								
Comments: Beta phase alloy. Weldability: Limited								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA [-]	1171	-	1240	8	107	HRC40	Typical (8Mo-8V-2Fe-3Al)	(#3)
SCS-6/B-21S	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	441	-	124		Transverse	(Textron)
[Fabric/foil preform]	-	-	1620	-	186		Longitudinal	(Textron)
SCS-6/Ti-6-2-4-2	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Plasma sprayed preform]	-	-	1586	-	186		Longitudinal. Fibre Vol.% 28-30	(Textron)
[Plasma sprayed preform]	-	-	345	-	131		Transverse. Fibre Vol.% 28-30	(Textron)
SCS-6/Ti-6-4	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	414	-	138		Transverse	(Textron)
[Fabric/foil preform]	-	-	1654	-	199		Longitudinal	(Textron)
[Plasma sprayed preform]	-	-	1586	-	186		Longitudinal. Fibre Vol. % 28-30	(Textron)
SCS-6/Ti-6Al-15Nb-3Cr	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Plasma sprayed preform]	-	-	1655	-	200		Longitudinal Fibre Vol.% 33	(Textron)
SCS-6/Ti-10Al-25Nb	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Plasma sprayed preform]	-	-	1517	-	200		Longitudinal Fibre Vol.% 33	(Textron)
SCS-6/Ti-14-21	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	1448	-	200		Longitudinal	(Textron)
[Plasma sprayed preform]	-	-	207	-	117		Transverse. Fibre Vol.% 24-26	(Textron)
[Plasma sprayed preform]	-	-	1103	-	165		Longitudinal. Fibre Vol.% 24-26	(Textron)
SCS-6/Ti-15-3-3-3	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	1551	-	193		Longitudinal	(Textron)
[Fabric/foil preform]	-	-	448	-	124		Transverse	(Textron)
SCS-9/Ti-6-4	Textron (USA)						Wrought	
No composition: -								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	1379	179	-		Longitudinal	(Textron)

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SCS-9/Ti-15-3-3-3		Textron (USA)					Wrought	
No composition: - Density (kg.m ⁻³) 4090								
Comments: Silicon carbide continuous fibre-reinforced titanium metal matrix composite. For aerospace structural components.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
[Fabric/foil preform]	-	-	1379	-	172	-	Longitudinal	(Textron)
[Fabric/foil preform]	-	-	400	-	100	-	Transverse	(Textron)
T 40		NF (France)					Cast	
Approximate composition: Fe 0.2, O ₂ 0.4, N ₂ 0.05, H ₂ 0.015, C 0.10, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Pipe, Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> UNS R50400, ASTM Grade 2, AMS 4902, 4941; <i>European (CEN):</i> Ti P99002 (<i>AECMA:</i> Ti P99002 (was Ti P02); <i>France:</i> T 40; <i>Germany:</i> LW. 3.7034; Wk. 3.7035; <i>Japan:</i> JIS Class 3: H4600, H4630, H4650, H4670; <i>UK:</i> 2TA2, 3, 4, 5, DTD 5013B, 5033B, 5183, 5293; <i>Proprietary:</i> IMI 125; Timetal 50A								
Comments: Commercial purity. Grade C2. For corrosion resistance in chemical, marine, aerospace and medical applications.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Castings]	275	-	345	15	-	-	-	(Taramm)
TA 4DE		NF (France)					Wrought	
Approximate composition: Al 4, Sn 2, Mo 4, Titanium rem.								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P68 (<i>AECMA:</i> Ti P68; <i>France:</i> TA 4DE; <i>Germany:</i> LW. 3.7184; <i>UK:</i> BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD: 5103, 5153, 5203; <i>Proprietary:</i> Timetal 550, IMI 550, Ti 550								
Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
ST [-]	930	-	1080	12	115	-	Typical (Timetal 550)	(Timetal)
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115	-	Typical (IMI 550)	(#3)
STA [-]	1070	-	1200	14	115	-	Typical (Timetal 550)	(Timetal)
Fully heat-treated [Rod]	1070	-	1200	14	116	-	Typical (IMI 550)	(#5)
TA 5E		NF (France)					Wrought	
Approximate composition: Al 5, Sn 2.5, Titanium rem. Density (kg.m ⁻³) 4500								
Similar/Equivalent alloys: <i>USA:</i> UNS R54520, ASTM B265, 348, 367, 381 Grade 6, AMS 4909, 4910, 4924, 4926, 4966, SAE 5Al-2.5Sn, MIL -T-9046; <i>European (AECMA):</i> Ti P65; <i>France:</i> TA 5E; <i>UK:</i> DTD 5083, 5093; <i>Proprietary:</i> IMI 317								
Comments: Alpha phase alloy. Airframe and jet engine applications. Good strength at elevated temperatures. Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	784	-	826	16	110	HRC36	Typical (5Al-2.5Sn)	(#3)
Annealed [Sheet]	820	-	860	16	-	-	Typical (IMI 317)	(#5)
TA 5M		NF (France)					Wrought	
Approximate composition: Al 4, Mn 4, Titanium rem.								
Similar/Equivalent alloys: <i>USA:</i> ASTM B348/7, B381 F7, AMS 4925A, SAE 4Al 4Mn; <i>European (AECMA):</i> Ti P62; <i>France:</i> TA 5M; <i>UK:</i> DTD 5053, 5143; <i>Proprietary:</i> Crucible Steel Co. C130AM; IMI 314A; ICI 314A; T314A								
TA6V		NF (France)					Cast Wrought	
Nominal composition: Al 5.5-6.76, V 3.5-4.5, Fe 0.25, O ₂ 0.12-0.2, N ₂ 0.05, H ₂ 0.01, Y 0.005, Others: Each 0.1 Total 0.2, Titanium rem. Density (kg.m ⁻³) 4430								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical); AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; <i>European (CEN):</i> Ti P63 (<i>AECMA:</i> Ti P64001 (was Ti-P63 / C63); <i>France:</i> TA6V; NF L14-633 Ti P64001; AIR 9183; <i>Germany:</i> TiAl6V4; Wk. 3.7165; LW. 3.7164; <i>UK:</i> BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; <i>Others:</i> AWS A5-16 (USA); <i>Proprietary:</i> IMI 318; Ti 318A; Timetal 6-4								
Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. Investment casting, sometimes post-cast, HIP densified Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Bar >50mm dia.]	827	-	896	10	112.8	HRC36-39	Typical	(Armco)
Annealed [HIP densified castings]	780	-	860	10	115	-	Typical	(Taramm)
Annealed [Rod]	990	-	1050	15	106	-	Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-	-	Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-	-	Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-	-	Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5	-	Typical (Timetal 6-4)	(Timetal)
TA6V ELI		NF (France)					Wrought	
Nominal composition: Al 5.5-6.5, V 3.5-4.5, Fe 0.25, O ₂ 0.12-0.13, N ₂ 0.05, H ₂ 0.012, C 0.08, Titanium rem. Density (kg.m ⁻³) 4430								
Similar/Equivalent alloys: <i>USA:</i> UNS R56401; <i>France:</i> TA6V ELI								
Comments: Extra-low interstitial. Surgical implants, aerospace components. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Bar <=44.5mm dia.]	795	-	860	10	112.8	-	Minimum	(Armco)

T-A6Zr5D	NF (France)						Wrought
Approximate composition: Al 5.7-6.3, Zr 4.5-6, Mo 0.25-0.75, Si 0.1-0.4, Fe 0.05, O ₂ 0.09-0.19, N ₂ 0.03, H ₂ 0.006, C 0.08, Y 0.001, Titanium rem.							
Similar/Equivalent alloys: <i>USA:</i> UNS R54790; <i>Germany:</i> Ti P67; <i>France:</i> T-A6Zr5D; <i>Germany:</i> LW. 3.7154; <i>UK:</i> BS: TA43, TA44; <i>Proprietary:</i> Timetal 685; IMI 685							
Comments: Near alpha alloy. Medium strength alloy. Useful creep resistance to ~ 520°C. Good forging characteristics. Weldability: Weldable							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Beta ht + OQ + Age 550°C/24hr. [-]	787	-	900	8	125		Typical (IMI 685) (#3)
Fully heat-treated [Rod]	920	-	1020	11	124		Typical (IMI 685) (#5)
TA18	BS (UK)						Wrought
Nominal composition: Al 2-2.5, Sn 10.5-11.5, Zr 4-6, Mo 0.8-1.2, Si 0.1-0.5, Fe 0.2, H ₂ 0.0125, Titanium 78.08 min.							
Identified Product forms: Plate, Forging stock/Billet, Bar							
Similar/Equivalent alloys: <i>USA:</i> UNS R54790, AMS 4974 (bar, forging); <i>UK:</i> BS: TA18, TA19, TA20, TA25, TA26, TA27							
Comments: Composition for BS: TA18, TA19, TA25, TA26. Near alpha alloy. Jet engine blades and disks, large forgings.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si) (#3)
TA20	BS (UK)						Wrought
Nominal composition: Al 2-2.5, Sn 10.5-11.5, Zr 4-6, Mo 0.8-1.2, Si 0.1-0.5, Fe 0.2, H ₂ 0.015, Titanium 78.08 min.							
Identified Product forms: Plate, Forging stock/Billet, Bar							
Similar/Equivalent alloys: <i>USA:</i> UNS R54790, AMS 4974 (bar, forging); <i>UK:</i> BS: TA18, TA19, TA20, TA25, TA26, TA27							
Comments: Composition for BS: TA20, TA27. Near alpha alloy. Jet engine blades and disks, large forgings.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Duplex annealed [-]	947	-	1052	15	114	HRC36	Typ. (11Sn-1Mo-2.25Al-5.0Zr-0.2Si) (#3)
TA45	BS (UK)						Wrought
Approximate composition: Al 4, Sn 2, Mo 4, Si 0.5, Titanium rem.							
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar							
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P68 (<i>AECMA</i>): Ti P68; <i>France:</i> TA 4DE; <i>Germany:</i> LW. 3.7184; <i>UK:</i> BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD: 5103, 5153, 5203; <i>Proprietary:</i> Timetal 550, IMI 550, Ti 550							
Comments: BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD: 5103, 5153, 5203. High strength alloy. Useful creep resistance to 400°C.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
ST [-]	930	-	1080	12	115		Typical (Timetal 550) (Timetal)
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115		Typical (IMI 550) (#3)
STA [-]	1070	-	1200	14	115		Typical (Timetal 550) (Timetal)
Fully heat-treated [Rod]	1070	-	1200	14	116		Typical (IMI 550) (#5)
Ti-1	Titanium Intl. (USA)						Wrought
Approximate composition: Fe 0.15, N ₂ 0.05, Titanium 99.8 min. Density (kg.m ⁻³) 4510							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 1; <i>Germany:</i> 30; 3.7025; <i>Sweden:</i> ATI 24; <i>Proprietary:</i> IMI 115							
Comments: Commercial purity, soft and ductile for deep drawing.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Not stated [-]	170	-	240	24	-		(Source) (Bunting)
Ti-2	Titanium Intl. (USA)						Wrought
Approximate composition: Titanium 99.7 min. Density (kg.m ⁻³) 4510							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 2; <i>Germany:</i> 35; 3.7035; <i>Sweden:</i> ATI 30; <i>Proprietary:</i> IMI 125							
Comments: Commercial purity, standard grade for most chemical and engineering applications.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Not stated [-]	275	-	345	20	-		(Source) (Bunting)
Ti-3	Titanium Intl. (USA)						Wrought
Approximate composition: Titanium 99.6 min. Density (kg.m ⁻³) 4510							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 3; <i>Germany:</i> 35D; 3.7055; <i>Sweden:</i> ATI 35; <i>Proprietary:</i> IMI 130							
Comments: Commercial purity, harder grade for some chemical and engineering applications.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Not stated [-]	380	-	450	18	-		(Source) (Bunting)
Ti-3Al-2.5V	(USA)						Wrought
Nominal composition: Al 2.5-3.5, V 2-3, Fe 0.3, O ₂ 0.12, N ₂ 0.02, H ₂ 0.015, C 0.05, Titanium rem.							
Identified Product forms: Sheet/strip, Tube, Bar							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 9, AMS 4943; <i>Proprietary:</i> IMI 325; Timetal 3-2.5							
Comments: Alpha-Beta phase alloy. Normally used in cold-worked stress-relieved condition. Honeycomb foil, hydraulic tubing, pressure vessels. Weldability: Weldable							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Annealed [-]	553	-	655	20	107		Typical (3Al-2.5V) (#3)
Not stated [-]	550	-	650	15	112.5		Typical (Timetal 3-2.5) (Timetal)
Ti-4	Titanium Intl. (USA)						Wrought
Approximate composition: Titanium 99.5 min. Density (kg.m ⁻³) 4510							
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 4; <i>Germany:</i> 55; 3.7065; <i>Sweden:</i> ATI 45; <i>Proprietary:</i> IMI 160							
Comments: Commercial purity, hard grade for springs and contacts.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes
Not stated [-]	485	-	550	15	-		(Source) (Bunting)

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Ti-4-4-2.5 (550)		Titanium Industries (USA)						Wrought
Approximate composition: Al 4, Sn 2.5, Mo 4, Titanium rem. Density (kg.m ⁻³) 4600								
Identified Product forms: Plate, Forging stock/Billet								
Similar/Equivalent alloys: <i>UK:</i> TA 45, 46, 47, 48, 49, 50, 51, 57								
Comments: Popular medium strength alloy for airframe and engines. Weldability: Poor								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
[Not stated]	850	-	1160	10	-	-	Typical Min. values (Source) (Titanium Industries)	
Ti-6-2-4-2		Titanium Industries (USA)						Wrought
Approximate composition: Al 6, Sn 2, Zr 4, Mo 2, Titanium rem. Density (kg.m ⁻³) 4540								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> AMS 4975, 4976, MIL T-9046/9047: AB4								
Comments: Alloy developed for aeroengine use. Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
[Not stated]	830	-	1100	10	-	-	Typical Min. values (Source) (Titanium Industries)	
Ti-6-2-4-6		Titanium Industries (USA)						Wrought
Approximate composition: Al 6, Sn 2, Zr 4, Mo 6, Titanium rem. Density (kg.m ⁻³) 4650								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> AMS 4981								
Comments: Alloy developed for aeroengine use. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
[Not stated]	970	-	1300	10	-	-	Typical Min. values (Source) (Titanium Industries)	
Ti-6Al-2Sn-2Zr-2Cr-Mo		(USA)						Wrought
Approximate composition: Al 5.25-6.25, Sn 1.75-2.25, Zr 1.75-2.25, Mo 1.75-2.25, Cr 1.75-2.25, Si 0.2-0.27, Fe 0.25, O ₂ 0.14, N ₂ 0.03, H ₂ 0.0125, C 0.05, Titanium rem.								
Identified Product forms: Sheet/strip, Forging stock/Billet								
Comments: Heavy-section, high-strength forgings. High modulus and fracture toughness. Airframes.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
Annealed [-]	970	-	1030	-	-	-	Typ. (6Al-2Sn-2Zr-2Cr-Mo) (#3) (Source)	
STA [-]	1138	-	1276	11	122	-	Typ. (6Al-2Sn-2Zr-2Cr-Mo) (#3) (Source)	
Ti-7		Titanium Intl. (USA)						Wrought
Approximate composition: Pd 0.15, Titanium 99.6 min. Density (kg.m ⁻³) 4510								
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 7; <i>Germany:</i> Pd02/35; <i>Sweden:</i> ATI 30-Pd; <i>Proprietary:</i> IMI 262								
Comments: Increased corrosion resistance, especially in reducing acid conditions.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
Not stated [-]	275	-	345	20	-	-	(Source) (Bunting)	
Ti-8Al-1Mo-1V		(USA)						Wrought
Nominal composition: Al 8, Mo 1, V 1, Fe 0.3, O ₂ 0.12, N ₂ 0.05, H ₂ 0.015, C 0.08, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Bar, Wire								
Similar/Equivalent alloys: <i>Proprietary:</i> IMI 811; Timetal 8-1-1								
Comments: Near alpha or alpha-beta phase alloy (depending on processing). Creep resistance to 450°C. Fan blades, jet engine forgings (compressor blades and disks), cargo flooring. Weldability: Very good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
Duplex annealed [-]	891	-	950	15	124	HRC35	Typical (8Al-1Mo-1V) (#3) (Source)	
Ti-8Mo-8V-2Fe-3Al		(USA)						Wrought
Nominal composition: Al 2.6-3.4, Mo 7.5-8.5, V 7.5-8.5, Fe 1.6-2.4, O ₂ 0.16, N ₂ 0.05, H ₂ 0.015, C 0.05, Others: Total 0.4, Titanium rem.								
Identified Product forms: Sheet/strip, Forging stock/Billet, Rod, Wire								
Similar/Equivalent alloys: <i>USA:</i> UNS R58820, MIL T-9046, T-9047, F-83142								
Comments: Beta phase alloy. Weldability: Limited								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
STA [-]	1171	-	1240	8	107	HRC40	Typical (8Mo-8V-2Fe-3Al) (#3) (Source)	
Ti-10-2-3		Titanium Industries (USA)						Wrought
Approximate composition: Al 3, V 2, Fe 10, Titanium rem. Density (kg.m ⁻³) 4650								
Identified Product forms: Forging stock/Billet								
Similar/Equivalent alloys: <i>USA:</i> AMS 4983								
Comments: Beta alloy with excellent fabrication characteristics. High strength developed by heat-treatment. Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
[Not stated]	1100	-	1250	8	-	-	Typical Min. values (Source) (Titanium Industries)	
Ti-10V-2Fe-3Al		(USA)						Wrought
Nominal composition: Al 2.5-3.5, V 9.25-10.75, Fe 1.6-2.5, O ₂ 0.13, N ₂ 0.05, H ₂ 0.015, C 0.05, Others: Each 0.1 Total 0.3, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Bar, Wire								
Comments: Beta phase forging alloy. High strength, high toughness.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	
STA [-]	1150	-	1223	10	112	-	Typical (10V-2Fe-3Al) (#3) (Source)	

Ti-13V-11Cr-3Al (USA) Wrought

Nominal composition: Al 2.5-4, V 12.5-14.5, Cr 10-12, Fe 0.35, C 0.05-0.1, Titanium rem.

Identified Product forms: Plate, Sheet/strip, Forging stock/Billet, Wire

Similar/Equivalent alloys: USA: UNS R58010, AMS 4917, 4959, MIL -T-9046, T-9047, T81588, F83142; Others: AWS A5; Proprietary: Crucible Steel Co. B 120 VCA

Comments: High-strength beta-phase alloy. High strength airframe and missile applications. Little used. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA(1) [-]	1136	-	1195	8	101		Typical (13V-11Cr-3Al)	(#3)
STA(2) [-]	1207	-	1276	8	-	HRC40	Typical (13V-11Cr-3Al)	(#3)

Ti-15-3 (USA) Wrought

Nominal composition: Al 2.5-3.5, Sn 2.5-3.5, V 14-16, Cr 2.5-3.5, Fe 0.3, O₂ 0.13, N₂ 0.03, H₂ 0.015, C 0.03, Others: Each 0.1 Total 0.3, Titanium rem. **Density** (kg.m⁻³) 4780

Identified Product forms: Sheet/strip

Similar/Equivalent alloys: Proprietary: Timetal 15-3

Comments: Beta phase sheet alloy. Cold formable, weldable. Aircraft ducting and pressure vessels. Fabricated sheet metal structures up to 300°C. **Weldability:** Weldable

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	773	-	785	22	-		Typical (Ti-15-3)	(#3)
Annealed [Sheet/strip]	780	-	825	16	70		Typical (Timetal 15-3)	(Timetal)
Aged [-]	1115	-	1215	9	-		Typical (Ti-15-3)	(#3)
Aged 482°C [-]	1210	-	1300	9	107		Typical (Timetal 15-3)	(Timetal)
Aged 538°C [-]	1050	-	1160	11	103		Typical (Timetal 15-3)	(Timetal)

Ti-15-3 Titanium Industries (USA) Wrought

Approximate composition: Al 3, Sn 3, V 15, Cr 3, Titanium rem. **Density** (kg.m⁻³) 4760

Identified Product forms: Plate, Sheet/strip, Tube, Wire

Similar/Equivalent alloys: USA: AMS 4916

Comments: Beta alloy with excellent fabrication characteristics. High strength developed by heat-treatment. **Weldability:** Excellent

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	1100	-	1280	10	-		Typical Min. values	(Titanium Industries)

Ti 17 (USA) Wrought

Approximate composition: Al 5, Sn 2, Zr 2, Mo 4, Cr 4, Fe 0.3, O₂ 0.13, N₂ 0.04, H₂ 0.0125, C 0.05, Titanium rem.

Identified Product forms: Forging stock/Billet

Comments: Forgings. Alpha-rich near-Beta alloy. Good creep strength to 430°C.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
STA [-]	-	-	1173	12	-		Typical (Ti 17)	(#3)

Ti-64 Titanium Intl. (USA) Wrought

Approximate composition: Al 6, V 4, Titanium 89. **Density** (kg.m⁻³) 4420

Similar/Equivalent alloys: USA: ASTM Grade 5; Germany: ALV64; 3.7165; Proprietary: IMI 318

Comments: Alloy with high strength and fatigue resistance, reduced corrosion resistance.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [-]	825	-	895	10	-			(Bunting)

Ti-6242 (USA) Wrought

Nominal composition: Al 5.5-6.5, Sn 1.8-2.2, Zr 3.6-4.4, Mo 1.8-2.2, Fe 0.25, O₂ 0.15, N₂ 0.05, H₂ 0.0125, C 0.05, Others: Total 0.3, Titanium rem.

Similar/Equivalent alloys: Proprietary: IMI 624; Timetal 6-2-4-2

Comments: Near alpha alloy. Hydrogen limits: 0.01% max for bar/billet, 0.015% max for sheet/forgings. Good creep strength. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Duplex annealed [-]	863	-	940	15	114	HRC32	Typical (6Al-2Sn-4Zr-2Mo)	(#3)

Ti-6242S (USA) Cast Wrought

Approximate composition: Al 6, Sn 2, Zr 4, Mo 2, Si 0.08, Titanium rem.

Comments: Silicon gives additional creep resistance.

Ti Al6 V4 DIN (Germany) Wrought

Approximate composition: Al 6, V 4, Titanium rem. **Density** (kg.m⁻³) 4500

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: USA: UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical); AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; European (CEN): Ti P63 (AECMA); Ti P64001 (was Ti-P63 / C63); France: TA6V; NF L14-633 Ti P64001; Germany: TiAl6V4; Wk. 3.7165; LW. 3.7164; UK: BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; Others: AWS A5-16 (USA); Proprietary: IMI 318; Ti 318A; Timetal 6-4

Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. **Weldability:** Fair

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106		Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-		Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-		Typical (IMI 318)	(#5)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Aged [Rod]	1050	-	1140	15	-		Typ. (IMI 318) Fastener Stock	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-		Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5		Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5		Typical (Timetal 6-4)	(Timetal)

340 Titanium Alloys

Ti-Metacs TM6		TYK (Japan)					Wrought	
No composition: - Density (kg.m ⁻³) 5320								
Comments: Ceramic particle reinforced titanium metal matrix composite. High-temperature resistance, erosion and abrasion resistance. For high-temperature load-bearing parts, e.g. TC Sleeve for die-casting machinery & for molten aluminium processing, squeeze casting. Corrosion resistance: Resists molten aluminium (type ADC12)								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	-	-	441	0.5	121	45RC	Typical values	(TYK)
Ti-Metacs TS7		TYK (Japan)					Wrought	
No composition: - Density (kg.m ⁻³) 4340								
Comments: Ceramic particle reinforced titanium metal matrix composite. High-temperature resistance, erosion and abrasion resistance. High fracture toughness grade for high-temperature load-bearing parts, e.g. TC Sleeve for die-casting machinery & for molten aluminium processing, squeeze casting.								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
[Not stated]	-	-	422	0.5	111	55RC	Typical values	(TYK)
Ti P62		AECMA (Europe)					Wrought	
Approximate composition: Al 4, Mn 4, Titanium rem.								
Similar/Equivalent alloys: <u>USA:</u> ASTM B348/7, B381 F7, AMS 4925A, SAE 4AI 4Mn; <u>European (AECMA):</u> Ti P62; <u>France:</u> TA 5M; <u>UK:</u> DTD 5053, 5143; <u>Proprietary:</u> Crucible Steel Co. C130AM; IMI 314A; ICI 314A; Ti314A								
Ti P63		CEN (Europe)					Wrought	
Nominal composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.01, C 0.08 max, Others: Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>USA:</u> UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67, F136 (medical); Grade 5, AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; <u>European (CEN):</u> EN Ti P63 (<u>AECMA</u>): Ti P64001 (was Ti-P63 / C63); <u>France:</u> TA6V; NF L14-633 Ti P64001; <u>Germany:</u> TiAl6V4; Wk. 3.7165; LW. 3.7164; <u>UK:</u> BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; <u>Others:</u> AWS A5-16 (USA); <u>Proprietary:</u> IMI 318; Ti 318A; Timetal 6-4								
Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. Hydrogen limits: Bars 0.01%, Sheet, strip & plate 0.012%. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)
Ti P9001		AECMA (UK)					Wrought	
Nominal composition: Cu 2-3, Fe 0.2, O ₂ 0.2, N ₂ 0.05, H ₂ 0.01, C 0.08 (for sheet, strip & forging: H 0.012), Others: Total 0.4, Titanium rem. Density (kg.m ⁻³) 4560								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>European (CEN):</u> Ti P11 (<u>AECMA</u>): Ti P9001 (was Ti P11); <u>France:</u> T-U2; <u>Germany:</u> DIN TiCu2; LW. 3.7124; <u>UK:</u> BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263; <u>Proprietary:</u> De.Titan Tikrutan LT 25; Timetal 230; IMI 230								
Comments: Was Ti P11. RT phase type: Alpha. Useful properties to 350°C. Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [Rod]	580	-	740	20	125	-	Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-	-	Typical (IMI 230)	(#5)
Annealed [-]	510	-	620	25	112.5	-	Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-	-	Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125	-	Typical (IMI 230)	(#5)
STA [-]	600	-	760	20	112.5	-	Typical (Timetal 230)	(Timetal)
Ti P64001		NF L14-633 (France)					Wrought	
Nominal composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, N ₂ 0.03, H ₂ 0.0125, O+N 0.25, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>USA:</u> UNS R56400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical); AMS 4906, 4907, 4911, 4928L, 4930, 4932, 4934, 4935, 4954, 4965, 4967E, MIL F83142, T9046, T9047, T81556, T81915; <u>European (CEN):</u> Ti P63 (<u>AECMA</u>): Ti P64001 (was Ti-P63 / C63); <u>France:</u> TA6V; NF L14-633 Ti P64001; <u>Germany:</u> TiAl6V4; Wk. 3.7165; LW. 3.7164; <u>UK:</u> BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; <u>Others:</u> AWS A5-16 (USA); <u>Proprietary:</u> IMI 318; Ti 318A; Timetal 6-4								
Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [Rod]	1050	-	1140	15	-	-	Typ. (IMI 318) Fastener Stock	(#5)
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V)	(#3)
Annealed [Rod]	990	-	1050	15	106	-	Typical (IMI 318)	(#5)
Annealed [Sheet]	1110	-	1160	10	-	-	Typical (IMI 318)	(#5)
Hard drawn [Wire]	-	-	1410	4	-	-	Typical (IMI 318)	(#5)
Not stated [Fastener Stock]	1075	-	1205	14	-	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Rod]	885	-	985	15	112.5	-	Typical (Timetal 6-4)	(Timetal)
Not stated [Sheet]	980	-	1035	12	112.5	-	Typical (Timetal 6-4)	(Timetal)
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V)	(#3)

Ti P99001		CEN (Europe)					Wrought	
Nominal composition: Fe 0.2, O ₂ 0.2, N ₂ 0.05, H ₂ 0.0125, C 0.08, Others: Each 0.1 Total 0.6, Titanium rem.								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>European (CEN):</i> EN Ti P99001 (<i>AECMA:</i> Ti P99001 (was Ti P01); <i>France:</i> T 35; <i>Germany:</i> LW. 3.7024; <i>UK:</i> Ti P99001 (was Ti P01); DTD 5073; BS 2TA1; <i>Proprietary:</i> IMI 115; Ti 115; Timetal 35A								
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Rod]	220	-	370	40	-	-	Typical (IMI 115)	(#5)
Annealed [Sheet]	255	-	370	33	-	-	Typical (IMI 115)	(#5)
Annealed [Wire]	-	-	390	38	-	-	Typical (IMI 115)	(#5)
Not stated [-]	220	-	345	35	112.5	-	Typical (Timetal 35A)	(Timetal)

Ti P99002		CEN (Europe)					Wrought	
Nominal composition: Fe 0.25, O ₂ 0.25, N ₂ 0.05, H ₂ 0.0125, C 0.08, Others: Each 0.1 Total 0.6, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> UNS R50400, ASTM B265 (sheet, plate); B299 (sponge); B337 (tubes); B338 (heat-exchanger tubes); B348 (bars, billets); B363 (fittings); B367 (castings); B381 (forgings); B600 (cleaning); F67 (medical); F136 (medical), AMS 4902, 4941, 4942, 4951, MIL -T-9046; <i>European (CEN):</i> EN Ti P99002 (<i>AECMA:</i> Ti P99002 (was Ti P02); <i>France:</i> T 40; <i>Germany:</i> LW. 3.7034; <i>UK:</i> BS: 2TA2, 2TA3, 2TA4, 2TA5; DTD 5013B, 5033B, 5183, 5293; <i>Proprietary:</i> IMI 125; Timetal 50A								
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Rod]	305	-	460	28	-	-	Typical (IMI 125)	(#5)
Annealed [Sheet]	340	-	460	30	-	-	Typical (IMI 125)	(#5)
Annealed [Tube]	325	-	480	35	-	-	Typical (IMI 125)	(#5)

Ti P99003		CEN (Europe)					Wrought	
Nominal composition: Fe 0.35, O ₂ 0.4, N ₂ 0.05, H ₂ 0.0125, C 0.08 max, Others: Each 0.1 Total 0.6, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>USA:</i> UNS R50700, ASTM B265 Grade 4, AMS 4901, 4921, MIL -T-9046, -T-9047; <i>European (CEN):</i> EN Ti P99003 (<i>AECMA:</i> Ti P99003 (was Ti P04); <i>France:</i> T 60; <i>Germany:</i> Wk. 3.7065; LW 3.7064; <i>UK:</i> BS: 2TA6; <i>Proprietary:</i> IMI 155; Timetal 75A								
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Annealed [Sheet]	540	-	640	24	-	-	Typical (IMI 155)	(#5)

Tikrutan LT 24		Deutsche Titan (Germany)					Wrought	
Proprietary composition: Al 5.5-6.5, Sn 1.8-2.2, Zr 3.6-4.4, Mo 1.8-2.2, Si 0.06-0.12, Fe 0.25, O ₂ 0.15, N ₂ 0.05, H ₂ 0.015, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4550								
Similar/Equivalent alloys: <i>USA:</i> AMS 4976, 4975; <i>Germany:</i> DIN TiAl6Sn2Zr4Mo2, Wk. 3.7145, LW 3.7144; <i>Proprietary:</i> IMI 624								
Comments: RT phase type: Alpha (+ Beta). Good creep strength. Weldability: Fair								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [t < 100mm]	820	-	890	8	114	-	Minimum values	(Deutsche Titan)
Duplex annealed [-]	863	-	940	15	114	HRC32	Typical (6Al-2Sn-4Zr-2Mo)	(#3)

Tikrutan LT 25		Deutsche Titan (Germany)					Wrought	
Proprietary composition: Cu 2-3, Fe 0.2, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.1, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4560								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P11 (<i>AECMA:</i> Ti P9001 (was Ti P11); <i>France:</i> T-U2; <i>Germany:</i> DIN TiCu2, LW 3.7124; <i>UK:</i> BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD 5123, 5133, 5233, 5243, 5253, 5263; <i>Proprietary:</i> Timetal 230; IMI 230								
Comments: RT phase type: Alpha. Useful properties to ~350°C. Weldability: Good								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [Rod]	580	-	740	20	125	-	Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-	-	Typical (IMI 230)	(#5)
Aged [t < 80mm]	540	-	650	10	113	-	Minimum values	(Deutsche Titan)
Aged [t 0.4-6mm]	550	-	690	10	113	-	Minimum values	(Deutsche Titan)
Annealed [-]	510	-	620	25	112.5	-	Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-	-	Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125	-	Typical (IMI 230)	(#5)
Annealed [t < 80mm]	400	-	540	16	113	-	Minimum values	(Deutsche Titan)
Annealed [t 0.4-6mm]	460	-	540	15	113	-	Minimum values	(Deutsche Titan)
STA [-]	600	-	760	20	112.5	-	Typical (Timetal 230)	(Timetal)

Tikrutan LT 26		Deutsche Titan (Germany)					Wrought	
Proprietary composition: Al 5.7-6.3, Zr 4-6, Mo 0.25-0.75, Si 0.1-0.4, Fe 0.2, O ₂ 0.19, N ₂ 0.05, H ₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4450								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <i>European (CEN):</i> Ti P67 (<i>AECMA:</i> Ti P67; <i>France:</i> T-A6Zr5D; T-A6ZD; <i>Germany:</i> DIN TiAl6Zr5Mo0.5Si, Wk. 3.7155, LW 3.7154; <i>UK:</i> BS: TA43, TA44; <i>Proprietary:</i> Timetal 685; IMI 685								
Comments: Near alpha alloy. Medium strength alloy. Useful creep resistance to ~520°C. Good forging characteristics. Weldability: Weldable								
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [t 10-65mm]	880	-	950	6	125	-	Minimum values	(Deutsche Titan)
Beta ht + OQ + Age 550°C/24hr. [-]	787	-	900	8	125	-	Typical (IMI 685)	(#3)
Fully heat-treated [Rod]	920	-	1020	11	124	-	Typical (IMI 685)	(#5)

342 Titanium Alloys

Tikrutan LT 27		Deutsche Titan (Germany)						Cast Wrought
Proprietary composition: Mo 0.2-0.4, Fe 0.25, O ₂ 0.25, N ₂ 0.03, H ₂ 0.013, Ni 0.6-0.9, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Wire								
Similar/Equivalent alloys: <u>USA:</u> ASTM Grade 12; <u>Germany:</u> DIN TiNiMo083, Wk. 3.7105; <u>Proprietary:</u> IMI Code 12, Timetal Code 12								
Comments: Better corrosion resistance and strength than CP titanium grades. Chemical industry. Corrosion resistance: Very good Weldability: Good								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Typical values [-]	360	-	480	18	105	HB 170	(Deutsche Titan)	
Tikrutan LT 31		Deutsche Titan (Germany)						Wrought
Proprietary composition: Al 5.5-6.75, V 3.5-4.5, Fe 0.3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4430								
Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>USA:</u> UNS R56400, ASTM Grade 5, AMS 4906, 4907, 4911, 4928, 4930, 4932, 4934, 4935, 4954, 4965, 4967, MIL F83142, T-9046, T-9047, T81556, T81915; <u>European (CEN):</u> Ti-P63 (AECMA): Ti P64001 (was Ti-P63 / C63); <u>France:</u> TA6V; NF L14-633 Ti P64001; <u>Germany:</u> DIN TiAl6V4, Wk. 3.7165, LW 3.7164; <u>UK:</u> BS: 2TA10, 2TA11, 2TA12, 2TA13, 2TA28, TA56, TA59; DTD 5163, 5173, 5303, 5313, 5323, 5363; <u>Others:</u> AWS A5-16; <u>Proprietary:</u> IMI 318								
Comments: Alpha-Beta phase alloy. Most widely used titanium alloy type. Mill annealed or beta annealed, sometimes solution treated and aged. Useful creep resistance to 300°C and excellent fatigue strength. Jet engine parts, structural airframe components, prosthetic implants, chemical processing equipment. Weldability: Fair								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Aged [t < 13mm]	1030	-	1100	8	110		Minimum values (Deutsche Titan)	
Aged [t < 25mm]	1000	-	1070	8	110		Minimum values (Deutsche Titan)	
Annealed [-]	877	-	947	14	114	HRC36	Typical (6Al-4V) (#3)	
Annealed [t < 80mm]	830	-	900	10	110	HB 310	Minimum values (Deutsche Titan)	
Annealed [t 0.6-6mm]	870	-	920	8	110	HB 310	Minimum values (Deutsche Titan)	
Annealed [t 80-150mm]	830	-	900	8	110	HB 310	Minimum values (Deutsche Titan)	
STA [-]	1103	-	1172	10	-	HRC41	Typical (6Al-4V) (#3)	
Tikrutan LT 33		Deutsche Titan (Germany)						Wrought
Proprietary composition: Al 5-6, Sn 1.5-2.5, V 5-6, Cu 0.35-1, Fe 0.35-1, O ₂ 0.2, N ₂ 0.04, H ₂ 0.015, C 0.05, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4540								
Similar/Equivalent alloys: <u>USA:</u> UNS R56620, MIL -T-9047, F83142; <u>European (CEN):</u> Ti P64 (AECMA): Ti P64; <u>Germany:</u> DIN TiAl6V6Sn2, Wk. 3.7175, LW 3.7174; <u>Proprietary:</u> Timetal 6-6-2; IMI 662								
Comments: RT phase type: Alpha + Beta. Greater strength than Ti-6Al-4V but reduced fracture toughness and fatigue properties. Useful to 315°C. Rocket motor case, airframe and forged applications. Weldability: Limited								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Aged [t < 25mm]	1100	-	1200	6	116		Minimum values (Deutsche Titan)	
Annealed [-]	985	-	1050	14	110	HRC38	Typical (6Al-6V-2Sn) (#3)	
Annealed [-]	1005	-	1090	10	115		Typical (Timetal 6-6-2) (Timetal)	
Annealed [t < 100mm]	930	-	1000	8	116	HB 320	Minimum values (Deutsche Titan)	
Annealed [t 0.6-6mm]	1000	-	1070	10	116	HB 320	Minimum values (Deutsche Titan)	
STA [-]	1172	-	1276	10	-	HRC42	Typical (6Al-6V-2Sn) (#3)	
STA [-]	1105	-	1205	8	115		Typical (Timetal 6-6-2) (Timetal)	
Tikrutan LT 34		Deutsche Titan (Germany)						Wrought
Proprietary composition: Al 3-5, Sn 1.5-2.5, Mo 3-5, Si 0.3-0.7, Fe 0.2, O ₂ 0.25, N ₂ 0.05, H ₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4600								
Identified Product forms: Extrusion, Forging stock/Billet, Rod, Bar								
Similar/Equivalent alloys: <u>European (CEN):</u> Ti P68 (AECMA): Ti P68; <u>France:</u> TA4DE; <u>Germany:</u> DIN TiAl4Mo4Sn2Si, Wk. 3.7185, LW 3.7184; <u>UK:</u> BS: TA45, TA46, TA47, TA48, TA49, TA50, TA51, TA57; DTD 5103, 5153, 5203; <u>Proprietary:</u> Timetal 550; IMI 550; Ti550								
Comments: RT phase type: Alpha + Beta. High strength alloy. Useful creep resistance to 400°C.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Aged [t < 25mm]	960	-	1100	9	117		Minimum values (Deutsche Titan)	
Aged [t 100-150mm]	870	-	1000	9	117		Minimum values (Deutsche Titan)	
Aged [t 25-100mm]	920	-	1050	9	117		Minimum values (Deutsche Titan)	
Annealed [t 6-65mm]	900	-	1030	9	117	HB 350	Minimum values (Deutsche Titan)	
Fully heat-treated [Rod]	1070	-	1200	14	116		Typical (IMI 550) (#5)	
ST [-]	930	-	1080	12	115		Typical (Timetal 550) (Timetal)	
ST 900°C+AC+Aged [25mm]	940	-	1100	7	115		Typical (IMI 550) (#3)	
STA [-]	1070	-	1200	14	115		Typical (Timetal 550) (Timetal)	
Tikrutan LT 35		Deutsche Titan (Germany)						Wrought
Proprietary composition: Al 4.5-5.5, Fe 2-3, O ₂ 0.2, N ₂ 0.05, H ₂ 0.015, C 0.08, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4450								
Similar/Equivalent alloys: <u>Germany:</u> DIN TiAl5Fe2.5, Wk. 3.7110								
Comments: RT phase type: Alpha + Beta.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Annealed [t < 160mm]	780	-	860	8	116		Minimum values (Deutsche Titan)	
Annealed [t < 80mm]	780	-	860	10	116		Minimum values (Deutsche Titan)	
Annealed [t 6-50mm]	780	-	860	8	116	HB 310	Minimum values (Deutsche Titan)	
Tikrutan RT 12		Deutsche Titan (Germany)						Wrought
Proprietary composition: Fe 0.15, O ₂ 0.12, N ₂ 0.05, H ₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500								
Identified Product forms: Plate, Sheet/strip, Tube, Pipe, Extrusion, Forging stock/Billet, Rod, Bar, Wire								
Similar/Equivalent alloys: <u>European (AECMA):</u> Ti P01; <u>France:</u> T 35; <u>Germany:</u> DIN Ti 1, Wk. 3.7025, LW 3.7024; <u>UK:</u> BS: TA1; DTD 5013; <u>Proprietary:</u> IMI 115								
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u> (Source)	
Typical values [-]	190	-	350	27	105	HB 120	(Deutsche Titan)	

Tikrutan RT 12 Pd	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.15, O ₂ 0.12, N ₂ 0.05, H ₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>USA:</i> ASTM B265, 337, 338, 348, 381; Grade 11; <i>Germany:</i> DIN Ti 1 Pd, Wk. 3.7225; <i>Proprietary:</i> IMI 260		
Comments: Pd additions increase corrosion resistance to certain media. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Typical values [-]	190 - 350 27 105 HB 120	(Deutsche Titan)
Tikrutan RT 15	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.2, O ₂ 0.18, N ₂ 0.05, H ₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>USA:</i> UNS R50400, ASTM Grade 2, AMS 4902, 4941, 4942, 4951, MIL -T-9046; <i>European (CEN):</i> Ti P99002 (AECMA); Ti P99002 (was Ti P02); <i>France:</i> T 40; <i>Germany:</i> DIN Ti 2, Wk. 3.7035, LW 3.7034; <i>UK:</i> BS: 2TA2, 2TA3, 2TA4, 2TA5; DTD 5013B, 5033B, 5183, 5293; <i>Proprietary:</i> IMI 125; Timetal 50A		
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Annealed [Rod]	305 - 460 28 -	Typical (IMI 125) (#5)
Annealed [Sheet]	340 - 460 30 -	Typical (IMI 125) (#5)
Annealed [Tube]	325 - 480 35 -	Typical (IMI 125) (#5)
Typical values [-]	260 - 465 22 105 HB 150	(Deutsche Titan)
Tikrutan RT 15 Pd	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.2, O ₂ 0.18, N ₂ 0.05, H ₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>USA:</i> ASTM Grade 7; <i>Germany:</i> DIN Ti 2 Pd, Wk. 3.7235; <i>Proprietary:</i> IMI 262		
Comments: Pd additions increase corrosion resistance to certain media. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Typical values [-]	260 - 465 22 105 HB 150	(Deutsche Titan)
Tikrutan RT 18	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.25, O ₂ 0.25, N ₂ 0.05, H ₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>USA:</i> UNS R50500, ASTM Grade 3, AMS 4900, MIL -T-9046; <i>France:</i> T 50; <i>Germany:</i> DIN Ti 3, Wk. 3.7055; <i>UK:</i> DTD 5003B, 5023C, 5193, 5283, 5293; <i>Proprietary:</i> IMI 130; Timetal 65A		
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Annealed [Rod]	360 - 540 24 105	Typical (IMI 130) (#5)
Annealed [Sheet]	420 - 540 25 -	Typical (IMI 130) (#5)
Annealed [Wire]	- - 550 24 -	Typical (IMI 130) (#5)
Hard drawn [Wire]	- - 700 11.5 -	Typical (IMI 130) (#5)
Typical values [-]	335 - 525 18 105 HB 170	(Deutsche Titan)
Tikrutan RT 18 Pd	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.25, O ₂ 0.25, N ₂ 0.05, H ₂ 0.013, C 0.06, Pd 0.15-0.25, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>Germany:</i> DIN Ti 3 Pd, Wk. 3.7255		
Comments: Pd additions increase corrosion resistance to certain media. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Typical values [-]	335 - 525 18 105 HB 170	(Deutsche Titan)
Tikrutan RT 20	Deutsche Titan (Germany)	Wrought
Proprietary composition: Fe 0.3, O ₂ 0.35, N ₂ 0.05, H ₂ 0.013, C 0.06, Others: Each 0.1 Total 0.4, Titanium rem. Density (kg.m ⁻³) 4500		
Similar/Equivalent alloys: <i>USA:</i> UNS R50700, ASTM Grade 4, AMS 4901, 4921, MIL -T-9046, T-9047; <i>European (CEN):</i> Ti P99003 (AECMA); Ti P99003 (was Ti P04); <i>France:</i> T 60; <i>Germany:</i> DIN Ti 4, Wk. 3.7065, LW 3.7064; <i>UK:</i> BS: 2TA6; <i>Proprietary:</i> IMI 155; Timetal 75A		
Comments: Commercial purity. For corrosion resistance in chemical and marine applications. Sheet formed aircraft components. Very good formability. Corrosion resistance: Very good Weldability: Good		
Condition [Form]	PS (MPa) YS (MPa) UTS (MPa) El (%) E (GPa) Hardness Notes	(Source)
Annealed [Sheet]	540 - 640 24 -	Typical (IMI 155) (#5)
Typical values [-]	400 - 640 16 105 HB 200	(Deutsche Titan)
Titanium/Aluminium	Goodfellow (UK)	Powder
Proprietary composition: Al 12, Ti 88, Titanium rem.		
Comments: Specialist product. Mean particle size: 75 microns. Melting point: 1660°C. Range of other titanium alloy powders, wires and foils.		
Titanium/Aluminium	Goodfellow (UK)	Powder
Proprietary composition: Al 35, Ti 65, Titanium rem.		
Comments: Specialist product. Mean particle size: 75 microns. Melting point: 1480°C. Range of other titanium alloy powders, wires and foils.		
Titanium/Aluminium	Goodfellow (UK)	Powder
Proprietary composition: Al 22, Ti 78, Titanium rem.		
Comments: Specialist product. Mean particle size: 75 microns. Melting point: 1600°C. Range of other titanium alloy powders, wires and foils.		
TL10	Otto Fuchs (Germany)	Wrought
Approximate composition: Al, Fe, Titanium rem.		
TL20	Otto Fuchs (Germany)	Wrought
Approximate composition: Cu 2, Titanium rem.		

344 Titanium Alloys

T-U2 NF (France) Wrought

Approximate composition: Cu 2.5, Titanium rem. **Density** (kg.m⁻³) 4560

Identified Product forms: Plate, Sheet/strip, Extrusion, Forging stock/Billet, Rod, Bar, Wire

Similar/Equivalent alloys: *European (CEN):* Ti P11 (*AECMA*): Ti P9001 (was Ti P11); *France:* T-U2; *Germany:* DIN TiCu2; Wk. 3.7124; *UK:* BS: 2TA21, 2TA22, 2TA23, 2TA24, 2TA52, 2TA53, 2TA54, 2TA55, 2TA58; DTD: 5123, 5133, 5233, 5243, 5253, 5263; *Proprietary:* De.Titan Tikrutan LT 25; Timetal 230

Comments: RT phase type: Alpha. Useful properties to ~350°C. **Weldability:** Good

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Aged [Rod]	580	-	740	20	125		Typical (IMI 230)	(#5)
Aged [Sheet]	670	-	770	20	-		Typical (IMI 230)	(#5)
Annealed [-]	510	-	620	25	112.5		Typical (Timetal 230)	(Timetal)
Annealed [Rod]	500	-	630	24	-		Typical (IMI 230)	(#5)
Annealed [Sheet]	520	-	620	24	125		Typical (IMI 230)	(#5)
STA [-]	600	-	760	20	112.5		Typical (Timetal 230)	(Timetal)

VT51 (Russia) Wrought

Nominal composition: Al 4-5, Sn 2-3, Si 0.15, Fe 0.3, O₂ 0.02, N₂ 0.05, H₂ 0.015, C 0.1, Titanium rem.

Similar/Equivalent alloys: *USA:* UNS R54521, AMS 4909, 4924; *Russia (CIS):* VT51

Beryllium Alloys

AlbeMet AM162	Brush Wellman (USA)						Wrought	
Proprietary composition: Al 36-40, O ₂ 1, C 0.1 max., Others: Each 0.2, Beryllium 62 min. Density (kg.m ⁻³) 2096								
Identified Product forms: Sheet/strip, Extrusion								
Comments: Aluminium-Beryllium alloy extruded bar and rolled sheet.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
24hrs/593°C [Rolled Sheet]	-	276	379	5	-	-	-	(Brush Wellman)
24hrs/593°C [Type 1 Extruded bar]	-	276	358	6	-	-	Type 1: extrusion ratio 4.0-7.0	(Brush Wellman)
24hrs/593°C [Type 2 Extruded bar]	-	276	379	7	-	-	Type 2: extrusion ratio >7.0	(Brush Wellman)
AlbeMet AM162 Extruded Bar	Brush Wellman (USA)						Wrought	
Proprietary composition: Al 36-40, O ₂ 1, C 0.1, Others: Each 0.2, Beryllium 60-64. Density (kg.m ⁻³) 2097								
Identified Product forms: Extrusion								
Similar/Equivalent alloys: <u>USA:</u> AMS (pending); <u>Others:</u> USA DoD: Be38Al Lockalloy; <u>Proprietary:</u> Lockalloy								
Comments: Extrusion: Type I - extrusion ratio 4.0<7.0; Type II - extrusion ratio >7.0								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
593+/-25°C/24 hrs [Type I - Extruded bar]	-	276	358	6	-	-	ASTM E-8; MAB-205M	(Brush Wellman)
593+/-25°C/24 hrs [Type II - Extruded bar]	-	276	379	7	-	-	ASTM E-8; MAB-205M	(Brush Wellman)
AlbeMet AM162 Rolled Sheet	Brush Wellman (USA)						Wrought	
Proprietary composition: Al 36-40, O ₂ 1, C 0.1, Others: Each 0.2, Beryllium 60-64. Density (kg.m ⁻³) 2097								
Identified Product forms: Sheet/strip								
Similar/Equivalent alloys: <u>USA:</u> AMS (pending); <u>Others:</u> USA DoD: Be38Al Lockalloy; <u>Proprietary:</u> Lockalloy								
Comments: Rolled Sheet								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
593+/-25°C/24 hrs [Rolled Sheet]	-	276	379	5	-	-	ASTM E-8; MAB-205M	(Brush Wellman)
AlbeMet AM162H	Brush Wellman (USA)						Wrought	
Proprietary composition: Al 36-40, O ₂ 1, C 0.1, Others: Each 0.2, Beryllium 60-64. Density (kg.m ⁻³) 2097								
Similar/Equivalent alloys: <u>USA:</u> AMS (pending)								
Comments: HIP billet								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
593+/-25°C/24 hrs [Billet]	-	193	262	2	-	-	ASTM E-8; MAB-205M, RT min.	(Brush Wellman)
B-26-D	Brush Wellman (USA)						Cast	
No composition: - Density (kg.m ⁻³) 1850								
Identified Product forms: Ingot								
Comments: Standard mill product: available as ingot, lump, chips.								
I-220B	Brush Wellman (USA)						Wrought	
Proprietary composition: BeO 2.2 max., Beryllium 98 min.								
Comments: Vacuum Hot-pressed. Optical Grade. Instrument Grade (Standard). Max. ppm: Al 1000, C 1500, Fe 1500, Mg 800, Si 800, Other, each max: 400. Used for inertial guidance systems.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Not stated [Instrument Grade]	-	337.8	439.2	2.6	-	-	Microyield 49.6 MPa	(Brush Wellman)
Not stated [Vacuum Hot Pressed]	-	276	379	2	-	-	Microyield 34 MPa typ.	(Brush Wellman)

346 Beryllium Alloys

I-220B	Brush Wellman (USA)						Wrought
Proprietary composition: BeO 2.2 max., Beryllium 98 min. Density (kg.m ⁻³) 1850							
Comments: Instrument Grade. Optical Grade. Max ppm: Al 1000, C 1500, Fe 1500, Mg 800, Si 800. Other metallic impurities max. each: 400. Vacuum Hot-pressed. Standard size: 81cm dia. x 76cm.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
Not Stated [Instrument Grade]	340	-	439.2	2.6	-	-	Microyield 49.6MPa. RT values. (Brush Wellman)
Not Stated [Vacuum Hot-pressed Block]	276	-	379	2	-	-	Microyield 34MPa min. (Brush Wellman)
I-250	Brush Wellman (USA)						Wrought
Proprietary composition: BeO 4.2 min., Beryllium 94 min.							
Comments: Hot isostatically Pressed. Instrument Grade. Max. ppm: Al 1600, C 2500, Fe 2500, Mg 800, Si 800, Other, each max: 1000. High micro-yield strength. Improved dimensional stability compared with other I-grades. More isotropic properties.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
Not stated [Instrument Grade]	520	517.3	620.5	3	-	-	Microyield 96.4 MPa (Brush Wellman)
Not stated [Near-Net Shapes]	-	483	586	2	-	-	Min. values. Microyield 97 MPa min. (Brush Wellman)
I-400	Brush Wellman (USA)						Wrought
Proprietary composition: BeO 4.2 min., Beryllium 94 min.							
Comments: Vacuum Hot-pressed. Instrument Grade (Standard) Max. ppm: Al 1600, C 2500, Fe 2500, Mg 800, Si 800, Other, each max: 1000. Used for inertial guidance systems. Standard size: 81 dia. x 56cm.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
Not stated [Instrument Grade]	-	-	517.1	0.5	-	-	Microyield 96.4 MPa (Brush Wellman)
Not stated [Vacuum Hot Pressed]	-	-	345	-	-	-	Microyield 62 MPa typ. (Brush Wellman)
I-70A	Brush Wellman (USA)						Wrought
Proprietary composition: BeO 0.7 max., Beryllium 99 min. Density (kg.m ⁻³) 1850							
Comments: Max ppm: Al 700, C 700, Fe 1000, Mg 700, Si 700. Other metallic impurities max. each: 400. Vacuum Hot-pressed Grade. Standard size: 81cm dia. x 76cm.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
Not Stated [Vacuum Hot-pressed Block]	172	-	241	2	-	-	Microyield 12.4 MPa min. typ. (Brush Wellman)
I-70B	Brush Wellman (USA)						Wrought
Proprietary composition: BeO, Beryllium rem. Density (kg.m ⁻³) 1850							
Comments: Optical Grade. Guaranteed minimum micro-yield. Used for mirrors with an electroless nickel hard-polished surface. For visible & infrared wavelengths. High resistance to permanent deformation due to high g-loading or other working stress.							
Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes (Source)
Not stated [Optical Grade]	-	-	-	-	303	-	Microyield 15-110 MPa (Brush Wellman)
IF-1	Brush Wellman (USA)						Wrought
Proprietary composition: BeO 0.03 max., Beryllium 99.8 min.							
Identified Product forms: Foil							
Comments: Highest purity grade foil. Max. ppm: Al 100, B 3, Cd 2, Ca 200, C 300, Cr 25, Co 5, Cu 50, Fe 300, Pb 5, Mg 60, Mn 30, Mo 10, Ni 200, Si 100, Ag 5, Ti 10, Zn 100. Gauge thickness: 0.008-0.508mm. Radiation source/detector windows.							
IP-70	Brush Wellman (USA)						Powder
Proprietary composition: BeO 0.7 max., Beryllium 98 min. Density (kg.m ⁻³) 1850							
Identified Product forms: Foil							
Comments: Max ppm: Al 700, C 700, Fe 100, Mg 700, Si 700. Other metallic impurities max. each: 400. Impact ground powder. Particle size 95%-, 325 mesh. Vacuum hot-pressed blocks for wrought material manufacture. Other powder metallurgy processes (pressing & sintering, extrusion, forging, rolling, explosive compaction).							

O-50 Brush Wellman (USA) Powder

Proprietary composition: BeO 0.5 max., Beryllium rem. **Density** (kg.m⁻³) 1850

Comments: Optical Grade. HIP Grade.

- Impact ground powder, hot isostatically pressed.
- Lowest BeO content.
- Developed to replace I-70B as standard grade for bare-polished Be optics.
- Reflectivity 98.5% at 8-12 micron wavelengths, decreased scatter.
- More isotropic properties than previous optical grades.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [HIP Grade]	-	-	241	2	-	-	Microyield 10 MPa min.	(Brush Wellman)
Not stated [Near-Net Shapes (HIP)]	-	172	241	2	-	-	Min. values. Microyield 10 MPa min.	(Brush Wellman)
Not stated [Optical Grade]	-	-	-	-	303	-	Microyield 15-110 MPa	(Brush Wellman)

PF-60 Brush Wellman (USA) Wrought

Proprietary composition: BeO 0.8 max., Beryllium 99 min. **Density** (kg.m⁻³) 1850

Identified Product forms: Foil

Comments: Foil (Gauge: 0.008-3.175mm) produced from vacuum hot-pressed block.

- Max ppm: Al 500, B 3, Cd 2, Ca 100, C 700, Cr 100, Co 10, Cu 100, Fe 700, Pb 20, Li 3, Mg 500, Mn 120, Mo 20, N 400, Ni 200, Si 400, Ag 10.
- Highest purity gauge foil.
- Radiation source/detector windows.

PR-200 Brush Wellman (USA) Wrought

Proprietary composition: Al 0.16, Si 0.08, Fe 0.18, Mg 0.08, BeO 2 max. C 0.15, Others: Each 0.04, Beryllium 98 min.

Identified Product forms: Plate

Comments: Hot-rolled sheet from S-200E vacuum hot-pressed block (steel canned). Cross-rolled.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Plate 11.431-15.240 mm]	-	275.8	413.7	3	-	-	Minimum values	(Brush Wellman)
Not stated [Plate 6.351-11.430 mm]	-	310.3	448.2	4	-	-	Minimum values	(Brush Wellman)

PR-200E Brush Wellman (USA) Wrought

Proprietary composition: Beryllium rem. **Density** (kg.m⁻³) 1850

Identified Product forms: Plate

Comments: Plate produced by warm rolling S-200E vacuum hot-pressed block encased in steel.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not Stated [Plate (11.431-15.240mm)]	275.8	-	413.7	3	-	-	Min. values	(Brush Wellman)
Not Stated [Plate (6.351-11.430mm)]	310.3	-	448.2	4	-	-	Min. values	(Brush Wellman)

S-200 Brush Wellman (USA) Wrought

Proprietary composition: BeO 1.5 max., Beryllium 99.5 min.

Identified Product forms: Tube, Extrusion

Comments: Extruded from steel canned hot-pressed block.

- Max. ppm: Al 1000, C 1500, Fe 1300, Mg 800, Si 600, Other, each max: 400.
- Frame & truss structures for spacecraft subsystems.
- Fuel cladding.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	EI (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [Rod 25.4-63.5 mm dia.]	-	345	745	10	-	-	Longitudinal Direction	(Brush Wellman)
Not stated [Rod 25.4-63.5 mm dia.]	-	372	434	0.6	-	-	Radial Direction	(Brush Wellman)
Not stated [Rod 25.4-63.5 mm dia.]	-	393	455	0.6	-	-	Circumferential Direction	(Brush Wellman)
Not stated [Rod 9.5-12.7 mm dia.]	-	414	765	10	-	-	Longitudinal Direction	(Brush Wellman)
Not stated [Tube 116.8 OD/81.3 ID mm]	-	331	717	11	-	-	Longitudinal Direction	(Brush Wellman)
Not stated [Tube 116.8 OD/81.3 ID mm]	-	324	393	0.7	-	-	Circumferential Direction	(Brush Wellman)
Not stated [Tube 165.1 OD/94.0 ID mm]	-	352	655	13	-	-	Longitudinal Direction	(Brush Wellman)
Not stated [Tube 165.1 OD/94.0 ID mm]	-	345	427	1	-	-	Circumferential Direction	(Brush Wellman)
Not stated [Tube 165.1 OD/94.0 ID mm]	-	324	414	0.7	-	-	Radial Direction	(Brush Wellman)
Not stated [Tube 30.5 OD/20.3 ID mm]	-	434	800	9	-	-	Longitudinal Direction	(Brush Wellman)
Not stated [Tube 63.5 OD/33.0 ID mm]	-	379	765	9	-	-	Longitudinal Direction	(Brush Wellman)

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S-200F Brush Wellman (USA) Wrought

Proprietary composition: BeO 1.5 max., Beryllium 99.5 min.

Comments: Vacuum Hot-pressed.

Structural Grade (Standard Purity).

Optical Grade.

Max. ppm: Al 1000, C 1500, Fe 1300, Mg 800, Si 600, Other, each max: 400.

Used for machined parts. Inertial guidance systems. Missile interstages. Optical substrates. Spacecraft structures. Small rocket nozzles.

Standard size: 81cm dia. x 114cm.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not stated [SF-200FC (CIP/sintered)]	-	231	319	3	-	-		(Brush Wellman)
Not stated [SF-200FH (HIP)]	-	276	414	2	-	-	Microyield 27-41 MPa typ.	(Brush Wellman)
Not stated [Vacuum Hot Pressed]	-	241	324	2	-	-	Microyield 27 MPa typ.	(Brush Wellman)

S-200FC Brush Wellman (USA) Wrought

Proprietary composition: BeO 1.5 max., Beryllium 99.5 min.

Comments: Structural Grade (Standard Purity).

Near-net shapes by cold isostatic pressing + sintering.

Max. ppm: Al 1000, C 1500, Fe 1300, Mg 800, Si 600, Other, each max: 400.

Used for machined parts.

Inertial guidance systems. Missile interstages. Optical substrates. Spacecraft structures. Small rocket nozzles.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
CIP + sintering [Near Net Shapes]	-	231	319	3	-	-	Typical properties	(Brush Wellman)

S-200FH Brush Wellman (USA) Wrought

Proprietary composition: BeO 1.5 max., Beryllium 99.5 min.

Comments: Structural Grade (Standard Purity).

Near-net shapes by HIP.

Max. ppm: Al 1000, C 1500, Fe 1300, Mg 800, Si 600, Other, each max: 400.

Used for machined parts.

Inertial guidance systems. Missile interstages. Optical substrates. Spacecraft structures. Small rocket nozzles.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
HIP [Near Net Shapes]	-	276	414	2	-	-	Min. values. Microyield 27-41 MPa min.	(Brush Wellman)

S-65B Brush Wellman (USA) Wrought

Proprietary composition: BeO 1.0 max., Beryllium 99 min. **Density** (kg m⁻³) 1850

Comments: Structural Grade. Max. ppm: Al 600, C 1000, Fe 800, Mg 600, Si 600. Other metallic impurities max. each: 400.

Vacuum Hot-pressed.

Used in window frames. Umbilical doors. Space Shuttle navigational base.

Standard size: 81cm dia. x 76cm.

Condition [Form]	PS (MPa)	YS (MPa)	UTS (MPa)	El (%)	E (GPa)	Hardness	Notes	(Source)
Not Stated [Vacuum Hot-pressed Block]	207	-	290	3	-	-	Min. values	(Brush Wellman)

SP-200F Brush Wellman (USA) Powder

Proprietary composition: BeO 1.5 max., Beryllium 98.5 min. **Density** (kg m⁻³) 1850

Identified Product forms: Foil

Comments: Max. ppm: Al 1000, C 1500, Fe 1300, Mg 800, Si 600. Other metallic impurities max. each: 400.

Impact ground powder. Particle size 95% - 325 mesh.

Vacuum hot pressed blocks for wrought material manufacture.

Other powder metallurgy processes (pressing & sintering, extrusion, forging, rolling, explosive compaction).

SP-65 Brush Wellman (USA) Powder

Proprietary composition: BeO 1 max., Beryllium 99 min. **Density** (kg m⁻³) 1850

Identified Product forms: Foil

Comments: Highest purity grade.

Max. ppm: Al 600, C 1000, Fe 800, Mg 600, Si 600, B 2, Cd 2, Ca 100, Cr 100, Co 10, Cu 150, Pb 20, Li 3, Mn 120, Mo 20, Ni 300, N 300, Ag 10. Other metallic impurities, each 200 max.

Impact ground powder. Particle size 95% - 325 mesh.

Used for X-ray sources & detector windows.

Vacuum hot pressed blocks for wrought material manufacture.

Other powder metallurgy processes (pressing & sintering, extrusion, forging, rolling, explosive compaction).

SR-200		Brush Wellman (USA)					Wrought	
Proprietary composition: Al 0.16, Si 0.08, Fe 0.18, Mg 0.08, BeO 2 max. C 0.15, Others: Each 0.04, Beryllium 98 min. Density (kg.m ⁻³) 1850								
Identified Product forms: Sheet/strip								
Comments: Hot-rolled sheet from S-200E vacuum hot-pressed block (steel cased). Cross-rolled. Electronic grade (combined heat-sink & structural supports for surface mount/IC assemblies in military electronics/avionics systems.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Not stated [Sheet 0.533-0.762mm]	-	344.7	482.6	10	-		Minimum values	(Brush Wellman)
Not stated [Sheet 0.763-3.175 mm]	-	344.7	482.6	10	-		Minimum values	(Brush Wellman)
Not stated [Sheet 3.176-6.350 mm]	-	344.7	482.6	10	-		Minimum values	(Brush Wellman)

SR-200E		Brush Wellman (USA)					Wrought	
No composition: - Density (kg.m ⁻³) 1850								
Identified Product forms: Sheet/strip								
Comments: Sheet produced by warm rolling S-200E vacuum hot-pressed block encased in steel.								
<u>Condition [Form]</u>	<u>PS (MPa)</u>	<u>YS (MPa)</u>	<u>UTS (MPa)</u>	<u>EI (%)</u>	<u>E (GPa)</u>	<u>Hardness</u>	<u>Notes</u>	<u>(Source)</u>
Not Stated [Sheet (0.533-0.762mm thick)]	344.7	-	482.6	10	-		Min. values	(Brush Wellman)
Not Stated [Sheet (0.763-3.175mm)]	344.7	-	482.6	10	-		Min. values	(Brush Wellman)
Not Stated [Sheet (3.176-6.350mm)]	344.7	-	482.6	10	-		Min. values	(Brush Wellman)

Part 4 : Appendices

APPENDIX A : STANDARDS

A compilation of international, national and industry standards and specifications commonly quoted within the light-metals industries. Grouped by base-metal, then listed by organisation and their reference code.

APPENDIX B : PRIMARY ALUMINIUM PRODUCTION

A summary of primary aluminium smelters by country, giving their location and an indication of their capacity (in tonnes).

APPENDIX C : GLOSSARY

A list of terms commonly used in the light metal industry. They are a mixture of those used to describe the materials themselves (metallurgical) and their processing, production and characteristics.

APPENDIX D : VOCABULARY

Multilingual listing of key words in English-French-German-Italian-Spanish

APPENDIX E : CONVERSION FACTORS

Conversion factors for quantities commonly found in light-alloy data sheets and manufacturers' literature.

Appendix A : Standards

This section contains a compilation of specifications and standards commonly quoted within the light-alloys industries. These are divided as relating to:

- Aluminium
- Titanium
- Magnesium
- Beryllium

Within each category, specification codes are listed by the organisation, e.g. ASTM, DIN, EN, ANSI, etc.

No responsibility is taken for the use of this listing, for errors, for omissions, or for the failure to advise of subsequent revisions or amendments. Standards and specifications are revised periodically, the appropriate specification index published by the specification issuing body should be consulted to determine the latest issue. CEN standards are available through the National Specification organisation. Many specification organisations now have Internet Web Sites. Advice may also be sought from various Associations.

Always use the most recent versions of standards/specification documents.

ALUMINIUM ALLOYS

Aluminum Association (USA)

[See also: Review – Further Reading list]

Registration Record of Aluminium Association Designation & Chemical Composition Limits for Aluminium Alloy Castings & Ingots (1996)

Registration Record of Aluminium Association Designation & Chemical Composition Limits for Wrought Aluminium & Aluminium Alloys (1997)

USA Federal Specifications

FED. STD. 184 : Item identification marking for aluminum products

FED. STD. 245 : Tolerances for aluminum wrought products

QQ-A-225 : General specification for rolled, drawn, or cold finished wire, rod, bar & special shapes

QQ-A-225/1 : 1100 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/2 : 3003 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/3 : 2011 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/4 : 2014 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/5 : 2017 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/6 : 2024 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/7 : 5052 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/8 : 6061 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/9 : 7075 rolled, drawn, or cold finished wire, rod & bar

QQ-A-225/10 : 6262 rolled, drawn, or cold finished wire, rod & bar

QQ-A-250 : General specifications for sheet & plate

QQ-A-250/1 : 1100 sheet & plate

QQ-A-250/2 : 3003 sheet & plate

QQ-A-250/3 : Alclad 2014 sheet & plate

QQ-A-250/4 : 2024 sheet & plate

QQ-A-250/5 : Alclad 2024 sheet & plate

QQ-A-250/6 : 5083 sheet & plate

QQ-A-250/7 : 5086 sheet & plate

QQ-A-250/8 : 5052 sheet & plate

QQ-A-250/9 : 5456 sheet & plate

USA Federal Specifications (Aluminium) - continued.

QQ-A-250/10 : 5454 sheet & plate
 QQ-A-250/11 : 6061 sheet & plate
 QQ-A-250/12 : 7075 sheet & plate
 QQ-A-250/13 : Alclad 7075 sheet & plate
 QQ-A-250/14 : 7178 sheet & plate
 QQ-A-250/15 : Alclad 7178 sheet & plate
 QQ-A-250/18 : Alclad one side 7075 sheet & plate
 QQ-A-250/21 : 7178-T76 & T7651 sheet & plate
 QQ-A-250/22 : Alclad 7178-T76 & T7651 sheet & plate
 QQ-A-250/24 : 7075-T76 & T7651 sheet & plate
 QQ-A-250/25 : Alclad 7075-T76 & T7651 sheet & plate
 QQ-A-250/26 : 7011 Alclad 7075 sheet & plate
 QQ-A-250/28 : 7011 Alclad 7178 sheet & plate
 QQ-A-250/29 : 2124-T851 plate
 QQ-A-250/30 : 2219 plate & sheet
 QQ-A-430 : Wire & rod for rivets & cold heading: 1100, 2017, 2024, 2117, 2219, 3003, 5005, 5052, 5056, 6053, 6061, 7050, 7075
 QQ-A-1876 : Aluminum foil
 WW-T-700 : General specification for drawn tube, seamless
 WW-T-700/1 : 1100 drawn tube, seamless
 WW-T-700/2 : 3003 drawn tube seamless
 WW-T-700/3 : 2024 drawn tube seamless
 WW-T-700/4 : 5052 drawn tube seamless
 WW-T-700/5 : 5086 drawn tube seamless
 WW-T-700/6 : 6061 drawn tube seamless
 WW-T-700/7 : 7075 drawn tube seamless

USA Military Specifications

MIL-A4W27 : 5083 & 5456 armor plate
 MIL-A4W83 : 5083, 5456 & 2219 extruded armor
 MIL-A-8625 : Anodic coatings for aluminum alloys
 MIL-A-12545 : 1100, 2014, 6061, 6070, & 7075 impacts
 MIL-A-22771 : 2014, 2219, 2618, 6061, 6151, 7049, 7050, 7075, & 7075 forgings & rings
 MIL-A-45225 : 5083 & 5456 forged armor
 MIL-A-46118 : 2219 armor plate & forgings
 MIL-A-81596 : 2024, 3003, 5052 & 5056 foil
 MIL-B-20148 : 4047 & 4343 brazing sheet
 MIL-C-915 : Alclad 5056-H392 wire
 MIL-C-5541 : Chemical films for aluminum & aluminum alloys
 MIL-H6088 : Heat treatment of aluminum alloys
 MIL-P-25995 : 3003, 6061 & 6063 pipe
 MIL-STD-129 : Marking for shipment & storage
 MIL-T-5077-7 : 2024 seamless drawn tube
 MIL-W-6712 : 1100 & 4043 metal spraying wire

AMS - The American Welding Society

A5.3 : Specification for aluminum & aluminum alloy electrodes for shielded gas metal arc welding
 A5.10 : Specification for bare aluminum & aluminum welding electrodes & rods

ASME - American Society of Mechanical Engineers

SB209 : 1060, 1100, 3003, Alclad 3003, 3004, Alclad 3004, 5050, 5052, 5083, 5086, 5154, 5254, 5454, 5456, 5652, 6061 & Alclad 6061 sheet & plate
 SB210 : 1060, 3003, Alclad 3003, 5052, 5154, 6061, & 6063 drawn seamless tube
 SB211 : 2014, 2024 & 6061 rolled, drawn, or cold finished wire, rod & bar
 SB221 : 1060, 1100, 2024, 3003, 5083, 5086, 5154, 5454, 5456, 6061 & 6063 extruded rod, bar, & shapes
 SB234 : 1060, 3003, Alclad 3003, 5052, 5454, & 6061 drawn, seamless tube for condensers & heat exchangers
 SB241/SB241M : 3003, 6061 & 6063 seamless pipe: 1060, 1100, 3003, Alclad 3003, 5052, 5083, 5086, 5454, 5456, 6061 & 6063 seamless extruded tube
 SB247 : 5083 & 6061 hand forgings; 2014, 3003, 5083 & 6061 die forgings
 SB308/SB308M : 6061 rolled or extruded standard structural shapes

ASTM - American Society for Testing & Materials

A846-85(1993) : Aluminum Scrap for Use in Deoxidation & Alloying of Steel
 B108-96a : Aluminum-Alloy Permanent Mold Castings
 B136-84(1993) : Measurement of Stain Resistance of Anodic Coatings on Aluminum
 B179-96 : Aluminum Alloys in Ingot & Molten Forms for Castings from All Casting Processes
 B209-96 : Aluminum & Aluminum-Alloy Sheet & Plate: 1060, 1100, 2014, Alclad 2014, 2024, Alclad 2024 Alclad one side 2024, 2124, 2219, Alclad 2219, 3003, Alclad 3003, 3004, Alclad 3004, 3005, 3105, 5005, 5050, 5052, 5083, 5086, 5154, 5252, 5254, 5454, 5456, 5457, 5652, 5657, 6061, Alclad 6061, 7075, Alclad 7075, Alclad one side 7075, 7178, Alclad 7178 sheet & plate
 B209M-95 : Aluminum & Aluminum-Alloy Sheet & Plate [Metric]
 B210-95 : Aluminum & Aluminum-Alloy Drawn Seamless Tubes: 1060, 1100, 2011, 2014, 2024, 3003, Alclad 3003, 5005, 5050, 5052, 5083, 5086, 5154, 5456, 6061, 6063, 6262 & 7075 drawn, seamless tube
 B210M-95 : Aluminum & Aluminum-Alloy Drawn Seamless Tubes [Metric]
 B211-95a : Aluminum & Aluminum-Alloy Bar, Rod, & Wire (rolled, drawn, or cold-finished): 1060, 1100, 2011, 2014, 2017, 2024, 2219, 3003, 5052, 5056, Alclad 5056, 5154, 6061, 6262, & 7075
 B211M-95a : Aluminum & Aluminum-Alloy Bar, Rod, & Wire [Metric]
 B221-96 : Aluminum & Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, & Tubes: 1060, 1100, 2014, 2024, 2219, 3003, Alclad 3003, 3004, 5052, 5083, 5086, 5154, 5454, 5456, 6005, 6061, 6063, 6066, 6105, 6262, 6351, 6463, 7005, 7075, & 7178.
 B221M-96 : Aluminum & Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, & Tubes [Metric]
 B230 : 1350-H19 wire
 B231 : Aluminum conductors, concentric-lay-stranded

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ASTM (Aluminium) - continued.

- B232 : Aluminum conductors, steel reinforced, concentrically-stranded (ACSR)
- B233 : 1350 drawing stock for electrical purposes
- B234-95 : Aluminum & Aluminum-Alloy Drawn Seamless Tubes for Condensers & Heat Exchangers: 1060, 3003, Alclad 3003, 5052, 5454, & 6061.
- B234M-95 : Aluminum & Aluminum-Alloy Drawn Seamless Tubes for Condensers & Heat Exchangers [Metric]
- B236-95 : Aluminum Bars for Electrical Purposes (Bus Bars/conductor): 1350
- B236M-95 : Aluminum Bars for Electrical Purposes (Bus Bars) [Metric]
- B241/B241M-96 : Aluminum & Aluminum-Alloy Seamless Pipe & Seamless Extruded Tube: 3003, 6061, 6063, & 6351 seamless pipe; 1060, 1100, 2014, 2024, 2219, 3003, Alclad 3003, 5052 5083, 5086, 5254, 5454, 5456, 5652, 6061, 6063, 6351, 7075, & 7178 seamless extruded tube
- B244-79 : Measurement of Thickness of Anodic Coatings on Aluminum & of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments
- B247-95a : Aluminum & Aluminum-Alloy Die Forgings, Hand Forgings, & Rolled Ring Forgings: 2014, 2219, 2618, 5083, 6061, 7049, 7050, 7075, & 7175 hand forgings; 1100, 2014, 2018, 2025, 2218, 2219, 2618, 3003, 4032, 5083, 6061, 6066 6151, 7049, 7050, 7075, 7076 & 7175 die forgings; 2014, 2219, 261 FI, 6061, 6151, & 7075 rolled ring forgings.
- B247M-95a : Aluminum & Aluminum-Alloy Die Forgings, Hand Forgings, & Rolled Ring Forgings [Metric]
- B253-87 : Preparation of Aluminum Alloys for Electroplating
- B26/B26M-96a : Aluminum-Alloy Sand Castings
- B308/B308M-96 : Aluminum-Alloy 6061-T6 Standard Structural Profiles (rolled or extruded)
- B313/B313M-95 : Aluminum & Aluminum-Alloy Round Welded Tubes: 1100, 3003, 3004, Alclad 3004, 5050, 5052, 5086, 5154, & 6061 round welded tube
- B316/B316M-96 : Aluminum & Aluminum-Alloy Rivet & Cold-Heading Wire & Rods : 1100, 2017, 2024, 2117, 2219, 3003, 5005, 5052, 5056, 6053, 6061, 7050, 7075 & 7178.
- B317-96 : Aluminum-Alloy Extruded Bar, Rod, Tube, Pipe, & Structural Profiles for Electrical Purposes (Bus Conductor): 6101 extruded rod, bar, structural shapes & pipe for electrical purposes
- B324 : 1350 rectangular & square wire
- B327-95e1 : Master Alloys Used in Making Zinc Die Casting Alloys
- B345-96 : Aluminum & Aluminum-Alloy Seamless Pipe & Seamless Extruded Tube for Gas & Oil Transmission & Distribution Piping Systems: 3003, 6061, 6063, & 6351 seamless pipe; 1060, 3003, Alclad 3003, 5083, 5086, 6061, 6063, 6070, & 6351 seamless extruded tube
- B345M-96 : Aluminum & Aluminum-Alloy Seamless Pipe & Seamless Extruded Tube for Gas & Oil Transmission & Distribution Piping Systems [Metric]
- B361-95 : Factory-Made Wrought Aluminum & Aluminum-Alloy Welding Fittings
- B368-85(1990)e1 : Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)
- B373-95 : Aluminum Foil for Capacitors :1145 & 1235
- B37-96 : Aluminum for Use in Iron & Steel Manufacture
- B380-85(1990) Corrosion Testing of Decorative Electrodeposited Coatings by the Corrodokote Procedure
- B396-87e1 : Aluminum-Alloy 5005-H19 Wire for Electrical Purposes
- B397-85e1 : Concentric-Lay-Stranded Aluminum-Alloy 5005-H19 Conductors
- B398M-97 : Aluminum-Alloy 6201-T81 Wire for Electrical Purposes [Metric]
- B399-97 : Concentric-Lay-Stranded Aluminum-Alloy 6201-T81 Conductors
- B399M-92 : Concentric-Lay-Stranded Aluminum-Alloy 6201-T81 Conductors [Metric]
- B400 : Compact round concentric-lay-stranded, 1350 conductors, hard-drawn
- B401 : Compact round, concentric-lay-stranded aluminum conductors, steel reinforced (ACSR)
- B404-95 : Aluminum & Aluminum-Alloy Seamless Condenser & Heat-Exchanger Tubes with Integral Fins: 1060, 3003, Alclad 3003, 5052, 5454, & 6061.
- B404M-95 : Aluminum & Aluminum-Alloy Seamless Condenser & Heat-Exchanger Tubes with Integral Fins [Metric]
- B429-95 : Aluminum-Alloy Extruded Structural Pipe & Tube: 6061 & 6063 extruded structural pipe & tube
- B449-93 : Chromates on Aluminum
- B457-67(1980) : Measurement of Impedance of Anodic Coatings on Aluminum
- B479-95 : Annealed Aluminum & Aluminum-Alloy Foil for Flexible Barrier Applications: 1100, 1145 & 1235.
- B483-95 : Aluminum & Aluminum-Alloy Drawn Tubes for General Purpose Applications: 1060, 1100, 1435, 3003, 5005, 5050, 5052, 6061, 6063 & 6262.
- B483M-95 : Aluminum & Aluminum-Alloy Drawn Tubes for General-Purpose Applications [Metric]
- B491/B491M-95 : Aluminum & Aluminum-Alloy Extruded Round Tubes for General-Purpose Applications: 1050, 1100, 1200, 1235, 3003 & 6063 extruded round coiled tube
- B524-92 : Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Alloy Reinforced (ACAR, 1350/6201)
- B524M-92 : Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Alloy Reinforced (ACAR, 1350/6201) [Metric]
- B531-90 : Aluminum-Alloy 5005 Drawing Stock for Electrical Purposes
- B547/B547M-95 : Aluminum & Aluminum-Alloy Formed & Arc-Welded Round Tube: 1100, 3003, Alclad 3003, 3004, Alclad 3004, 5050, 5052, 5083, 5086, 5154, 5454 & 6061.
- B548-90 : Ultrasonic Inspection of Aluminum-Alloy Plate for Pressure Vessels
- B557-94 : Tension Testing Wrought & Cast Aluminum- & Magnesium-Alloy Products
- B557M-94 : Tension Testing Wrought & Cast Aluminum- & Magnesium-Alloy Products [Metric]
- B565-94 : Shear Testing of Aluminum & Aluminum-Alloy Rivets & Cold-Heading Wire & Rods
- B580-79(1995) : Anodic Oxide Coatings on Aluminum

ASTM (Aluminium) - continued.

- B588-88 : Measurement of Thickness of Transparent or Opaque Coatings by Double-Beam Interference Microscope Technique
- B594-95 : Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
- B597-92 : Heat Treatment of Aluminum Alloys
- B603-90(1995)e1 : Drawn or Rolled Iron-Chromium-Aluminum Alloys for Electrical Heating Elements
- B606-93 : High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Aluminum & Aluminum-Alloy Conductors, Steel Reinforced
- B609 : Aluminum 1350 round wire, annealed & intermediate tempers, for electrical purposes
- B618-96 : Aluminum-Alloy Investment Castings
- B632/B632M-95 : Aluminum-Alloy Rolled Tread Plate: 6061
- B645-95 : Plane-Strain Fracture Toughness Testing of Aluminum Alloys
- B646-94 : Fracture Toughness Testing of Aluminum Alloys
- B647-84 : Indentation Hardness of Aluminum Alloys by Means of a Webster Hardness Gage
- B648-78(1984)e1 : Indentation Hardness of Aluminum Alloys by Means of a Barcol Impressor
- B659-90 : Measuring Thickness of Metallic & Inorganic Coatings
- B660-96 : Packaging/Packing of Aluminum & Magnesium Products
- B666/B666M-96 : Identification Marking of Aluminum & Magnesium Products
- B669-95a : Zinc-Aluminum Alloys in Ingot Form for Foundry & Die Castings
- B680-80(1989) : Seal Quality of Anodic Coatings on Aluminum by Acid Dissolution
- B681-88 : Measurement of Thickness of Anodic Coatings on Aluminum & of Other Transparent Coatings on Opaque Surfaces Using the Light-Section Microscope
- B686-96a : Aluminum Alloy Castings, High-Strength
- B724-83(1991)e1 : Indentation Hardness of Aluminum Alloys by Means of a Newage Portable Non-Caliper-Type Instrument
- B736-95 : Aluminum, Aluminum Alloy & Aluminum-Clad Steel Cable Shielding Stock
- B750-94a : Zinc-5% Aluminum-Mischmetal Alloy (UNS Z38510) in Ingot Form for Hot-Dip Coatings
- B753-86(1993)e1 : Thermostat Component Alloys
- B769-94 : Shear Testing of Aluminum Alloys
- B788-94 : Installing Factory-Made Corrugated Aluminum Culverts & Storm Sewer Pipe
- B78-90(1995)e1 : Accelerated Life of Iron-Chromium-Aluminum Alloys for Electrical Heating
- B789-96 : Installing Corrugated Aluminum Structural Plate Pipe for Culverts & Sewers
- B791-96 : Zinc-Aluminum (ZA) Alloy Foundry & Die Castings
- B800-94 : 8000 Series Aluminum Alloy Wire for Electrical Purposes-Annealed & Intermediate Tempers
- B801-95 : Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation
- B803-94 : High-Strength Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum & Aluminum-Alloy Conductors, Steel Reinforced
- B807-95 : Extrusion Press Solution Heat Treatment for Aluminum Alloys
- B831-93 : Shear Testing of Thin Aluminum Alloy Products
- B85-96 : Aluminum-Alloy Die Castings
- C703-72(1983) : Spalling Resistance of Porcelain Enameled Aluminum
- D1730-67(1984)e1 : Preparation of Aluminum & Aluminum-Alloy Surfaces for Painting
- D1731-67(1984)e1 : Preparation of Hot-Dip Aluminum Surfaces for Painting
- D2570-96 : Simulated Service Corrosion Testing of Engine Coolants
- D2651-90 : Preparation of Metal Surfaces for Adhesive Bonding
- D2674-72(1984) : Analysis of Sulfochromate Etch Solution Used in Surface Preparation of Aluminum
- D2773-94 : Test Method for Loss on Ignition of Electrical Grade Magnesium Oxide (10.01).
- D2809-94 : Cavitation Corrosion & Erosion-Corrosion Characteristics of Aluminum Pumps With Engine Coolants
- D2847-94 : Testing Engine Coolants in Car & Light Truck Service
- D3115-95 : Explosive Reactivity of Lubricants with Aerospace Alloys Under High Shear
- D3933-93 : Preparation of Aluminum Surfaces for Structural Adhesives Bonding (Phosphoric Acid Anodizing)
- D4340-96 : Corrosion of Cast Aluminum Alloys in Engine Coolants Under Heat-Rejecting Conditions
- D4628-96 : Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oils.
- D5502-94 : Test Method for Apparent Density by Physical Measurements of Manufactured Anodes.
- D930-89(1996)e1 : Total Immersion Corrosion Test of Water-Soluble Aluminum Cleaners
- E101-91 : Spectrographic Analysis of Aluminum & Aluminum Alloys by the Point-to-Plane Technique
- E1004-91 : Electromagnetic (Eddy-Current) Measurements of Electrical Conductivity
- E1251-94 : Optical Emission Spectrometric Analysis of Aluminum & Aluminum Alloys by the Argon Atmosphere, Point-to-Plane, Unipolar Self-Initiating Capacitor Discharge
- E1338-90 : The Identification of Metals & Alloys in Computerized Material Property Databases
- E155-95e1 : Inspection of Aluminum & Magnesium Castings
- E1637-94 : Specification for Structural Standing Seam Aluminum Roof Panel Systems (04.11).
- E164-94a : Ultrasonic Contact Examination of Weldments
- E1793-96 : Preparation of Aluminum Alloy for Bonding in Foam & Beam Type Transportable Shelters
- E1794-96 : Adhesive for Bonding Foam Cored Sandwich Panels (200°F Elevated Humidity Service), Type II Panels
- E1800-96 : Adhesive for Bonding Foam Cored Sandwich Panels (160°F Elevated Humidity Service), Type I Panels

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ASTM (Aluminium) - continued.

E1801-96 : Adhesive Bonding of Aluminum Facings in Foam & Beam Type Shelters

E1826-96 : Low Volatile Organic Compound (VOC) Corrosion-Inhibiting Adhesive Primer for Aluminum Alloys to Be Adhesively Bonded.

E215-87(1992)e1 : Standardizing Equipment for Electromagnetic Examination of Seamless Aluminum-Alloy Tube

E227-90 : Optical Emission Spectrometric Analysis of Aluminum & Aluminum Alloys by the Point-to-Plane Technique

E252-84 : Thickness of Thin Foil & Film by Weighing

E262-86e1 : Determining Thermal Neutron Reaction & Fluence Rates by Radioactivation Techniques

E34-94 : Chemical Analysis of Aluminum & Aluminum-Base Alloys

E428-92 : Fabrication & Control of Steel Reference Blocks Used in Ultrasonic Inspection

E505-96 : Inspection of Aluminum & Magnesium Die Castings

E602-91 : Sharp-Notch Tension Testing with Cylindrical Specimens

E607-90 : Optical Emission Spectrometric Analysis of Aluminum & Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere

E716-94 : Sampling Aluminum & Aluminum Alloys for Spectrochemical Analysis

E749-96 : Acoustic Emission Monitoring During Continuous Welding

E864-96 : Surface Preparation of Aluminum Alloys to be Adhesively Bonded in Honeycomb Shelter Panels

E866-96 : Corrosion-Inhibiting Adhesive Primer for Aluminum Alloys to Be Adhesively Bonded in Honeycomb Shelter Panels

E874-96 : Practice for Adhesive Bonding of Aluminum Facings to Nonmetallic Honeycomb Core.

F1077-95a : Selection of Committee F-16 Fastener Specifications

F1110-90 : Sandwich Corrosion Test

F467-93 : Nonferrous Nuts for General Use

F467M-93 : Nonferrous Nuts for General Use [Metric]

F468-93 : Nonferrous Bolts, Hex Cap Screws, & Studs for General Use

F468M-93 : Nonferrous Bolts, Hex Cap Screws, & Studs for General Use [Metric]

G100-89(1994)e : Conducting Cyclic Galvanostaircase Polarization

G102-89(1994)e1 : Calculation of Corrosion Rates & Related Information from Electrochemical Measurements

G103-89e1 : Performing a Stress-Corrosion Cracking Test of Low Copper Containing Al-Zn-Mg Alloys in Boiling 6% Sodium Chloride Solution

G110-92 : Evaluating Intergranular Corrosion Resistance of Heat Treatable Aluminum Alloys by Immersion in Sodium Chloride + Hydrogen Peroxide Solution

G112-92 : Conducting Exfoliation Corrosion Tests in Aluminum Alloys

G139-96 : Determining Stress-Corrosion Cracking Resistance of Heat-Treatable Aluminum Alloy Products Using Breaking Load Method

G34-97 : Exfoliation Corrosion Susceptibility in 2XXX & 7XXX Series Aluminum Alloys (EXCO Test)

G44-94 : Evaluating Stress Corrosion Cracking Resistance of Metals & Alloys by Alternate Immersion in 3.5% Sodium Chloride Solution

G64-91 : Resistance to Stress-Corrosion Cracking of Heat-Treatable Aluminum Alloys

G66-95 : Visual Assessment of Exfoliation Corrosion Susceptibility of 5XXX Series Aluminum Alloys (ASSET Test)

G67-93 : Determining the Susceptibility to Intergranular Corrosion of 5XXX Series Aluminum Alloys by Mass Loss After Exposure to Nitric Acid (NAMLT Test)

G69-81(1994)e1 : Measurement of Corrosion Potentials of Aluminum Alloys

G82-83e1 : Development & Use of a Galvanic Series for Predicting Galvanic Corrosion Performance

AMS - Aerospace Material Specifications

2201 : Tolerances for rolled, drawn, cold-finished, & centerless ground wire, rod, bar & forging stock

2202 : Tolerances for sheet & plate

2203 : Tolerances for drawn tube

2204 : Tolerances for rolled or extruded standard structural shapes

2205 : Tolerances for extruded rod, bar, shapes, & tube

2468 : Hard-coating of aluminum alloys

2469 : Process & performance requirements for hard-coating

2470 : Chromic-acid anodizing of aluminum alloys

2471 : Clear sulfuric-acid anodizing of aluminum alloys bar

2472 : Dyed sulfuric-acid anodizing of aluminum alloys

2473 : Chemical conversion treatments for aluminum alloys

2474 : Low electrical resistivity chemical conversion treatments for aluminum alloys

2808 : Identification markings of forgings

2816 : Color code identification marking of welding wire

4001 : 1100-O sheet & plate

4003 : 1100-H14 sheet & plate

4004 : 5052-H191 foil

4005 : 5056-H191 foil

4006 : 3003-O sheet & plate

4007 : 2024-O foil

4008 : 3003-H14 sheet & plate

4009 : 6061-O foil

4010 : 3003-H18 foil

4011 : 1145-O foil

4013 : Laminated shim stock, surface bonded

4015 : 5052-O sheet & plate

4016 : 5052-H32 sheet & plate

4017 : 5052-H34 sheet & plate

4021 : Alclad 6061- sheet & plate

4024 : 7075-T6 & T651 sheet & plate

4025 : 6061-O sheet & plate

4026 : 6061-T4 & T451 sheet & plate

4027 : 6061-T6 & T651 sheet & plate

4028 : 2014-O sheet & plate

4029 : 2014-T6 & T651 sheet & plate

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- 4035 : 2024-O sheet & plate
 4036 : Alclad one side 2024-T3 sheet & T351 plate
 4037 : 2024-T3 sheet & T351 plate
 4040 : Alclad 2024-O sheet & plate
 4044 : 7075-O sheet & plate
 4045 : 7075-T6 sheet & T651 plate
 4046 : Alclad one side 7075-T6 sheet & T651 plate
 4048 : Alclad 7075-O sheet & plate
 4049 : Alclad 7075-T6 sheet & T651 plate
 4050 : 7050-T7451 (formerly T73651) plate
 4054 : Brazing sheet No. 21-0
 4055 : Brazing sheet No. 22-0
 4056 : 5083-O sheet & plate
 4062 : 1100-H14 drawn tube
 4063 : Brazing sheet No. 11-0
 4064 : Brazing sheet No. 12-0
 4065 : 3003-O drawn tube, seamless
 4066 : 2219-T851 drawn tube, seamless
 4067 : 3003-H14 drawn tube, seamless
 4068 : 2219-T351 drawn tube, seamless
 4069 : 5052-O drawn tube, special tolerances, seamless
 4070 : 5052-O drawn tube, seamless
 4071 : 5052-O drawn, hydraulic tube, seamless
 4077 : Alclad one side 2024-O sheet & plate
 4078 : 7075-T7351 plate
 4079 : 6061-O drawn tube, special tolerances
 4080 : 6061-O drawn tube
 4081 : 6061-T4 drawn, hydraulic tube
 4082 : 6061-T6 drawn tube
 4083 : 6061-T6 drawn, hydraulic tube
 4084 : 7475-T61 sheet
 4085 : 7475-T761 sheet
 4086 : 2024-T3 drawn, hydraulic tube
 4087 : 2024-O drawn tube
 4088 : 2024-T3 drawn tube
 4089 : 7475-T7631 plate
 4090 : 7475-T761 plate
 4094 : Alclad 2219-T81 sheet & T851 plate
 4095 : Alclad 2219-T31 sheet & T351 plate
 4096 : Alclad 2219-O sheet & plate
 4100 : Alclad 7475-T761 sheet
 4101 : 2124-T851 plate
 4102 : 1100-F rolled or cold-finished wire, rod & bar
 4107 : 7050-T74 (formerly T736) die forgings
 4108 : 7050-T7452 (formerly T73652) hand forgings
 4111 : 7049-T73 forgings & forging stock
 4112 : 2024-T6 rolled, drawn, or cold-finished wire, rod & bar
 4113 : 6061-T6 structural shapes
 4114 : 5052-F rolled or cold-finished wire, rod & bar
 4115 : 6061-O rolled, drawn, or cold finished wire, rod & bar
 4116 : 6061-T4 rolled or cold finished wire, rod & bar
 4117 : 6061-T6 & T651 rolled, drawn, or cold finished wire, rod & bar
 4118 : 2017-T4 & T451 rolled, drawn, or cold finished wire, rod & bar
 4120 : 2024-T4 & T351 rolled, drawn, or cold finished wire, rod & bar
 4121 : 2014-T6 rolled, drawn or cold finished wire, rod & bar
 4122 : 7075-T6 rolled or cold finished wire, rod & bar
 4123 : 7075-T651 rolled or cold finished rod & bar
 4124 : 7075-T7351 rolled or cold finished bar
 4125 : 6151-T6 forgings
 4126 : 7075-T6 forgings & 7075-F forging stock
 4127 : 6061-T6 die forgings & rolled rings & 6061-F forging stock
 4128 : 6061-T451 rod & bar, rolled or cold finished
 4130 : 2025-T6 forgings
 4131 : 7075-T736 forgings
 4132 : 2618-T61 forgings
 4133 : 2014-T6 forgings & 2014 forging stock
 4134 : 2014-T4 forgings
 4140 : 2018-T61 forgings
 4141 : 7075-T73 die forgings & forging stock
 4142 : 2218-F forgings
 4143 : 2219-T6 forgings
 4144 : 2219-T852 forgings
 4146 : 6061-T4 die forgings & rolled rings & 6061-F forging stock
 4147 : 7075-T7352 forgings
 4148 : 7175-T66 die forging
 4149 : 7175-T74 die & hand forgings
 4150 : 6061-T6 extruded wire, rod, bar, shapes & tube
 4152 : 2024-T3 extruded wire, rod, bar, shapes & tube
 4153 : 2014-T6 extruded wire, rod, bar, shapes & tube
 4154 : 7075-T6 extruded wire, rod, bar, shapes & tube
 4156 : 6063-T6 extruded wire, rod, bar, & shapes
 4157 : 7049-T73511 extrusion
 4159 : 7049-T76511 extrusion
 4160 : 6061-O extruded wire, rod, bar, shapes & tube
 4161 : 6061-T4 extruded wire, rod, bar, shapes & tube
 4162 : 2219-T8511 extruded wire, rod, bar, shapes & tube
 4163 : 2219-T3511 extruded wire, rod, bar, shapes & tube
 4164 : 2024-T3510 extruded wire, rod, bar, shapes & round tube
 4165 : 2024-T3511 extruded wire, rod, bar, shapes, & round tube
 4166 : 7075-T73 extruded wire, rod, bar, shapes & tube
 4167 : 7075-T73511 extruded wire, rod, bar & shapes
 4168 : 7075-T6510 extruded wire, rod, bar, shapes, & round tube
 4169 : 7075-T6511 extruded wire, rod, bar, shapes, & round tube
 4172 : 6061-T4511 extruded rod, bar, shapes & tube
 4173 : 6061-T6511 extruded rod, bar, shapes & tube
 4179 : 7175-T7452 hand forgings & forging stock
 4180 : 1100-H18 wire for metal spraying
 4182 : 5056-O wire
 4184 : 4145 brazing metal
 4185 : 4047 brazing metal

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4186 : 7075-F wire, rod & bar; rolled, drawn or cold finished
4187 : 7075-O wire, rod & bar rolled, drawn or cold finished
4190 : 4043-F welding wire & rod
4191 : 2319-F welding wire & rod
4192 : 2024-T361 sheet & plate
4193 : 2024-T861 sheet & plate
4194 : Alclad 2024-T361 sheet & plate
4195 : Alclad 2024-TB61 sheet & plate
4196 : 7011 Alclad 7075-O sheet & plate
4197 : 7011 Alclad 7075-T6 sheet & T651 plate
4200 : 7049-T7351 plate
4201 : 7050-T7651 plate
4202 : 7475-T731 plate
4207 : Alclad 7475-T61 sheet
4243 : Alclad 7050-T76 sheet
4247 : 7049-T7352 hand forging
4248 : 6061 -T652 forgings
4310 : 7075-T651 & T652 rings, forged or rolled
4311 : 7075-T7351 rings, forged or rolled
4312 : 6061-T651 rings, rolled or forged
4313 : 2219-T351 & T352 rings, forged or rolled
4314 : 2014-T651 rings, forged or rolled
4321 : 7049-O forgings
4323 : 7075-T7452 hand forged
4333 : 7050-T742 die forgings
4340 : 7050-T76511 extrusions
4341 : 7050-T73511 extrusions
4342 : 7050-T74511 (formerly T736511) extrusions
4344 : 7175-T73511 extrusions
7220 : 1100-H14 rivets
7222 : 2117-T4 rivet
7223 : 2024-T4 rivets

ANSI - American National Standards Institute

C119.4-1991 : Electric Connectors - Connectors for Use between Aluminum-to-Aluminum or Alumin.
C80.5 : Aluminum alloy rigid conduit
CGATS.2-1992 : Graphic Technology - Thickness of Aluminum Lithographic Plates.
H35.1-1997 : Alloy and Temper Designation Systems for (Wrought) Aluminum
H35.1M-1997 : Alloy and Temper Designation Systems for Aluminum (Metric).
H35.2-1997 : Dimensional Tolerances for Aluminum Mill Products.
H35.2M-1993 : Dimensional Tolerances for Aluminum Mill Products (Metric).
H35.3-1997 : Designation System for Aluminum Hardeners.
H35.4-1997 : Designation System for Unalloyed Aluminum.
H35.5-1993 : Nomenclature System for Aluminum Metal Matrix Composite Materials.

ANSI/AAMA

ANSI/AAMA 101-1993 : Aluminum and PVC (PolyVinylChloride) Prime Windows & Glass Doors.
ANSI/AAMA 1102.7-1989 : Aluminum Storm Doors.
ANSI/AAMA 1402-1986 : Standard Specifications for Aluminum Siding, Soffit & Fascia.

ANSI/ASME

ANSI/ASME B96.1-1993 : Welded Aluminum-Alloy Storage Tanks (includes revision service).
ANSI/ASSE 1045-1990 : Aluminum Drain, Waste, and Vent Pipe with End Cap Components.

ANSI/AWS

ANSI/AWS A5.10-92 : Bare Aluminum and Aluminum Alloy Welding Electrodes and Rods, Specification.
ANSI/AWS A5.3-91 : Aluminum and Aluminum Alloy Electrodes for Shielded Metal Arc Welding.
ANSI/AWS C2.18-93 : Protection of Steel with Thermal Sprayed Coatings of Aluminum and Zinc, etc.
ANSI/AWS C3.7-93 : Specification for Aluminum Brazing.
ANSI/AWS D1.2-90 : Structural Welding Code - Aluminum (includes ANSI/AWS D1.2A-83, Commentary).
ANSI/AWS D10.7-86 (R1992) : Gas Shielded Arc Welding of Aluminum and Aluminum Alloy Pipe, Recommended Practice
ANSI/AWS D3.7-90 : Guide for Aluminum Hull Welding.

ANSI/IEEE

ANSI/IEEE 635-1989 (R1994) : Guide for Selection and Design of Aluminum Sheaths for Power Cables.

ANSI/NFPA

ANSI/NFPA 651-1993 : Manufacture of Aluminum and Magnesium Powder.
ANSI/NFPA 65-1993 : Processing and Finishing of Aluminum.

ANSI/SAE ARP

ANSI/SAE ARP 1524A : Surface Preparation and Priming of Aluminum Alloy Parts for High Durability.
ANSI/SAE ARP 1675 : Structural Weldbonding of Aluminum Structures.
ANSI/SAE ARP 1842 : Surface Preparation for Structural Adhesive Bonding, Aluminum Alloy and Low Al.
ANSI/SAE ARP 4402 : Eddy Current Inspection of Open Fastener Holes in Aluminum Aircraft Structure.
ANSI/SAE ARP 823B : Aluminum Alloy Products, Minimizing Stress Corrosion Cracking in Wrought Heat.

ANSI/SAE AS

ANSI/SAE AS 1990 : Aluminum Alloy Tempers.
ANSI/SAE AS 7220 : Aluminum Rivets, UNS A91100, 99A1 (1100-H14).
ANSI/SAE AS 7222 : Aluminum Rivets, UNS A92117 2.5Cu - 0.3Mg (2117-T4).

ANSI/SAE J

- ANSI/SAE J452-JAN89 : General Information - Chemical Compositions, Mechanical and Physical Properties.
- ANSI/SAE J454-FEB91 : General Data on Wrought Aluminum Alloys.
- ANSI/SAE J457-FEB91 : Chemical Compositions, Mechanical Property Limits, and Dimensional Tolerance.
- ANSI/SAE J993-JAN89 : Alloy and Temper Designation Systems for Aluminum.

ANSI/SAE MA

- ANSI/SAE MA 2152/1 : Clamp, Center Mount, Bare Metal, Aluminum, Metric.
- ANSI/SAE MA 2153/1 : Clamp, Loop Type, Bare Metal, Aluminum, Metric.

ANSI/SAE MAM

- ANSI/SAE MAM 2201 : Tolerances, Metric, Aluminum and Aluminum Alloy Bar, Rod, Wire, and Forging St.
- ANSI/SAE MAM 2202A : Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate.
- ANSI/SAE MAM 2204A : Tolerances, Metric Aluminum Alloy Standard Structural Shapes.
- ANSI/SAE MAM 2355B : Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloy.
- ANSI/SAE MAM 2771 : Heat Treatment of Aluminum Alloy Castings.
- ANSI/SAE MAM 4208A : Aluminum Alloy Sheet - (2004-F), As Rolled.
- ANSI/SAE MAM 4209A : Aluminum Alloy Sheet, Alclad, 6.0Cu - 0.40Zr (2004-F), As Rolled (revision)

ANSI/SMA

- ANSI/SMA 1004-1987 : Aluminum Tubular Frame Screens for Windows, Specifications.
- ANSI/SMA 2006-1987 : Aluminum Sliding Screen Doors, Specifications for.
- ANSI/SMA 3001-1987 : Aluminum Swinging Screen Doors, Specifications.

ANSI/UL

- ANSI/UL 486B-1990 : Wire Connectors for Use With Aluminum Conductors.
- ANSI/UL 486E-1994 : Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.

SAE Standards

SAE MAM

- SAE MAM 4131A (Nov-96) Aluminum Alloy, Die & Hand Forgings 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated & Aged
- SAE MAM 4141A (Jul-90) Aluminum Alloy, Die Forgings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated
- SAE MAM 4208A (Apr-90) Aluminum Alloy, Sheet, 6.0Cu 0.40Zr, As Rolled
- SAE MAM 4209A (Oct-90) Aluminum Alloy, Sheet, Alclad, 6.0Cu 0.40Zr, As Rolled

- SAE MAM 4247A (May-94) Aluminum Alloy, Hand Forgings 7.7Zn 2.4Mg 1.6Cu 0.16Cr (7049-T7352) Solution Heat Treated, Stress Relieved by Compression, & Precipitation Heat Treated
- SAE MAM 4248A (Apr-93) Aluminum Alloy, Hand Forgings & Rolled Rings 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated, Stress Relieved by Compression, & Precipitation Heat Treated
- SAE MAM 4323A (Jan-97) Aluminum Alloy, Hand Forgings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated

SAE/AMS

Note: * denotes that a standard has been cancelled or superseded as a result of technical committee action; photocopies are available from SAE.

- SAE/AMS 4000E (Jul-76) Aluminum Sheet & Plate (1060-0)
- SAE/AMS 4001G (Jul-91) Aluminum Sheet & Plate 0.12Cu (1100-0) Annealed
- SAE/AMS 4003G (Sep-95) Aluminum Alloy, Sheet & Plate 0.12Cu (1100-H14) Strain Hardened
- SAE/AMS 4004C (Sep-95) Aluminum Alloy, Foil 2.5 Mg 0.25Cr (5052-H191) Strain Hardened
- SAE/AMS 4005C (Jul-89) Aluminum Alloy, Foil, 5.0Mg 0.12Mn 0.12Cr, Strain Hardened
- SAE/AMS 4006G (Jul-90) Aluminum Alloy, Sheet & Plate, 1.25Mn 0.12Cu (3003-0), Annealed
- SAE/AMS 4007C (Apr-87) Aluminum Alloy, Foil 4.4Cu 1.5Mg 0.60Mn
- SAE/AMS 4008H (Sep-94) Aluminum Alloy, Sheet & Plate, 1.25Mn 0.12Cu, Strain Hardened
- SAE/AMS 4009A (Oct-91) Aluminum Alloy, Foil 1.0Mg 0.6Si 0.30Cu 0.20Cr Annealed
- SAE/AMS 4010B (Jan-77) Foil, 1.2Mn 0.12Cu
- SAE/AMS 4011B (Feb-95) Aluminum, Foil & Light Gage Sheet, 99.45Al (1145-0) Annealed
- SAE/AMS 4012F (Apr-87) Aluminum Sheet, Laminated, Edge Bonded
- SAE/AMS 4013D (Jul-91) Aluminum Sheet, Laminated, Surface Bonded
- SAE/AMS 4014B (Invalid D) Aluminum Alloy, Plate 4.5Cu 0.85Si 0.80Mn 0.50Mg*
- SAE/AMS 4015J (Sep-94) Aluminum Alloy, Sheet & Plate, 2.5Mg 0.25Cr Annealed
- SAE/AMS 4016J (Jul-94) Aluminum Alloy, Sheet & Plate, 2.5Mg 0.25Cr (5052-H32), Strain Hardened, Quarter-Hard, & Stabilized
- SAE/AMS 4017J (Oct-91) Aluminum Alloy, Sheet & Plate, 2.5Mg 0.25Cr, Strain-Hardened, Half-Hard, & Stabilized
- SAE/AMS 4018C (Invalid D) Aluminum Alloy, Sheet & Plate 3.5Mg 0.25Cr*
- SAE/AMS 4019B (Invalid D) Aluminum Alloy, Sheet & Plate 3.5Mg 0.25Cr*
- SAE/AMS 4020B (Invalid D) Aluminum Alloy, Plate, Alclad 1.0Mg 0.60Si 0.28Cu 0.25Cr*
- SAE/AMS 4021F (Oct-93) Aluminum Alloy, Alclad Sheet & Plate, 1.0Mg 0.60Si 0.28Cu 0.20Cr (Alclad 6061-0) Annealed
- SAE/AMS 4022F (Jan-77) Aluminum Alloy Sheet & Plate, Alclad, 1.0Mg 0.60Si 0.28Cu 0.20Cr*

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SAE/AMS (Aluminium) - continued.

SAE/AMS 4023E (Jan-77) Sheet & Plate, Alclad, 1.0Mg 0.60Si 0.28Cu 0.28Cr

SAE/AMS 4024C (Invalid D) Aluminum Alloy, Sheet & Plate 4.3Zn 3.3Mg 0.60Cu 0.20Mn 0.17Cr (7079:-T6Sheet, -T651 Plate)*

SAE/AMS 4025J (Jul-94) Aluminum Alloy, Sheet & Plate, 1.0Mg 0.60Si 0.28Cu 0.20Cr Annealed

SAE/AMS 4026K (Aug-96) Aluminum Alloy, Sheet & Plate 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated & Naturally Aged

SAE/AMS 4027L (Oct-93) Aluminum Alloy, Sheet & Plate, 1.0Mg 0.60Si 0.28Cu 0.20Cr (6061; -T6 Sheet, -T651 Plate), Solution & Precipitation Heat Treated

SAE/AMS 4028F (Oct-91) Aluminum Alloy, Sheet & Plate 4.4Cu 0.85Si 0.80Mn 0.50Mg, Annealed

SAE/AMS 4029H (Jan-92) Aluminum Alloy, Sheet & Plate 4.5Cu 0.85Si 0.80Mn 0.50Mg Solution & Precipitation Heat Treated

SAE/AMS 4030C (Jun-49) Aluminum Alloy, Sheet & Plate Copper Manganese Magnesium (17 So)*

SAE/AMS 4031E (Oct-93) Aluminum Alloy, Sheet & Plate 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti (2219-0) Annealed

SAE/AMS 4032C (Jun-49) Aluminum Alloy, Sheet & Plate Copper Manganese Magnesium (17 S-T)*

SAE/AMS 4033C (Invalid D) Aluminum Alloy, Plate 4.4Cu 1.5Mg 0.60Mn*

SAE/AMS 4034C (Invalid D) Aluminum Alloy, Plate, Alclad 4.4Cu 1.5Mg 0.60Mn*

SAE/AMS 4035J (Sep-96) Aluminum Alloy, Sheet & Plate 4.4Cu 1.5Mg 0.60Mn (2024-0) Annealed

SAE/AMS 4036H (Oct-93) Aluminum Alloy, Sheet & Plate, Alclad One Side 4.4Cu 1.5Mg 0.60Mn Alclad One Side 2024 & 1-1/2% Alclad One Side 2024-T3 Sheet; 1-1/2% Alclad One Side 2024-T351 Plate

SAE/AMS 4039C (Invalid D) Superseded by*SAE/AMS 4038C (Invalid D) Superseded by*SAE/AMS 4037M (Jan-93) Aluminum Alloy, Sheet & Plate 4.4Cu 1.5Mg 0.60Mn Solution Heat Treated

SAE/AMS 4040L (Mar-95) Aluminum Alloy, Alclad Sheet & Plate, 4.4Cu 1.5Mg 0.60Mn, Annealed

SAE/AMS 4041N (Oct-93) Aluminum Alloy, Sheet Plate, Alclad 4.4Cu 1.5Mg 0.60Mn Alclad 2024 & 1-1/2% Alclad 2024, -T3 Flat Sheet; 1-1/2% Alclad 2024-T351 Plate

SAE/AMS 4042F (Invalid D) Aluminum Alloy, Sheet & Plate, Alclad 4.5Cu 1.5Mg 0.60Mn Width 48 in. & Under*

SAE/AMS 4043B (Invalid D) Aluminum Alloy, Plate 1.0Mg 0.60Si 0.28Cu 0.25Cr*

SAE/AMS 4044H (Jul-94) Aluminum Alloy, Sheet & Plate, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Annealed

SAE/AMS 4045H (Jan-93) Aluminum Alloy, Sheet & Plate 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated

SAE/AMS 4046E (Oct-91) Aluminum Alloy, Sheet & Plate, Alclad One Side 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated

SAE/AMS 4047B (Oct-81) Aluminum Alloy, Sheet & Plate, Aluminum Alloy Clad, Roll Tapered 5.6Zn 2.5Mg 1.6Cu 0.25Cr (Alclad 7075-T6)*

SAE/AMS 4048H (Apr-89) Aluminum Alloy, Sheet & Plate, Alclad, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Annealed

SAE/AMS 4049H (Apr-87) Aluminum Alloy, Sheet & Plate, Alclad, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated

SAE/AMS 4050E (Jul-92) Aluminum Alloy, Plate 6.2Zn 2.3Cu 2.2Mg 0.12Zr Solution Heat Treated, Stress Relieved, & Overaged

SAE/AMS 4051E (Apr-85) Aluminum Alloy, Sheet & Plate, Alclad 6.8Zn 2.8Mg 2.0Cu 0.23Cr Annealed

SAE/AMS 4052A (Invalid D) Cancelled Jul. 1981*

SAE/AMS 4053B (Invalid D) Aluminum Alloy, Plate 1.0Mg 0.60Si 0.28Cu 0.25Cr*

SAE/AMS 4054C (Invalid D) Aluminum Alloy, Sheet, Clad One Side, 0.6Mg-0.35Si-0.28Cu (No. 21-0 Brazing Sheet)*

SAE/AMS 4055D (Invalid D) Aluminum Alloy, Sheet, Clad Two Sides 0.6Mg-0.35Si-0.28Cu (No. 22-0 Brazing Sheet) Annealed*

SAE/AMS 4056F (Nov-94) Aluminum Alloy, Sheet & Plate, 4.4Mg 0.70Mn 0.15Cr, Annealed

SAE/AMS 4057E (Jul-77) Aluminum Alloy, Sheet 4.4Mg-0.70Mn-0.15Cr (5083-H323)*

SAE/AMS 4058E (Jul-77) Aluminum Alloy, Sheet 4.4Mg-0.70Mn-0.15Cr (5083-373)*

SAE/AMS 4059F (Jul-77) Sheet & Plate - 4.4Mg 0.70Mn 0.15Cr*

SAE/AMS 4061 (Invalid D) Aluminum Alloy, Sheet & Plate, Alclad 4.5 Cu - 1.5 Mg - 0.60 Mn - (Alclad 2024-T36) Width over 60 Inches*

SAE/AMS 4062G (Apr-89) Aluminum Tubing, Seamless, Drawn, Round, Strain Hardened

SAE/AMS 4063C (Oct-93) Aluminum Alloy, Clad One Side Sheet, 1.25Mn 0.12Cu (No. 11-0 Brazing Sheet), Annealed

SAE/AMS 4064D (Nov-95) Aluminum Alloy, Clad Two Sides Sheet, 1.25Mn 0.12Cu (No. 12-0 Brazing Sheet), Annealed

SAE/AMS 4065G (Oct-86) Aluminum Alloy, Tubing, Seamless, Drawn 1.2Mn-0.12Cu (3003-0) Annealed

SAE/AMS 4066B (Oct-93) Aluminum Alloy, Drawn, Round Seamless Tubing 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti (2219-T8511), Solution Heat Treated, Stress Relieved by Stretching, & Precipitation Heat Treated

SAE/AMS 4067G (Oct-93) Aluminum Alloy, Drawn Round Seamless Tubing 1.25Mn 0.12Cu (3003-H14) Strain Hardened

SAE/AMS 4068C (Apr-97) Aluminum Alloy, Drawn Seamless Tubing 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti (2219-T3511), Solution Heat Treated & Stress Relieved by Stretching

SAE/AMS 4069C (Sep-95) Aluminum Alloy, Drawn, Round Seamless Tubing Close Tolerance 2.5Mg 0.25Cr (5052-0) Annealed

SAE/AMS 4070K (Sep-95) Aluminum Alloy, Drawn, Round Seamless Tubing 2.5Mg 0.25Cr (5052-0) Annealed

SAE/AMS 4071K (Sep-95) Aluminum Alloy, Drawn, Round, Seamless Hydraulic Tubing 2.5Mg 0.25Cr (5052-0) Annealed

SAE/AMS 4072 (Jul-81) Aluminum Alloy, Sheet & Plate, Alclad 4.5Cu 1.5Mg 0.60Mn (Alclad 2024-T86) Width 30 In. & Under*

SAE/AMS 4073 (Jul-81) Aluminum Alloy, Sheet & Plate, Alclad 4.5 Cu - 1.5 Mg - 0.60 Mn - (Alclad 2024-T86) Width over 30 to 48 In., Incl.*

SAE/AMS (Aluminium) - continued.

- SAE/AMS 4074 (Jul-81) Aluminum Alloy, Sheet & Plate, Alclad 4.5 Cu - 1.5 Mg - 0.60 Mn - (Alclad 2024-T86) Width over 30 to 48 In., Incl.*
- SAE/AMS 4075 (Jul-81) Aluminum Alloy, Sheet & Plate, Alclad 4.5 Cu - 1.5 Mg - 0.60 Mn - (Alclad 2024-T86) Width over 60 In.*
- SAE/AMS 4076B (Feb-49) Aluminum Alloy, Tubing (Seamless) Magnesium Silicon Chromium (53S-W)*
- SAE/AMS 4077E (Oct-91) Aluminum Alloy, Sheet & Plate, Alclad One Side 4.4Cu 1.5Mg 0.60Mn Annealed
- SAE/AMS 4078E (Jul-92) Aluminum Alloy, Plate 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4079E (May-96) Aluminum Alloy, Drawn, Round, Seamless, Tubing 1.0Mg 0.06Si 0.28Cu 0.20Cr Close Tolerance, Annealed
- SAE/AMS 4080L (May-96) Aluminum Alloy, Drawn, Seamless Tubing 1.0Mg 0.60Si 0.28Cu 0.20Cr, Annealed
- SAE/AMS 4081G (Jan-93) Aluminum Alloy, Tubing, Hydraulic, Seamless, Drawn, Round 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated & Naturally Aged
- SAE/AMS 4082M (Dec-94) Aluminum Alloy, Seamless Drawn Tubing, 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution & Precipitation Heat Treated
- SAE/AMS 4083J (Jan-93) Aluminum Alloy, Tubing, Hydraulic, Seamless, Drawn, Round, 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution & Precipitation Heat Treated
- SAE/AMS 4084C (Jul-90) Aluminum Alloy, Sheet 5.7Zn 2.2Mg 1.6Cu 0.22Cr Solution & Precipitation Heat Treated
- SAE/AMS 4085B (Jan-86) Aluminum Alloy, Sheet 5.7Zn 2.2Mg 1.6Cu 0.22Cr Solution Heat Treated & Overaged
- SAE/AMS 4086M (Nov-96) Aluminum Alloy, Drawn, Round, Seamless Hydraulic Tubing, 4.4Cu 1.5Mg 0.6Mn, Solution Heat Treated, Cold Worked & Naturally Aged
- SAE/AMS 4087F (Oct-90) Aluminum Alloy, Tubing, Seamless, Drawn, 4.4Cu 1.5Mg 0.60Mn Annealed
- SAE/AMS 4088H (Oct-90) Aluminum Alloy, Tubing, Seamless, Drawn, 4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated & Cold Worked
- SAE/AMS 4089B (Jul-87) Aluminum Alloy, Plate, 5.7Zn 2.2Mg 1.6Cu 0.22Cr(7475-T7651) Solution Heat Treated, Stress Relieved by Stretching & Precipitation Heat Treated
- SAE/AMS 4090C (Sep-96) Aluminum Alloy, Plate 5.7Zn 2.2Mg 1.6Cu 0.22Cr Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4091A (Invalid D) Aluminum Alloy, Tubing Hydraulic (6062 T4)*
- SAE/AMS 4093A (Invalid D) Aluminum Alloy, Tubing, Hydraulic (6062 T6)*
- SAE/AMS 4094B (Sep-97) Aluminum Alloy, Sheet & Plate, Alclad 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti Alclad 2219-T81 Sheet Solution Heat Treated, Cold Worked, & Precipitation Heat Treated Alclad 2219-T851 Plate Solution Heat Treated, Stress Relieved & Precipitation Heat Treated
- SAE/AMS 4095B (Oct-93) Aluminum Alloy, Sheet & Plate, Alclad 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti, Alclad 2219 T31; Sheet, Solution Heat Treated & Cold Worked Alclad 2219-T351; Plate, Solution Heat Treated & Stress Relieved
- SAE/AMS 4096A (Apr-84) Sheet & Plate, Alclad - 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti, Annealed
- SAE/AMS 4097 (Invalid D) Aluminum Alloy, Sheet & Plate 4.5 Cu - 1.5 Mg - 0.60 Mn (2024-T36) Width 48 In. & Under*
- SAE/AMS 4098 (Invalid D) Aluminum Alloy, Sheet & Plate 4.5 Cu - 1.5 Mg - 0.60 Mn (2024-T36) Width over 48 to 60 In., Incl.*
- SAE/AMS 4099 (Invalid D) Aluminum Alloy, Sheet & Plate 4.5 Cu - 1.5 Mg - 0.60 Mn (2024-T36) Width over 60 In.*
- SAE/AMS 4100B (Apr-93) Aluminum Alloy, Sheet, Alclad, 5.7Zn 2.2Mg 1.6Cu 0.22Cr Solution & Precipitation Heat Treated
- SAE/AMS 4101B (Mar-95) Aluminum Alloy, Plate, 4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated, Stretched, & Precipitation Heat Treated
- SAE/AMS 4102F (Oct-90) Aluminum Alloy, Bars, Rods, & Wire, Rolled or Cold-Finished 99.0A1, As Fabricated
- SAE/AMS 4103 (Invalid D) Aluminum Alloy, Sheet & Plate 4.5Cu 1.5Mg 0.60Mn (2024-T36) Width 30 In. & Under*
- SAE/AMS 4104 (Invalid D) Aluminum Alloy, Sheet & Plate 4.5Cu 1.5Mg 0.60Mn (2024-T36) Width over 30 to 48 In., Incl.*
- SAE/AMS 4105 (Jul-81) Aluminum Alloy, Sheet & Plate 4.5Cu 1.5Mg 0.60Mn (2024-T86) Width over 48 to 60 In., Incl.*
- SAE/AMS 4106 (Jul-81) Aluminum Alloy, Sheet & Plate 4.5Cu 1.5Mg 0.60Mn (2024-T86) Width over 60 Inches*
- SAE/AMS 4107D (Apr-92) Aluminum Alloy, Die Forgings 6.2Zn 2.3Cu 2.2Mg 0.12Zr, Solution Heat Treated & Overaged
- SAE/AMS 4108E (May-96) Aluminum Alloy, Hand Forgings, 6.2Zn 2.3Cu 2.2Mg 0.12Zr Solution Heat Treated, Compression Stress-Relieved, & Overaged
- SAE/AMS 4109A (Invalid D) Aluminum Alloy, Hand Forgings, 5.6Zn 2.5Mg 1.6Cu 0.24Cr*
- SAE/AMS 4110D (Invalid D) Aluminum Alloy, Bars & Rods, Rolled or Cold Finished 4.0Cu 0.70Mn 0.50Mg Stress Relief Stretched*
- SAE/AMS 4111B (Jul-84) Aluminum Alloy, Forgings 7.7Zn 2.5Mg 1.5Cu 0.16Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4112D (Jul-77) Aluminum Alloy, Bars, Rods, & Wire 4.4Cu 1.5Mg 0.60Mn Rolled, Drawn, or Cold Finished*
- SAE/AMS 4113C (Jan-94) Aluminum Alloy, Extruded Shapes, 1.0Mg 0.60Si 0.28Cu 0.20Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4114G (Oct-90) Aluminum Alloy, Rolled or Cold-Finished, Bars & Rods, 2.5Mg 0.25Cr, As Fabricated
- SAE/AMS 4115F (Sep-96) Aluminum Alloy, Rolled or Cold-Finished, Bars, Rods, Wire, & Flash Welded Rings, 1.0Mg 0.60Si 0.28Cu 0.20Cr, (6061-0) Annealed
- SAE/AMS 4116F (Sep-96) Aluminum Alloy, Bars, Rods, & Wire, 1.0Mg 0.60Si 0.30Cu 0.20Cr Cold Finished, Solution Heat Treated

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SAE/AMS (Aluminium) - continued.

- SAE/AMS 4117G (Jul-94) Aluminum Alloy, Rolled or Cold Finished Bars, Rods, & Wire & Flash Welded Rings, 1.0Mg 0.60Si 0.28Cu 0.20Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4118J (Jan-94) Aluminum Alloy, Rolled or Cold Finished Bars, Rods, & Wire, 4.0Cu 0.70Mn 0.60Mg 0.50Si, Solution Heat Treated
- SAE/AMS 4119F (Invalid D) Aluminum Alloy, Bars, Rolled Drawn, or Cold Finished 4.4Cu 1.5Mg 0.60Mn Stress-Relief Stretched*
- SAE/AMS 4120P (Apr-95) Aluminum Alloy, Rolled or Cold Finished Bars, Rods, & Wire, 4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated & Naturally Aged, Solution Heat Treated, Cold Worked, & Naturally Aged
- SAE/AMS 4121F (Jan-90) Aluminum Alloy, Bars, Rods, & Wire Rolled or Cold Finished, 4.5Cu 0.85Si 0.80Mn 0.50Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4122H (Oct-89) Aluminum Alloy, Bars, Rods, & Wire Rolled or Cold Finished, & Rings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4123F (Oct-93) Aluminum Alloy, Rolled or Cold Finished Bars & Rods 5.6Zn 2.5Mg 1.6Cu 0.23Cr (7075-T651) Solution & Precipitation Heat Treated
- SAE/AMS 4124C (Apr-97) Aluminum Alloy, Rolled or Cold Finished Bars, Rods, & Wire 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated, Stress Relieved by Stretching, & Overaged
- SAE/AMS 4125H (Apr-91) Aluminum Alloy, Die Forgings, & Rolled or Forged Rings 0.90Si 0.62Mg 0.25Cr Solution & Precipitation Heat Treated
- SAE/AMS 4126B (Sep-96) Aluminum Alloy, Die & Hand Forgings & Rolled Rings 5.6Zn 2.5Mg 1.6Cu 0.23Cr (7079-T6) Solution & Precipitation Heat Treated
- SAE/AMS 4127G (Jul-91) Aluminum Alloy, Forgings & Rolled or Forged Rings, 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution & Precipitation Heat Treated
- SAE/AMS 4128B (Oct-86) Aluminum Alloy, Bars, Rolled or Cold Finished 1.0Mg 0.60Si 0.30Cu 0.20Cr (6061-T451) Solution Heat Treated & Stress Relieved by Stretching
- SAE/AMS 4129B (Invalid D) Aluminum Alloy, Bars, Rolled or Cold Finished 1.0Mg 0.60Si 0.28Cu 0.20Cr Stress Relief Stretched*
- SAE/AMS 4130K (Apr-91) Aluminum Alloy, Die Forgings 4.4Cu 0.85Si 0.80Mn Solution & Precipitation Heat Treated
- SAE/AMS 4131C (Nov-96) Aluminum Alloy, Die & Hand Forgings 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Solution & Precipitation Heat Treated & Aged
- SAE/AMS 4132D (Jan-90) Aluminum Alloy, Die & Hand, Forgings, Rolled Rings, & Forging Stock, 2.3Cu 1.6Mg 1.1Fe 1.0Ni 0.18Si 0.07Ti, Solution & Precipitation Heat Treated
- SAE/AMS 4133C (Jul-90) Aluminum Alloy, Forgings & Rolled Rings, 4.4Cu 0.85Si 0.80Mn 0.50Mg Solution & Precipitation Heat Treated
- SAE/AMS 4134D (Jan-97) Aluminum Alloy, Die Forgings 4.4Cu 0.85Si 0.80Mn 0.50Mg, Solution Heat Treated
- SAE/AMS 4135M (Invalid D) Aluminum Alloy, Forgings 4.5Cu 0.85Si 0.8Mn 0.5Mg*
- SAE/AMS 4136A (Jun-62) Aluminum Alloy, Forgings, 4.3Zn 3.3Mg 0.6Cu 0.2Mn 0.2Cr, Solution & Precipitation Heat Treated, Low Residual Stresses*
- SAE/AMS 4137A (Jul-81) Aluminum Alloy, Forgings 7.5Zn 1.6Mg 0.7Cu 0.55Mn (76S - T6)*
- SAE/AMS 4138A (May-72) Aluminum Alloy, Forgings, 4.3Zn 3.3Mg 0.6Cu 0.2Mn 0.2Cr
- SAE/AMS 4139H (May-72) Aluminum Alloy, Forgings, 5.6Zn 2.5Mg 1.6Cu 0.25Cr*
- SAE/AMS 4140G (Oct-91) Aluminum Alloy, Die Forgings 4.0Cu 2.0Ni 0.68Mg Solution & Precipitation Heat Treated
- SAE/AMS 4141D (Jul-90) Aluminum Alloy, Die Forgings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated
- SAE/AMS 4142C (Invalid D) Aluminum Alloy, Forgings 4Cu 2Ni 1.5Mg 0.7Si As Fabricated*
- SAE/AMS 4143C (Jul-91) Aluminum Alloy, Forgings & Rolled or Forged Rings 6.3Cu 0.3Mn 0.18Zr 0.10V 0.06Ti, Solution & Precipitation Heat Treated
- SAE/AMS 4144E (Jul-95) Aluminum Alloy, Hand Forgings & Rings 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti Solution Heat Treated, Mechanically Stress Relief, & Precipitation Heat Treated
- SAE/AMS 4145F (Feb-52) Aluminum Alloy, Forgings, 12.2Si 1.1Mg 0.9Cu 0.9Ni*
- SAE/AMS 4146D (Oct-91) Aluminum Alloy, Forgings & Rolled or Forged Rings 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated & Naturally Aged
- SAE/AMS 4147C (Jul-92) Aluminum Alloy, Forgings 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated, Stress Relieved by Compression, & Overaged
- SAE/AMS 4148C (Jan-93) Aluminum Alloy, Die Forgings 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated
- SAE/AMS 4149B (Oct-87) Aluminum Alloy, Forgings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr [7175-T74 (formerly T736)] Solution & Precipitation Heat Treated
- SAE/AMS 4150K (Sep-97) Aluminum Alloy, Extrusions & Rings 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution & Precipitation Heat Treated
- SAE/AMS 4151A (Nov-44) Aluminum Alloy, Copper Manganese Magnesium (17S-T) Extruded*
- SAE/AMS 4152L (Apr-93) Aluminum Alloy, Extrusions 4.4Cu 1.5Mg 0.60Mn Solution Heat Treated
- SAE/AMS 4153H (Apr-90) Aluminum Alloy, Extrusions, 4.5Cu 0.85Si 0.80Mn 0.50Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4154L (Jul-90) Aluminum Alloy, Extrusions, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution & Precipitation Heat Treated
- SAE/AMS 4155B (Invalid D) Aluminum Alloy, Extrusions*
- SAE/AMS 4156H (Jan-91) Extrusions, Aluminum Alloy, 0.68Mg 0.40Si Solution & Precipitation Heat Treated
- SAE/AMS 4157C (May-94) Aluminum Alloy, Extrusions, 7.7Zn 2.4Mg 1.6Cu 0.16Cr (7049-T73511), Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4158A (Jul-81) Aluminum Alloy, Extrusions 6.8 Zn - 2.75 Mg - 2.0 Cu - 0.3 Cr (7178-T6)*
- SAE/AMS 4159B (Apr-89) Aluminum Alloy, Extrusions, 7.7Zn 2.4Mg 1.6Cu 0.16Cr, Solution Heat Treated, Stress Relieved & Overaged
- SAE/AMS 4160F (May-96) Aluminum Alloy, Extrusions 1.0Mg 0.60Si 0.28Cu 0.20Cr Annealed

SAE/AMS (Aluminium) - continued.

- SAE/AMS 4161F (May-96) Aluminum Alloy, Extrusions
1.0Mg 0.60Si 0.28Cu 0.20Cr, Solution Heat Treated & Naturally Aged
- SAE/AMS 4162B (Apr-90) Aluminum Alloy, Extrusions,
6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti, (2219-T8511)
Solution Treated, Stress Relief Stretched, Precipitation Heat Treated
- SAE/AMS 4163B (Apr-90) Aluminum Alloy, Extrusions,
6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti Solution Heat Treated & Stress-Relieved by Stretching
- SAE/AMS 4164F (Apr-90) Aluminum Alloy, Extrusions,
4.4Cu 1.5Mg 0.60Mn, Stress-Relief Stretched,
Unstraightened
- SAE/AMS 4165F (Apr-92) Aluminum Alloy, Extrusions
4.4Cu 1.5Mg 0.60Mn, Stress-Relieved Stretched & Straightened
- SAE/AMS 4166D (Jan-91) Extrusions, Aluminum Alloy,
5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated & Overaged
- SAE/AMS 4167G (Jul-95) Aluminum Alloy, Extrusions,
5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated,
Stress Relieved by Stretching, & Overaged
- SAE/AMS 4168G (Apr-92) Aluminum Alloy, Extrusions
5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated,
Stress Relieved by Stretching, & Precipitation Heat Treated Unstraightened
- SAE/AMS 4169H (Apr-92) Aluminum Alloy, Extrusions
5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated,
Stress Relieved by Stretching, & Precipitation Heat Treated Straightened
- SAE/AMS 4170 (Jul-81) Aluminum Alloy, Impact Extrusions
5.6Zn 2.5Mg 1.6Cu 0.25Cr (75S-T6)*
- SAE/AMS 4171C (Apr-78) Aluminum Alloy Extrusions,
4.3Zn 3.3Mg 0.60Cu 0.20Mn 0.18Cr*
- SAE/AMS 4172D (May-96) Aluminum Alloy, Extrusions
1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated & Stress Relieved by Stretching
- SAE/AMS 4173C (Jul-91) Aluminum Alloy, Extrusions
1.0Mg 0.60Si 0.30Cu 0.20Cr Solution Heat Treated,
Stress Relieved by Stretching, & Precipitation Heat Treated
- SAE/AMS 4174C (Dec-94) Aluminum Alloy, Flash Welded
Rings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4175B (Jan-77) Honeycomb Core, Aluminum Alloy, For Sandwich Construction, 5052, 350 (175)
- SAE/AMS 4176B (Jan-77) Honeycomb Core, Aluminum Alloy, For Sandwich Construction, 5056, 350 (175)
- SAE/AMS 4177C (Apr-95) Core, Flexible Honeycomb, Aluminum Alloy, for Sandwich Construction, 5056, 350 (177)
- SAE/AMS 4178C (Nov-95) Core, Flexible Honeycomb, Aluminum Alloy, Treated, For Sandwich Construction, 5052, 350 (177)
- SAE/AMS 4179B (Jan-87) Aluminum Alloy, Forgings 5.6Zn 2.5Mg 1.6Cu 0.23Cr (7175-T7452) Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4180E (Oct-93) Aluminum Wire, 99.0Al Minimum (1100-H18)
- SAE/AMS 4181B (Jul-96) Aluminum Alloy, Welding Wire
7.0Si 0.38Mg 0.10Ti
- SAE/AMS 4182E (Oct-93) Aluminum Alloy, Wire 5.0Mg 0.12Mn 0.12Cr (5056-0), Annealed
- SAE/AMS 4184D (Oct-90) Filler Metal, Aluminum Brazing,
10Si 4.0Cu
- SAE/AMS 4185C (Oct-90) Filler Metal, Aluminum Brazing,
12Si
- SAE/AMS 4186B (Apr-89) Aluminum Alloy, Bars, Rods, & Wire, Rolled or Cold Finished, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, As Fabricated
- SAE/AMS 4187B (Jan-83) Bars & Rods, Rolled, Drawn, or Cold Finished 5.6Zn 2.5Mg 1.6Cu 0.26Cr, Annealed
- SAE/AMS 4188/1 (Invalid D) Aluminum Alloy, Welding Wire
4.5Cu 0.70Ag 0.30Mn 0.25Mg 0.25Ti*
- SAE/AMS 4188/2 (Invalid D) Aluminum Alloy, Welding Wire
4.6Cu 0.35Mn 0.25Mg 0.22Ti*
- SAE/AMS 4188/3 (Invalid D) Aluminum Alloy, Welding Wire
5.0Si 1.2Cu 0.50Mg*
- SAE/AMS 4188/4 (Invalid D) Aluminum Alloy, Welding Wire
7.0Si 0.30Mg*
- SAE/AMS 4188/5 (Invalid D) Aluminum Alloy, Welding Wire
7.0Si 0.52Mg*
- SAE/AMS 4188A (Invalid D) Aluminum Alloy, Welding Wire*
- SAE/AMS 4189E (Jul-96) Aluminum Alloy, Welding Wire
4.1Si 0.2Mg
- SAE/AMS 4190F (Jul-96) Aluminum Alloy, Welding Wire
5.2Si
- SAE/AMS 4191F (Jul-96) Aluminum Alloy, Welding Wire,
6.3Cu 0.3Mn 0.18Zr 0.15Ti 0.10V
- SAE/AMS 4192A (Invalid D) Aluminum Alloy, Sheet & Plate
4.4Cu 1.5Mg 0.60Mn (2024-T361)*
- SAE/AMS 4193B (Apr-89) Aluminum Alloy, Sheet & Plate,
4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated, Cold Worked, & Precipitation Heat Treated
- SAE/AMS 4194B (Apr-89) Aluminum Alloy, Sheet & Plate,
Alclad, 4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated & Cold Worked
- SAE/AMS 4195B (Jan-89) Aluminum Alloy, Sheet & Plate,
Alclad, 4.4Cu 1.5Mg 0.60Mn, Solution Heat Treated, Cold Worked, & Precipitation Heat Treated
- SAE/AMS 4196A (Invalid D) Aluminum Alloy, Sheet & Plate,
Alclad, 5.6Zn 2.5Mg 1.6Cu 0.26Cr*
- SAE/AMS 4197A (Invalid D) Aluminum alloy Sheet & Plate,
Alclad 5.6Zn 2.5Mg 1.6Cu 0.26Cr*
- SAE/AMS 4198A (Invalid D) Aluminum Alloy, Sheet Plate Alclad 4.3Zn-3.3Mg-0.6Cu-0.20Mn-0.17C (7011 Alclad 7079-0)*
- SAE/AMS 4199A (Invalid D) Aluminum Alloy, Sheet & Plate,
Alclad 4.3Zn 3.3Mg 0.6Cu 0.20Mn 0.17Cr*
- SAE/AMS 4200A (Oct-91) Aluminum Alloy, Plate 7.7Zn 2.4Mg 1.6Cu 0.16Cr Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4201B (Jul-92) Aluminum Alloy, Plate 6.2Zn 2.3Cr 2.2Mg 0.12Zr Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4202C (Jul-89) Aluminum Alloy, Plate, 5.7Zn 2.2Mg 1.6Cu 0.22Cr, Solution Heat Treated, Stress Relieved by Stretching, & Precipitation Heat Treated
- SAE/AMS 4203B (Nov-96) Aluminum Alloy, Plate, 6.2Zn 1.8Cu 2.4Mg 0.13Zr, Solution Heat Treated, Stress Relieved & Precipitation Heat Treated
- SAE/AMS 4204B (Nov-95) Aluminum Alloy, Plate 6.2Zn 1.8Cu 2.4Mg 0.13Zr, Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated

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SAE/AMS (Aluminium) - continued.

- SAE/AMS 4205B (Nov-95) Aluminum Alloy, Plate 6.2Zn 1.8Cu 2.4Mg 0.13Zr, Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4207A (Apr-89) Aluminum Alloy, Sheet, Alclad, 5.7Zn 2.2Mg 1.6Cu 0.22Cr, Solution & Precipitation Heat Treated
- SAE/AMS 4208A (Apr-90) Aluminum Alloy, Sheet, 6.0Cu 0.40Zr, As Rolled
- SAE/AMS 4209A (Oct-90) Aluminum Alloy, Sheet, Alclad, 6.0Cu 0.40Zr, As Rolled
- SAE/AMS 4210J (Mar-96) Aluminum Alloy, Castings 5.0Si 1.2Cu 0.50Mg Precipitation Heat Treated
- SAE/AMS 4212H (Mar-96) Aluminum Alloy, Castings 5.0Si 1.2Cu 0.50Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4214G (Jan-91) Castings, Aluminum Alloy, Sand 5.0Si 1.2Cu 0.50Mg Solution Heat Treated & Stabilized
- SAE/AMS 4215F (Dec-94) Aluminum Alloy, Castings 5.0Si 1.2Cu 0.50Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4216 (Jul-89) Aluminum Alloy, Sheet, 1.0Mg 0.8Si 0.8Cu 0.50Mn, Solution Heat Treated & Artificially Aged
- SAE/AMS 4217G (Jun-96) Aluminum Alloy, Castings 7Si 0.3Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4218G (Jan-94) Aluminum Alloy, Castings, 7.0Si 0.35Mg, Solution & Precipitation Heat Treated
- SAE/AMS 4219C (Jul-92) Aluminum Alloy, Castings 7.0Si 0.55Mg, 0.12Ti 0.06Be, Solution & Precipitation Heat Treated
- SAE/AMS 4220E (Jun-69) Aluminum Alloy, Castings, Sand, 4Cu 2Ni 1.5Mg 0.2Cr, Solution Treated & Overaged*
- SAE/AMS 4221A (Sep-95) Aluminum Alloy, Plate 4.4Cu 1.5Mg 0.60Mn (2124-T8151) Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4222G (Apr-84) Castings, Sand, Moderate Heat Resistance, 4Cu 2Ni 1.5Mg 0.12Ti, Solution Heat Treated & Stabilized
- SAE/AMS 4223C (Mar-96) Aluminum Alloy, Castings 4.5Cu 0.70Ag 0.30Mn 0.25Mg 0.25Ti, Solution Heat Treated & Naturally Aged
- SAE/AMS 4224B (Oct-87) Aluminum Alloy, Castings, Sand, 4.0Cu 2.1Ni 2.0Mg 0.30Cr 0.30Mn 0.13Ti 0.13V (243.0), Stabilized
- SAE/AMS 4225C (Jul-96) Aluminum Alloy, Heat Resistant, Castings 5.0Cu 1.5Ni 0.25Mn 0.25Sb 0.25Co 0.20Ti 0.20Zr, Solution Heat Treated & Stabilized
- SAE/AMS 4226A (Nov-68) Castings, High Strength, 5.0Cu 0.35Mn 0.18Zr 0.10V, Solution & Precipitation Heat Treated
- SAE/AMS 4227D (Apr-88) Aluminum Alloy, Castings, Sand, 8.0Cu 6.0Mg 0.50Mn 0.50Ni, As Cast
- SAE/AMS 4228B (Jan-76) Aluminum Alloy, Castings, High Strength, 4.5Cu 0.70Ag 0.30Mn 0.25Mg 0.25Ti, Solution & Precipitation Heat Treated*
- SAE/AMS 4229C (Jan-90) Aluminum Alloy, Castings, High Strength, 4.5Cu 0.70Ag 0.30Mn 0.25Mg 0.25Ti, Solution Heat Treated & Overaged
- SAE/AMS 4230D (Aug-58) Aluminum Alloy, Castings, Sand, 4.5Cu, Solution Treated*
- SAE/AMS 4231F (Jul-83) Castings, Sand, 4.5Cu 1.1Si, Solution & Precipitation Heat Treated
- SAE/AMS 4232 (Jan-90) Aluminum Alloy, Extrusion, 2.7Cu 2.2Li 0.12Zr, Solution Heat Treated, Cold Worked, & Precipitation Heat Treated
- SAE/AMS 4233B (Jul-96) Aluminum Alloy, Welding Wire 4.5Cu 0.70Ag 0.30Mn 0.25Mg 0.25Ti
- SAE/AMS 4234A (May-45) Aluminum Alloy, Castings Sand Secondary 4 Copper Solution & Precipitation*
- SAE/AMS 4235A (Jan-87) Aluminum Alloy, Castings 4.6Cu 0.35Mn 0.25Mg 0.22Ti (A206.0-T71) Solution & Precipitation Heat Treated
- SAE/AMS 4236A (Jan-87) Aluminum Alloy, Castings 4.6Cu 0.35Mn 0.25Mg 0.22Ti (A206.0-T4) Solution Heat Treated & Naturally Aged
- SAE/AMS 4237A (Oct-87) Aluminum Alloy, Castings, Sand, 4.6Cu 0.35Mn 0.25Mg 0.22Ti (206.0-T71), Solution Heat Treated & Naturally Aged
- SAE/AMS 4238D (Jul-91) Aluminum Alloy Castings, Sand 6.8Mg 0.18Ti 0.18Mn, As Cast
- SAE/AMS 4239C (Jul-91) Aluminum Alloy Castings, Sand 6.8Mg 0.18Ti 0.18Mn, Annealed
- SAE/AMS 4240F (Jul-82) Castings, Sand, 10Mg, Solution Heat Treated & Naturally Aged
- SAE/AMS 4241A (Jul-92) Aluminum Alloy, Castings 7.0Si 0.58Mg 0.15Ti 0.06Be (D357.0-T6) Solution & Precipitation Heat Treated Dendrite Arm Spacing (DAS) Controlled
- SAE/AMS 4242A (Sep-97) Aluminum Alloy, Castings, 4.7Cu 0.60Ag 0.35Mn 0.25Mg 0.25Ti (B201.0-T7) Solution Heat Treated & Overaged Aircraft
- SAE/AMS 4243A (Nov-96) Aluminum Alloy, Alclad Sheet 6.2Zn 2.3Cu 2.2Mg 0.12Zr, Solution Heat Treated & Overaged
- SAE/AMS 4244 (Jan-87) Aluminum Alloy, Welding Wire 4.6Cu 0.35Mn 0.25Mg 0.22Ti for Welding 206 Type Alloys
- SAE/AMS 4245B (Jul-96) Aluminum Alloy, Welding Wire 5.0Si 1.2Cu 0.50Mg
- SAE/AMS 4246B (Jul-96) Aluminum Alloy, Welding Wire 7.0Si 0.52Mg
- SAE/AMS 4247A (May-94) Aluminum Alloy, Hand Forgings 7.7Zn 2.4Mg 1.6Cu 0.16Cr (7049-T7352) Solution Heat Treated, Stress Relieved by Compression, & Precipitation Heat Treated
- SAE/AMS 4248A (Apr-93) Aluminum Alloy, Hand Forgings & Rolled Rings 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated, Stress Relief by Compression, & Precipitation Heat Treated
- SAE/AMS 4249 (Jul-92) Aluminum Alloy, Castings 7.0Si 0.58Mg 0.15Ti 0.06Be Solution & Precipitation Heat Treated (Requiring Fatigue & Fracture Toughness Testing)
- SAE/AMS 4251 (Apr-89) Aluminum Alloy, Sheet, 2.7Cu 2.2Li 0.12Zr, Solution Heat Treated, Cold Worked, & Precipitation Heat Treated
- SAE/AMS 4252A (Mar-95) Aluminum Alloy, Plate 6.4Zn 2.4Mg 2.2Cu 0.12Zr, Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4253 (Jul-89) Aluminum Alloy, Aramid Fiber Reinforced-Laminated Sheet, 5.7Zn 2.2Mg 1.6Cu 0.22Cr, 3, 5, 7, or 9 Ply
- SAE/AMS 4254A (Jan-93) Aluminum Alloy, Aramid Fiber Reinforced, Laminated Sheet 4.4Cu 1.5Mg 0.6Mn, 3, 5, 7, or 9 Ply

SAE/AMS (Aluminium) - continued.

SAE/AMS 4255A (Sep-95) Aluminum Alloy, Clad One Side Sheet 0.6Mg 0.35Si 0.28Cu (No. 21 Brazing Sheet) As Fabricated

SAE/AMS 4256A (Sep-95) Aluminum Alloy, Clad Two Sides Sheet 0.6Mg 0.35Si 0.28Cu (No. 22 Brazing Sheet) As Fabricated

SAE/AMS 4258 (Jan-92) Laminated Sheet Aluminum Alloy, Aramid Fiber Reinforced 5.7Zn 2.2Mg 1.6Cu 0.22Cr. (Alclad, One Side 7475-T761) 5 or 7 Ply

SAE/AMS 4259 (Apr-94) Aluminum Alloy, Sheet 2.4Li 1.3Cu 0.95Mg 0.10Zr Solution & Precipitation Heat Treated (Unrecrystallized)

SAE/AMS 4260E (Jul-94) Aluminum Alloy, Investment Castings, 7.0Si 0.32Mg, Solution & Precipitation Heat Treated

SAE/AMS 4261D (Jul-91) Aluminum Alloy, Castings, Investment 7.0Si 0.30Mg, Precipitation Heat Treated

SAE/AMS 4263A (Jul-89) Aluminum Silicon Bronze Bars, Rods, & Forgings, 90Cu 7.0Al 1.9Si, Drawn & Stress Relieved*

SAE/AMS 4264A (Apr-92) Bronze, Aluminum Silicon, Rods, Bars, & Forgings 90Cu 7.0Al 1.8Si Drawn & Stress Relieved (HR50)

SAE/AMS 4265 (Nov-94) Aluminum Alloy, Particulate Reinforced Extrusions 6092/SiC/25p - T6P Solution Heat Treated, Quenched, & Precipitation Heat Treated

SAE/AMS 4266 (Mar-94) Aluminum Alloy, Sheet 6.5Fe 1.3Si 0.60V (8002-H112) Powder Metallurgy Product, Strain Hardened

SAE/AMS 4270A (Sep-97) Aluminum Alloy, Alclad Flat Sheet 4.1Cu 1.4Mg 0.45Mn Solution Heat Treated & Cold Worked

SAE/AMS 4273 (Jan-97) Aluminum Alloy, Sheet 4.1Cu 1.4Mg 0.45Mn Solution Heat Treated & Cold Worked

SAE/AMS 4275D (Jan-77) Castings, Permanent Mold, 6.2Sn 1Cu 1Ni, Stress Relieved

SAE/AMS 4276 (Sep-97) Aluminum Alloy, Sheet 4.4Cu 1.5Mg 0.60Mn Annealed, Fine Grained

SAE/AMS 4280G (Apr-90) Aluminum Alloy, Castings, Permanent Mold, 5.0Si 1.2Cu 0.5Mg, Solution Heat Treated & Overaged

SAE/AMS 4281E (Oct-89) Aluminum Alloy, Castings, Permanent Mold, 5Si 1.2Cu 0.5Mg, Solution & Precipitation Heat Treated

SAE/AMS 4282E (Oct-81) Aluminum Alloy, Castings, Permanent Mold 4.5Cu 2.5Si Solution & Precipitation Heat Treated6*

SAE/AMS 4283D (Jul-81) Aluminum Alloy, Casting, Permanent Mold 4.5 Cu, 2.5 Si (BI 95-T4) Solution Treated*

SAE/AMS 4284F (Oct-89) Aluminum Alloy, Castings, Permanent Mold, 7Si 0.3Mg, Solution & Precipitation Heat Treated

SAE/AMS 4285B (Jan-90) Aluminum Alloy, Castings, Centrifugal, 7.0Si 0.3Mg, Solution & Precipitation Heat Treated

SAE/AMS 4286D (Jul-84) Aluminum Alloy, Castings, Permanent Mold 7Si 0.32Mg, Precipitation Heat Treated

SAE/AMS 4290J (Mar-96) Aluminum Alloy, Die Castings 9.5Si 0.50Mg, As Cast

SAE/AMS 4291F (Mar-96) Aluminum Alloy, Die Castings 8.5Si - 3.5Cu As Cast

SAE/AMS 4292 (Jun-56) Cast Aluminum Alloy, Pressure Molded (Aluminum Silicon)*

SAE/AMS 4296 (Sep-97) Aluminum Alloy, Alclad Sheet & Plate 4.3Cu 1.4Mg 0.60Mn Solution Heat Treated & Cold Worked

SAE/AMS 4300B (Jul-90) Boron-Aluminum Composite Sheet, 50 V/O 5.6B, 6061-0, For Diffusion Bonding

SAE/AMS 4301C (Apr-85) Boron-Aluminum Composite Sheet - 50 V/O 5.6B, 2024-0, For Diffusion Bonding*

SAE/AMS 4302A (Jan-92) Aluminum Alloy, Laminated, Sheet, Aramid Fiber Reinforced, 5.7Zn 2.2Mg 1.6Cu 0.22Cr, 3, 5, or 7 Ply

SAE/AMS 4303 (Jan-90) Aluminum Alloy, Plate, 2.7Cu 2.2Li 0.12Zr, Solution Heat Treated, Cold Worked, & Aged

SAE/AMS 4304 (Jan-93) Aluminum Alloy, Discontinuously Reinforced Sheet 2009/SiC/15W (T8P) Solution Heat Treated, Stretched, & Precipitation Heat Treated

SAE/AMS 4306A (Oct-93) Aluminum Alloy, Plate 6.4Zn 2.4Mg 2.2Cu 0.12Zr, Solution Heat Treated, Stress Relieved, & Aged

SAE/AMS 4307 (Oct-88) Aluminum Alloy, Extrusions, 6.4Zn 2.4Mg 2.2Cu 0.12Zr, Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated

SAE/AMS 4308 (Apr-94) Aluminum Alloy, Sheet, 8.6Fe 1.8Si 1.3V Powder Metallurgy Product, Strain Hardened

SAE/AMS 4309 (Apr-94) Aluminum Alloy, Extrusions 8.6Fe 1.8Si 1.3V Powder Metallurgy Product, Strain-Hardened

SAE/AMS 4310C (Jun-94) Aluminum Alloy, Rolled or Forged Rings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr (7075-T651, 7075-T652), Solution Heat Treated, Mechanically Stress Relieved, & Precipitation Heat Treated

SAE/AMS 4311C (Jul-94) Aluminum Alloy, Rolled or Forged Rings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated, Mechanically Stress Relieved, & Precipitation Heat Treated

SAE/AMS 4312B (Mar-94) Aluminum Alloy Rings, Rolled or Forged Rings, 1.0Mg 0.60Si 0.28Cu 0.20Cr Solution Heat Treated, Mechanically Stress Relieved, & Precipitation Heat Treated

SAE/AMS 4313B (May-94) Aluminum Alloy, Rolled or Forged Rings, 6.3Cu 0.30Mn 0.18Zr 0.10V 0.06Ti, Solution Heat Treated & Mechanically Stress Relieved

SAE/AMS 4314B (Jan-87) Aluminum Alloy, Rings, Rolled or Forged 4.5Cu 0.85Si 0.80Mn 0.50Mg Solution Heat Treated, Mechanically Stress Relieved & Precipitation Heat Treated

SAE/AMS 4318 (Jun-94) Aluminum Alloy, Rolled or Cold Finished Bars & Rods 12,2Si 1.0Mg 0.90Cu 0.90Ni (4032-T86) Solution Heat Treated, Cold Worked, & Artificially Aged

SAE/AMS 4320A (Jul-90) Aluminum Alloy, Forgings, 7.7Zn 2.5Mg 1.5Cu 0.16Cr, Solution & Precipitation Heat Treated

SAE/AMS 4321A (Jan-93) Aluminum Alloy, Forgings 7.7Zn 2.5Mg 1.5Cu 0.16Cr High Temperature Annealed

SAE/AMS 4322 (Jul-92) Aluminum Alloy, Die Forgings 4.0Mg 1.3Li 1.2C 0.45O₂ Mechanically Alloyed, As-Fabricated

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SAE/AMS (Aluminium) - continued.

- SAE/AMS 4323A (Jan-97) Aluminum Alloy, Hand Forgings, 5.6Zn 2.5Mg 1.6Cu 0.23Cr, Solution Heat Treated, Stress Relieved, & Precipitation Heat Treated
- SAE/AMS 4333A (May-96) Aluminum Alloy, Die Forgings, 6.2Zn 2.3Cu 2.2Mg 0.12Zr Solution Heat Treated, Compression Stress-Relieved, & Overaged
- SAE/AMS 4334 (Jul-95) Aluminum Alloy, Forgings 7.8Zn 2.2Mg 1.6Cu 0.15Cr
- SAE/AMS 4339 (Mar-94) Aluminum Alloy, Rolled or Cold Finished Bars & Rods 4.4Cu 1.5Mg 0.60Mn Solution Heat Treated, Cold Worked, & Artificially Aged
- SAE/AMS 4340C (Apr-89) Aluminum Alloy, Extrusions, 6.2Zn 2.3Cu 2.2Mg 0.12Zr, Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4341C (Oct-91) Aluminum Alloy, Extrusions 6.2Zn 2.3Cu 2.2Mg 0.12Zr Solution Heat Treated, Stress Relieved & Overaged
- SAE/AMS 4342B (Oct-91) Aluminum Alloy, Extrusions 6.2Zn 2.3Cu 2.2Mg 0.12Zr Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4343C (May-96) Aluminum Alloy, Extrusions, 7.7Zn 2.4Mg 1.6Cu 0.16Cr, Solution Heat Treated, Stress Relieved by Stretching, & Overaged
- SAE/AMS 4344A (Jul-90) Aluminum Alloy, Extrusions, 5.6Zn 2.5Mg 1.6Cu 0.23Cr Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4345 (Oct-89) Aluminum Alloy, Extrusions, 6.4Zn 2.4Mg 2.2Cu 0.12Zr, Solution Heat Treated, Stress Relieved, & Overaged
- SAE/AMS 4346A (Invalid D) Aluminum Alloy, Plate, 2.7Cu-2.2Li-0.12Zr (2090-T81) Solution Heat Treated, Cold Worked, & Precipitation Heat Treated
- SAE/AMS 4347A (Apr-92) Aluminum Alloy, Sheet, 1.0Mg 0.8Si 0.8Cu 0.50Mn Solution Heat Treated & Naturally Aged
- SAE/AMS 4348C (Apr-95) Core, Honeycomb Aluminum Alloy, Corrosion Inhibited, For Sandwich Construction, 5052, 350 (177)
- SAE/AMS 4349C (Apr-95) Core, Honeycomb, Aluminum Alloy, Corrosion Inhibited For Sandwich Construction 5056, 350 (177)

Note: * denotes that a standard has been cancelled or superseded as a result of technical committee action; photocopies are available from SAE.

ISO Standards

- ISO/R 115:1968 : Classification & composition of unalloyed aluminium ingots for remelting
- ISO/DIS 115 : Unalloyed aluminium ingots for remelting - Classification & composition (Revision of ISO/R 115:1968)
- ISO 121:1980 : Magnesium-aluminium-zinc alloy ingots & alloy castings - Chemical composition & mechanical properties of sand cast reference test bars
- ISO 209-1:1989 : Wrought aluminium & aluminium alloys - Chemical composition & forms of products - Part 1: Chemical composition
- ISO 209-2:1989 : Wrought aluminium & aluminium alloys - Chemical composition & forms of products - Part 2: Forms of products
- ISO 791:1973 : Magnesium alloys - Determination of aluminium - 8-hydroxyquinoline gravimetric method

- ISO 793:1973 : Aluminium & aluminium alloys - Determination of iron - Orthophenanthroline photometric method
- ISO 795:1976 : Aluminium & aluminium alloys - Determination of copper content - Oxalyldihydrazide photometric method
- ISO 796:1973 : Aluminium alloys - Determination of copper - Electrolytic method
- ISO 797:1973 : Aluminium & aluminium alloys - Determination of silicon - Gravimetric method
- ISO 808:1973 : Aluminium & aluminium alloys - Determination of silicon - Spectrophotometric method with the reduced silicomolybdic complex
- ISO 886:1973 : Aluminium & aluminium alloys - Determination of manganese - Photometric method (Manganese content between 0.005 & 1.5 %)
- ISO 1118:1978 : Aluminium & aluminium alloys - Determination of titanium - Spectrophotometric chromotropic acid method
- ISO 1784:1976 : Aluminium alloys - Determination of zinc - EDTA titrimetric method
- ISO 1965:1973 : Aluminium terminal ends for crimping to aircraft aluminium electrical cables
- ISO 2063, Publication:1991-11 : Metallic & other inorganic coatings; thermal spraying; zinc, aluminium & their alloys.
- ISO 2085:1976 : Anodizing of aluminium & its alloys - Check of continuity of thin anodic oxide coatings - Copper sulphate test
- ISO 2107:1983 : Aluminium, magnesium & their alloys - Temper designations
- ISO 2128:1976 : Anodizing of aluminium & its alloys - Determination of thickness of anodic oxide coatings - Non-destructive measurement by split-beam microscope
- ISO 2135:1984 : Anodizing of aluminium & its alloys - Accelerated test of light fastness of coloured anodic oxide coatings using artificial light
- ISO 2142:1981 : Wrought aluminium, magnesium & their alloys - Selection of specimens & test pieces for mechanical testing
- ISO 2143:1981 : Anodizing of aluminium & its alloys - Estimation of loss of absorptive power of anodic oxide coatings after sealing - Dye spot test with prior acid treatment
- ISO 2297:1973 : Chemical analysis of aluminium & its alloys - Complexometric determination of magnesium
- ISO 2376:1972 : Anodization (anodic oxidation) of aluminium & its alloys - Insulation check by measurement of breakdown potential
- ISO 2378:1972 : Aluminium alloy chill castings - Reference test bar
- ISO 2379:1972 : Aluminium alloy sand castings - Reference test bar
- ISO 2931:1983 : Anodizing of aluminium & its alloys - Assessment of quality of sealed anodic oxide coatings by measurement of admittance or impedance
- ISO 3211:1977 : Anodizing of aluminium & its alloys - Assessment of resistance of anodic oxide coatings to cracking by deformation
- ISO 3255:1974 : Magnesium & magnesium alloys - Determination of aluminium - Chromazurol S photometric method

ISO (Aluminium) - continued.

- ISO 3256:1977 : Aluminium & aluminium alloys - Determination of magnesium - Atomic absorption spectrophotometric method
- ISO 3522:1984 : Cast aluminium alloys - Chemical composition & mechanical properties
- ISO/DIS 3613 : Chromate conversion coatings on zinc, cadmium aluminium-zinc alloys & zinc-aluminium alloys - Test methods (Revision of ISO 3613:1980)
- ISO 3978:1976 : Aluminium & aluminium alloys - Determination of chromium - Spectrophotometric method using diphenylcarbazide, after extraction
- ISO 3979:1977 : Aluminium & aluminium alloys - Determination of nickel - Spectrophotometric method using dimethylglyoxime
- ISO 3980:1977 : Aluminium & aluminium alloys - Determination of copper - Atomic absorption spectrophotometric method
- ISO 3981:1977 : Aluminium & aluminium alloys - Determination of nickel - Atomic absorption spectrophotometric method
- ISO 4192:1981 : Aluminium & aluminium alloys - Determination of lead content - Flame atomic absorption spectrometric method
- ISO 4193:1981 : Aluminium & aluminium alloys - Determination of chromium content - Flame atomic absorption spectrometric method
- ISO 5193:1981 : Wrought aluminium & aluminium alloys - Drawn round bars - Tolerances on shape & dimensions (Symmetric plus & minus tolerances on diameter)
- ISO 5194:1981 : Aluminium & aluminium alloys - Determination of zinc content - Flame atomic absorption spectrometric method
- ISO 5832-10:1996 : Implants for surgery - Metallic materials - Part 10: Wrought titanium 5-aluminium 2, 5-iron alloy
- ISO 5832-11:1994 : Implants for surgery - Metallic materials - Part 11: Wrought titanium 6-aluminium 7-niobium alloy
- ISO 6279:1979 : Plain bearings - Aluminium alloy for solid bearings
- ISO 6361-1:1986 : Wrought aluminium & aluminium alloy sheets, strips & plates - Part 1: Technical conditions for inspection & delivery
- ISO 6361-2:1990 : Wrought aluminium & aluminium alloy sheets, strips & plates - Part 2: Mechanical properties
- ISO 6361-3:1985 : Wrought aluminium & aluminium alloy sheets, strips & plates - Part 3: Strips - Tolerances on shape & dimensions
- ISO 6361-4:1988 : Wrought aluminium & aluminium alloy sheets, strips & plates - Part 4: Sheets & plates - Tolerances on form & dimensions
- ISO 6362-1:1986 : Wrought aluminium & aluminium alloy extruded rods/bars, tubes & profiles - Part 1: Technical conditions for inspection & delivery
- ISO 6362-2:1990 : Wrought aluminium & aluminium alloy extruded rods/bars, tubes & profiles - Part 2: Mechanical properties
- ISO 6362-3:1990 : Wrought aluminium & aluminium alloy extruded rods/bars, tubes & profiles - Part 3: Extruded rectangular bars - Tolerances on dimensions & form
- ISO 6362-4:1988 : Wrought aluminium & aluminium alloy extruded rods/bars, tubes & profiles - Part 4: Extruded profiles - Tolerances on shape & dimensions
- ISO 6362-5:1991 : Wrought aluminium & aluminium alloy extruded rods/bars, tubes & profiles - Part 5: Extruded round, square & hexagonal bars - Tolerances on form & dimensions
- ISO/DIS 6362-8 : Wrought aluminium & aluminium alloys extruded rods/bars, tubes & profiles - Part 8: Extruded tubes - Tolerances on form & dimensions (Item confirmed in May 1993)
- ISO 6363-1:1988 : Wrought aluminium & aluminium alloy cold-drawn rods/bars & tubes - Part 1: Technical conditions for inspection & delivery
- ISO 6363-2:1993 : Wrought aluminium & aluminium alloy cold-drawn rods/bars & tubes - Part 2: Mechanical properties
- ISO 6363-4:1991 : Wrought aluminium & aluminium alloy cold-drawn rods/bars & tubes - Part 4: Drawn rectangular bars - Tolerances on form & dimensions
- ISO 6363-5:1992 : Wrought aluminium & aluminium alloy cold-drawn rods/bars & tubes - Part 5: Drawn square & hexagonal bars - Tolerances on form & dimensions
- ISO 6365-1:1988 : Wrought aluminium & aluminium alloy cold-drawn wire - Part 1: Technical conditions for inspection & delivery
- ISO 6581:1980 : Anodizing of aluminium & its alloys - Determination of the fastness to ultra-violet light of coloured anodic oxide coatings
- ISO 6719:1986 : Anodized aluminium & aluminium alloys - Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments
- ISO 6827:1981 : Aluminium & aluminium alloys - Determination of titanium content - Diantipyrilmethane photometric method
- ISO 7061:1993 : Shipbuilding - Aluminium shore gangways for seagoing vessels
- ISO 7141:1995 : Passenger cars - Light alloy wheels - Impact test
- ISO 7271:1982 : Aluminium & aluminium alloys - Foil & thin strip - Dimensional tolerances
- ISO 7274:1981 : Wrought aluminium & aluminium alloys - Drawn round bars - Tolerances on shape & dimensions (All minus tolerances on diameter)
- ISO 7583:1986 : Anodizing of aluminium & its alloys - Vocabulary
- ISO 7599:1983 : Anodizing of aluminium & its alloys - General specifications for anodic oxide coatings on aluminium
- ISO 7668:1986 : Anodized aluminium & aluminium alloys - Measurement of specular reflectance & specular gloss at angles of 20 degrees, 45 degrees, 60 degrees or 85 degrees
- ISO 7722:1985 : Aluminium alloy castings produced by gravity, sand, or chill casting, or by related processes - General conditions for inspection & delivery
- ISO 7759:1983 : Anodizing of aluminium & its alloys - Measurement of reflectivity characteristics of aluminium surfaces using abridged goniophotometer or goniophotometer
- ISO/DIS 7866 : Refillable transportable seamless aluminium alloy gas cylinders for worldwide usage - Design, construction & testing
- ISO 8076:1984 : Aerospace process - Anodic treatment of aluminium alloys - Chromic acid process 40 V DC, undyed coating

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ISO (Aluminium) - continued.

- ISO 8077:1984 : Aerospace process - Anodic treatment of aluminium alloys - Chromic acid process 20 V DC, undyed coating
- ISO 8078:1984 : Aerospace process - Anodic treatment of aluminium alloys - Sulfuric acid process, undyed coating
- ISO 8079:1984 : Aerospace process - Anodic treatment of aluminium alloys - Sulfuric acid process, dyed coating
- ISO 8081:1985 : Aerospace process - Chemical conversion coating for aluminium alloys - General purpose
- ISO/TR 8125:1984 : Anodizing of aluminium & its alloys - Determination of colour & colour difference of coloured anodic coatings
- ISO 8251:1987 : Anodized aluminium & aluminium alloys - Measurement of wear resistance & wear index of anodic oxidation coatings with an abrasive wheel wear test apparatus
- ISO 8252:1987 : Anodized aluminium & aluminium alloys - Measurement of mean specific abrasion resistance of anodic oxidation coatings with an abrasive jet test apparatus
- ISO 8362-3:1989 : Injection containers for injectables & accessories - Part 3: Aluminium caps for injection vials
- ISO 8536-3:1992 : Infusion equipment for medical use - Part 3: Aluminium caps for infusion bottles
- ISO 8591-1:1989 : Aerospace - Wrought aluminium & aluminium alloys - Inspection, testing & supply requirements - Part 1: General requirements
- ISO 8644:1988 : Motorcycles - Light-alloy wheels - Test method
- ISO 8645:1988 : Mopeds - Light-alloy wheels - Test method
- ISO 8993:1989 : Anodized aluminium & aluminium alloys - Rating system for the evaluation of pitting corrosion - Chart method
- ISO 8994:1989 : Anodized aluminium & aluminium alloys - Rating system for the evaluation of pitting corrosion - Grid method
- ISO/DIS 9018 : Specimen dimensions & procedure for testing the static strength of fillet welds in structural steels & aluminium alloys
- ISO/DIS 9418 : Aerospace - Aluminium & aluminium alloy solid rivets - Procurement specification
- ISO 9591:1992 : Corrosion of aluminium alloys - Determination of resistance to stress corrosion cracking
- ISO 9915:1992 : Aluminium alloy castings - Radiography testing
- ISO 9916:1991 : Aluminium alloy & magnesium alloy castings - Liquid penetrant inspection
- ISO 10049:1992 : Aluminium alloy castings - Visual method for assessing the porosity
- ISO 10074:1994 : Specification for hard anodic oxidation coatings on aluminium & its alloys
- ISO 10215:1992 : Anodized aluminium & aluminium alloys - Visual determination of image clarity of anodic oxidation coatings - Chart scale method
- ISO 10216:1992 : Anodized aluminium & aluminium alloys - Instrumental determination of image clarity of anodic oxidation coatings - Instrumental method
- ISO 10461:1993 : Seamless aluminium-alloy gas cylinders - Periodic inspection & testing

- ISO 10546:1993 : Chemical conversion coatings - Rinsed & non-rinsed chromate conversion coatings on aluminium & aluminium alloys
- ISO 11040-3:1993 : Prefilled syringes - Part 3: Aluminium caps for dental local anaesthetic cartridges
- ISO 11678:1996 : Agricultural irrigation equipment - Aluminium irrigation tubes
- ISO/TR 11728:1993 : Anodized aluminium & aluminium alloys - Accelerated test of weather fastness of coloured anodic oxide coatings using cyclic artificial light & pollution gas
- ISO 11846:1995 : Corrosion of metals & alloys - Determination of resistance to intergranular corrosion of solution heat-treatable aluminium alloys
- ISO/DIS 11881 : Corrosion of metals & alloys - Exfoliation corrosion testing of aluminium alloys
- ISO/DIS 13595 : Aerospace - Inserts, in aluminium alloy, coated or uncoated with self-locking floating nut, with MJ-threads, in metallic material, coated or uncoated - Dimensions
- ISO/DIS 13596 : Aerospace - Inserts, self-locking, with MJ-threads, closed type, with or without helical coil insert, coated or uncoated aluminium alloy, anodized - Dimensions
- ISO/DIS 13597 : Aerospace - Inserts, self-locking, with MJ-thread, open type, in aluminium alloy, coated or uncoated - Dimensions
- ISO/DIS 13598 : Aerospace - Inserts, self-locking, with MJ-thread, reduced flanges, closed type, in aluminium alloy, coated or uncoated - Dimensions
- ISO/DIS 13599 : Aerospace - Inserts, with clearance hole, in aluminium alloy, coated or uncoated - Dimensions
- ISO/DIS 13770 : Aluminium alloy gas cylinders - Operational requirements for avoidance of neck & shoulder cracks
- ISO/DIS 13919-2 : Welding & allied processes - Electron- & laser-beam welded joints - Guidance on quality levels for imperfections - Part 2: Aluminium

British Standards (BSI)

- BS 215 : Specification for aluminium stranded conductors & steel-reinforced aluminium conductors for overhead power transmission
- BS 215-1 : Aluminium stranded conductors (IEC 207)
- BS 215-2 : Steel-reinforced aluminium conductors (IEC 209)
- BS 388 : Specification for aluminium pigments
- BS 1133-21 : Packaging. Regenerated cellulose film, plastic film, aluminium foil, flexible multilayer structures & metallized materials
- BS 1161 : Specification for aluminium alloy sections for structural purposes
- BS 1470 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – plate, sheet & strip (withdrawn; see EN 485-1 to -4; EN 515; EN 573-1 to -4)
- BS 1471 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – drawn tube
- BS 1472 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – forging stock & forgings (partially replaced; see also EN 586-2)
- BS 1473 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – rivet, bolt & screw stock

British Standards (Aluminium) - continued.

- BS 1474 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – bars, extruded round tubes & sections
- BS 1475 : Specification for wrought aluminium & aluminium alloys for general engineering purposes – wire
- BS 1476 : Wrought aluminium & aluminium alloys for general engineering purposes – bars & sections (withdrawn; see BS 1474)
- BS 1477 : Wrought aluminium & aluminium alloys for general engineering purposes – plate (withdrawn; see EN 485-1 to -4; EN 515; EN 573-1 to -4)
- BS 1490 (1988) : Specification for aluminium & aluminium alloy ingot & castings for general engineering purposes
- BS 1615 : Method for specifying anodic oxidation coatings on aluminium & its alloys
- BS 1616 : Aluminium electrodes for metal-arc welding (withdrawn)
- BS 1974 : Specification for large aluminium alloy rivets, 0.5 inch to 1 inch nominal diameter (obsolete)
- BS 2006 : Specification for aluminium collapsible tubes
- BS 2037 : Specification for portable aluminium ladders, steps, trestles & lightweight stagings (see also EN 131 -1 & -2)
- BS 2627 : Specification for wrought aluminium for electrical purposes - wire
- BS 2897 : Specification for wrought aluminium for electrical purposes – strip with drawn or rolled edges
- BS 2898 : Specification for wrought aluminium for electrical purposes – bars, extruded round tube & sections
- BS 2901-4 : Filler rods & wires for gas-shielded arc welding. Specification for aluminium, aluminium alloys & magnesium alloys
- BS 2997 : Specification for aluminium rainwater goods
- BS 3242 : Specification for aluminium alloy stranded conductors for overhead power transmission (IEC 208)
- BS 3313-1 : Specification for aluminium capping foil & strip for dairy product containers. Aluminium capping for glass containers
- BS 3313-2 : Specification for aluminium capping foil & strip for dairy product containers. Aluminium capping foil for skirted closures for plastics containers
- BS 3660 : Glossary of terms used in the wrought aluminium industry (withdrawn; see EN23134 series)
- BS 3987 : Specification for anodic oxidation coatings on wrought aluminium for external architectural applications
- BS 3988 : Specification for wrought aluminium for electrical purposes. Solid conductors for insulating cables (refer also to IEC 121)
- BS 3989 : Specification for aluminium street lighting columns (withdrawn)
- BS 4300 : Wrought aluminium & aluminium alloys for general engineering purposes (supplementary series)
- BS 4300-1 : Aluminium alloy longitudinally welded tube
- BS 4300-2 : BTR S1 & BTR S2 sheet & strip suitable for bright trim/reflector applications (withdrawn)
- BS 4300-3 : Aluminium alloy suitable for bright trim/reflector applications. Forgings (withdrawn)
- BS 4300-4 : 6463 solid extruded bars & sections suitable for bright trim/reflector applications
- BS 4300-5 : 2011 free-cutting bar & wire
- BS 4300-6 : 3105 sheet & strip (withdrawn; replaced by BS 1470)
- BS 4300-7 : 5005 sheet & strip (withdrawn; replaced by BS 1470)
- BS 4300-8 : 5454 plate, sheet & strip (withdrawn; replaced by BS 1470)
- BS 4300-9 : NG 41 wire (withdrawn)
- BS 4300-10 : 5454 drawn tube
- BS 4300-11 : 5454 forging stock & forgings
- BS 4300-12 : 5454 bars, extruded round tube & sections
- BS 4300-13 : 5554 welding wire
- BS 4300-14 : 7020 plate, sheet & strip (withdrawn)
- BS 4300-15 : 7020 bar, extruded round tube & sections
- BS 4300-16 : 8011 specification for sheet & strip (withdrawn; see EN 485-1 to -4; EN 515, EN 573-1 to -4)
- BS 4868 : Specification for profiled aluminium sheet for building (replaces BS 2855 & BS 3428)
- BS 4872-2 : Specification for approval testing of welders, when welding procedure approval is not required. TIG or MIG welding of aluminium & its alloys
- BS 4873 : Specification for aluminium alloy windows
- BS 5045-3 : Specification for seamless aluminium alloy gas containers above 0.5 litre water capacity & up to 300 bar charged pressure at 15°C
- BS 5045-5 : Specification for aluminium alloy containers above 0.5 litre water capacity & up to 130 litres water capacity with welded seams
- BS 5045-6 : Specification for seamless containers of less than 0.5 litre water capacity (aluminium & steel)
- BS 5286 : Specification for aluminium framed sliding glass doors
- BS 5430-3 : Periodic inspection, testing & maintenance of transportable gas containers – excluding dissolved acetylene containers. Specification for seamless aluminium alloy containers of water capacity 0.5 litres & above.
- BS 5430-6 : Periodic inspection, testing & maintenance of transportable gas containers – excluding dissolved acetylene containers. Specification for seamless steel & aluminium alloy containers of water capacity of less than 0.5 litres
- BS 5599 : Specification for hard anodic oxidation coatings on aluminium & its alloys for engineering purposes
- BS 6161 (parts 1 to 19) : Methods of test for anodic oxidation coatings on aluminium & its alloys
- BS 7365 : Specification for hard drawn aluminium wire for overhead line conductors (IEC 889)
- BS 8118 : Structural use of aluminium
- BS 8118-1 : Structural use of aluminium. Code of practice for design (replaces CP118, which also remains active)
- BS 8118-2 : Specification for materials, workmanship & protection (replaces CP118, which also remains active)

BS CP Standards

- BS CP 118 : The structural use of aluminium (replaced by BS 8118-1 & -2, but remains active to allow design overlap)
- BS CP 143-1 : Code of practice for sheet roof & wall coverings. Aluminium corrugated & toughed
- BS CP 143-15 : Code of practice for sheet roof & wall coverings. Aluminium metric units

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BS L Standards

- BS 6L 16 : Specification for sheet & strip of 99% aluminium, temper H14 or H24
- BS 6L 17 : Specification for sheet & strip of 99% aluminium, temper O
- BS 5L 34 : Specification for forging stock, bars, extruded sections & forgings of 99% aluminium
- BS 5L 36 : Specification for wire for solid, cold-forged rivets 99.5% aluminium, not exceeding 10mm diameter
- BS 5L 44 : Specification for forging stock, bars, extruded sections & forgings of Al-2.25%Mg alloy
- BS 3L 51 : Specification for ingots & castings of Al-Si-Cu-Fe-Ni-Mg alloy, precipitation treated, Si 2.5, Cu 1.2, Fe 1, Ni 1, Mg 0.1 (obsolete)
- BS 4L 54 : Specification for tube of 99% aluminium, cold-drawn, seamless, tested hydraulically; not exceeding 12 mm wall thickness
- BS 4L 56 : Specification for tube of Al 2.25%Mg, temper O, seamless, tested hydraulically; not exceeding 12 mm wall thickness
- BS 3L 58 : Specification for wire for solid, cold-forged rivets at Al-5%Mg, not exceeding 10mm diameter
- BS 4L 59 : Specification for sheet & strip of Al-Mn alloy, temper H16 or H26
- BS 4L 60 : Specification for sheet & strip of Al-Mn alloy, temper H12 or H22
- BS 4L 61 : Specification for sheet & strip of Al-Mn alloy, temper O
- BS 3L 63 : Specification for tube of Al-Cu-Mg-Si-Mn alloy, solution treated & precipitation treated, Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8
- BS 2L 77 : Specification for forging stock & forgings of Al-Cu-Mg-Si-Mn alloy, solution treated & precipitation treated, Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8 (replaces L 45)
- BS 3L 78 : Specification ingots & castings of Al-Si-Cu-Mg alloy, solution treated & precipitation treated, Si 5, Cu 1.2, Mg 0.5
- BS 3L 80 : Specification for sheet & strip of Al-2.25%Mg alloy, temper O
- BS 3L 81 : Specification for sheet & strip of Al-2.25% Mg alloy, temper H16 or H26
- BS 2L 83 : Specification for forging stock, bars, extruded sections & forgings of Al-Cu-Ni-Mg-Fe-Si alloy, solution treated & precipitation treated, Cu 2, Ni 1, Mg 1, Si 0.9, Fe 0.9
- BS 2L 84 : Specification for bars & extruded sections of Al-Cu-Si-Mg alloy, solution treated & aged at RT, not exceeding 200 mm diameter or minor sectional dimension; Cu 1.5, Si 1, Mg 0.8
- BS 2L 85 : Specification for forging stock, bars, extruded sections & forgings of Al-Cu-Si-Mg alloy, solution treated & precipitation treated; Cu 1.5, Si 1, Mg 0.8
- BS 3L 86 : Specification for wire for solid, cold-forged rivets of Al-Cu-Mg alloy, not exceeding 10mm diameter; Cu 2.5, Mg 0.3
- BS 2L 87 : Specification for hexagonal bars for nuts, couplings & hollow machined parts of Al-Cu-Mg-Si-Mn alloy, solution treated & precipitation treated, free from peripheral & asymmetric coarse grain; not less than 14mm nor more than 36 mm across flats
- BS 2L 88 : Specification for aluminium alloy coated sheet & strip for Al-Zn-Mg-Cu-Cr alloy, solution treated & precipitation treated, Zn 5.8, Mg 2.5, Cu 1.6, Cr 0.15
- BS 2L 93 : Specification for plate of Al-Cu-Mg-Si-Mn alloy, solution treated, controlled stretch & precipitation treated, Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8
- BS 2L 95 : Specification for plate of Al-Zn-Mg-Cu-Cr alloy, solution treated, controlled stretch & precipitation treated, Zn 5.8, Mg 2.5, Cu 1.6, Cr 0.15
- BS 2L 97 : Specification for plate of Al-Cu-Mg-Mn alloy, solution treated, controlled stretch & aged at RT, Cu 4.4, Mg 1.5, Mn 0.6
- BS 2L 98 : Specification for plate of Al-Cu-Mg-Mn alloy, solution treated & aged at RT – no controlled stretch, Cu 4.4, Mg 1.5, Mn 0.6
- BS 2L 99 : Specification for ingots & castings of Al-Si-Mg alloy, solution treated & precipitation treated, Si 7, Mg 0.3
- BS 4L 100 : Procedure for inspection, testing & acceptance of wrought aluminium & aluminium alloys
- BS 4L 101 : Procedure for inspection, testing & acceptance of aluminium-base & magnesium base ingots & castings
- BS L 102 : Specification for bars & extruded sections of Al-Cu-Mg-Si-Mn alloy, solution treated & aged at RT; not exceeding 200 mm diameter or minor sectional dimension, Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8 (replaced 2L39, 6L1, obsolete; see EN 2100)
- BS L 103 : Specification for forging stock & forgings of Al-Cu-Mg-Si-Mn alloy, solution treated & aged at RT, Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8 (replaced 2L 39).
- BS L 105 : Specification for tube of Al-Cu-Mg-Si-Mn alloy, solution treated & aged at RT, not exceeding 10 mm wall thickness
- BS L 109 : Specification for aluminium coated sheet & strip of Al-Cu-Mg-Mn alloy, solution treated & aged at RT, Cu 4.4, Mg 1.5, Mn 0.6
- BS L 110 : Specification for aluminium coated sheet & strip of Al-Cu-Mg-Mn alloy, supplied for solution treatment by end user, Cu 4.4, Mg 1.5, Mn 0.6
- BS L 111 : Specification for bars & extruded sections of Al-Mg-Si-Mn alloy, solution treated & precipitation treated, suitable for welding, Mg 0.8, Si 1, Mn 0.7
- BS L 112 : Specification for forging stock & forgings of Al-Mg-Si-Mn alloy, solution treated & precipitation treated, suitable for welding, Mg 0.8, Si 1, Mn 0.7
- BS L 113 : Specification for sheet & strip of Al-Mg-Si-Mn alloy, solution treated & precipitation treated, suitable for welding, Mg 0.8, Si 1, Mn 0.7
- BS L 114 : Specification for tube of Al-Mg-Si-Mn alloy, solution treated & precipitation treated, not exceeding 100 mm wall thickness, suitable for welding, Mg 0.8, Si 1, Mn 0.7
- BS L 115 : Specification for plate of Al-Mg-Si-Mn alloy, solution treated, controlled stretch & precipitation treated, not exceeding 25mm thick, suitable for welding Mg 0.8, Si 1, Mn 0.7
- BS 2L 116 : Specification for tube of 99% aluminium, cold drawn, seamless, not tested hydraulically; not exceeding 12 mm wall thickness
- BS L 117 : Specification for tube of Al-Mg-Si-Cu-Cr alloy, solution treated & artificially aged, tested hydraulically, not exceeding 10 mm thickness, Mg 1.0, Si 0.6, Cu 0.28, Cr 0.2
- BS L 118 : Specification for tube of Al-Mg-Si-Cu-Cr alloy, solution treated & artificially aged, tested hydraulically, not exceeding 10 mm thickness, Mg 1.0, Si 0.6, Cu 0.28, Cr 0.2

British Standards “L” (Aluminium) - continued.

- BS L 119 : Specification for ingots & castings of Al-Cu-Ni-Mn-Ti-Zr-Co-Sb alloy, solution treated & artificially aged, Cu 5.0, Ni 1.5, Mn 0.25, Ti 0.2, Zr 0.2, Co 0.2, Sb 0.2
- BS L 154 : Specification for ingots & castings of Al-Cu-Si alloy, solution treated & aged at RT, Cu 4, Si 1
- BS L 155 : Specification for ingots & castings of Al-Cu-Si alloy, solution treated & artificially aged, Cu 4, Si 1
- BS L 156 : Specification for sheet & strip of Al-Cu-Mg-Si-Mn alloy, solution treated & aged at RT, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS 5L 3, 3L 70 & BS L 106)
- BS L 157 : Specification for sheet & strip of Al-Cu-Mg-Si-Mn alloy, solution treated & artificially aged, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS L 150)
- BS L 158 : Specification for close toleranced sheet & strip of Al-Cu-Mg-Si-Mn alloy, solution treated & aged at RT, Cu 4.4, Mg, 0.5, Si 0.8, Mn 0.8
- BS L 159 : Specification for close toleranced sheet & strip of Al-Cu-Mg-Si-Mn alloy, solution treated & artificially aged, Cu 4.4, Mg, 0.5, Si 0.8, Mn 0.8
- BS L 160 : Specification for bars & extruded sections of Al-Zn-Mg-Si-Mn, solution treated & artificially overaged, Zn 5.6, Mg 2.5, Cu 1.6, Cr 0.22 (obsolete; replaced by EN 2127)
- BS L 161 : Specification. Hand- & die-forgings of Al-Zn-Mg-Cu-Cr, solution treated & artificially overaged, Zn 5.6, Mg 2.5, Cu 1.6, Cr 0.22
- BS L 162 : Specification. Cold compressed hand forgings of Al-Zn-Mg-Cu-Cr, solution treated & artificially overaged, Zn 5.6, Mg 2.5, Cu 1.6, Cr 0.22
- BS L 163 : Specification for sheet & strip of aluminium-coated Al-Cu-Mg-Si-Mn, solution treated, cold worked for flattening & aged at RT, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS 2L 38, 3L 72)
- BS L 164 : Specification for sheet & strip of aluminium-coated Al-Cu-Mg-Si-Mn, solution treated & aged at RT, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS L 151 7 BS L 153)
- BS L 165 : Specification for sheet & strip of aluminium-coated Al-Cu-Mg-Si-Mn, solution treated & artificially aged, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS L 152)
- BS L 166 : Specification for close toleranced sheet & strip of aluminium-coated Al-Cu-Mg-Si-Mn, solution treated & aged at RT, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS 2L 89 & BS L 108)
- BS L 167 : Specification for close toleranced sheet & strip of aluminium-coated Al-Cu-Mg-Si-Mn, solution treated & aged at RT, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS 2L 90)
- BS L 168 : Specification for bars & extruded sections of Al-Cu-Mg-Si-Mn, solution treated & artificially aged not exceeding 200 mm diameter or minor sectional dimension, Cu 4.4, Mg 0.5, Si 0.8, Mn 0.8 (replaces BS 2L40, L45, 3L 65)
- BS L 169 : Specification for ingots & castings of Al-Si-Mg alloy, solution treated & artificially aged, Si7, Mg 0.6
- BS L 170 : Specification for extruded bars & sections of Al-Zn-Mg-Cu-Cr, solution treated, controlled stretch & artificially aged, not exceeding 150 mm diameter or minor sectional dimension, Zn 5.6, Mg 2.5, Cu 1.6, Cr 0.22; 7075
- BS L 171 : Specification for forging of Al-Zn-Mg-Mn-Cu alloy, supplied as-forged or annealed for subsequent heat treatment, not exceeding 150 mm diameter or minor sectional dimension, Zn 5.7, Mg 2.7, Mn 0.5, Cu 0.5, (7014)
- BS L 172 : Specification for extruded, rolled or cast forging stock of Al-Zn-Mg-Mn-Cu alloy, for manufacture forgings to BS L 171, Zn 5.7, Mg 2.7, Mn 0.5, Cu 0.5, (7014)
- BS L 173 : Specification for castings of Al-Si-Mg alloy, chill cast, solution treated & precipitation treated to an overaged, T7, condition
- BS L 174 : Specification for castings of Al-Si-Mg alloy, sand cast, solution treated & precipitation treated to an overaged, T7, condition

BS SP Standards

- BS SP 65 : Specification for aluminium alloy taper pins for aeronautical purposes (replaces SP 28, 29, 30)
- BS 2SP 68 to 2SP 71 : Specification for 100° countersunk precision head aluminium & aluminium alloy rivets
- BS 2SP 77 to 2SP 80 : Specification for snap head aluminium 7 aluminium alloy rivets
- BS 2SP 83 to SP 85 : Specification for mushroom head aluminium alloy rivets
- BS 2SP 142 : Specification for solid rivets with 100° countersunk truncated radiused head made from BS L 86 material
- BS SP 143 : Specification for solid rivets with 100° countersunk truncated radiused head made from BS L 37 material
- BS 2SP 157-163 : Specification for solid rivets with universal head made from BS L 86 (SP 157 & SP 163), BS L 58 (SP160 & SP 161), BS L 37 (SP 162) & DTD 204 (SP 158 & 159) materials

BS DTD Standards

MOD (Aviation Supply) Department of Trade and Industry, Aerospace Material Specification Alloys.

Compiled from information provided by ALFED - Aluminium Federation (UK) and OEA (Organisation of European Aluminium Refiners & Remelters).

- 18C : Replaced by L102 (now EN2100)
- 25 : Withdrawn
- 27 : Withdrawn
- 50 : Withdrawn
- 58A : Withdrawn
- 84 : Withdrawn
- 106 : Withdrawn
- 110 : Replaced by 7L37
- 111 : Replaced by L163
- 128 : Withdrawn
- 130B : Replaced by 2L83
- 131B : Replaced by 3L52
- 132 : Withdrawn
- 133C : Replaced by 3L51 (Obsolete)
- 147 : Withdrawn
- 148 : Replaced by 5L36
- 150A : Forging stock and forgings
- 165A : Withdrawn

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British Standards "DTD" (Aluminium) - continued.

170A : Withdrawn	342 : Replaced by L165
175A : Withdrawn	346A : Replaced by L113 (in soft condition)
177A : Withdrawn	351 : Replaced by L165
179A : Withdrawn	356 : Replaced by L157
180C : Withdrawn	361B : Withdrawn
182B : Withdrawn	363A : Replaced by DTD 5124
184 : Withdrawn	364B : Replaced by L168
186B : Withdrawn	372B : 6063 Bars and sections
190 : Withdrawn	390 : Replaced by L163
191 : Withdrawn	404 : Withdrawn
194 : Withdrawn	410 : Replaced by 2L83
198A : Withdrawn	423C : Replaced by 2L85
202 : Replaced by BS1453-5056A	424A : Withdrawn
206 : Withdrawn	428 : Withdrawn
209A : Replaced by 3L80	440 : Withdrawn
213A : Replaced by 4L59	443A : Replaced by 2L84
220A : Withdrawn	450A : Withdrawn
231 : Withdrawn	460A : Withdrawn
238 : Withdrawn	464A : Replaced by 3L63
240 : Withdrawn	478 : Withdrawn
243 : Withdrawn	479 : Withdrawn
245A : Withdrawn	520 : Withdrawn
246C : Forging stock and forgings	543A : Withdrawn
248 : Withdrawn	546B : Replaced by L165
249 : Withdrawn	603B : Replaced by L156
250 : Withdrawn	606A : Replaced by 3L81
252 : Replaced by L168	610B : Replaced by L163
255 : Replaced by 3L52	634A : Replaced by 3L80
264A : Withdrawn	635A : Withdrawn
266 : Withdrawn	646B : Replaced by L157
269 : Withdrawn	653 : Replaced by 4L60
270 : Withdrawn	683A : Replaced by DTD 5024, 5114, 5044
272A : Withdrawn	687B : Replaced by 2L88
273 : Withdrawn	693 : Withdrawn
275 : Withdrawn	706 : Withdrawn
276A : Replaced by 3L78	710B : Replaced by L166
278 : Replaced by 3L80	716B (1971) : Ingots and castings
280 : Withdrawn	717A : 2618A Forging stock and forgings
287 : Replaced by 3L51 (Obsolete)	722B (1971) : Ingots and castings
290 : Withdrawn	724 : Withdrawn
292 : Replaced by 3L80	727B (1971) : Ingots and castings
293 : Replaced by 2L83	731B : 2618A Forging stock and forgings
294 : Withdrawn	735B (1971) : Ingots and castings
296 : Withdrawn	741A : Withdrawn
297A : Forging stock and forgings	745A : 2618A Forging stock and forgings
298B : Replaced by 2L91	746C : Replaced by L167
300A : Replaced by 4L53	5004A : Forging stock and forgings
303 : Replaced by 3L58	5008B (1971) : Ingots and castings
304B : Replaced by 2L92	5009 : Withdrawn
309 : Withdrawn	5010A : 2014A Plate
310C : Replaced by 3L56 (4L56)	5014A : 2618A Bars and sections
313 : Withdrawn	5018A (1971) : Ingots and castings
324B : Forging stock and forgings	5020A : Replaced by 2L93
327 : Replaced by 3L86	5024 : 7014 Forging stock and forgings
	5028 : Replaced by 2L99

British Standards “DTD” (Aluminium) - continued.

- 5030A : 2014A Clad plate
- 5034 : Withdrawn
- 5040A : 2014A Clad plate
- 5044 : 7014 Bars and sections
- 5050B : Replaced by 2L95
- 5054A : Replaced by DTD 5114
- 5060A : Replaced by DTD 5110
- 5064 : Withdrawn
- 5070B : 2618A Clad sheet and strip
- 5074A : Replaced by DTD 5124
- 5080 : Replaced by L113
- 5084A : 2618A Forging stock and forgings
- 5090 : Replaced by 2L97 and 2L98
- 5094A : 7014 Forging stock and forgings
- 5100A : 2024 Clad plate
- 5104 : Part replaced by L172
- 5104A : 7014 Forging stock and forgings
- 5110 : 7014, 7075 Clad plate
- 5114 : Bars and sections
- 5120B : 7010 Plate
- 5124 : 7075 Bars and sections
 - 5124 : Part replaced by L170
- 5130A : 7010 Plate
- 5636 : 7010 Forgings

DIN Standards

- DIN 1712-1 : Aluminium – ingots
- DIN 1712-3 : Aluminium – semi-finished products
- DIN 1725-1 : Wrought aluminium alloys
- DIN 1725-2 : Casting aluminium alloys, by sand, gravity die, pressure die, investment
- DIN 1725-2-Supp. 1 : Casting aluminium alloys, by sand, gravity die, pressure die, investment – mechanical & physical properties, with notes on casting techniques
- DIN 1725-3 : Master aluminium alloys
- DIN 1725-5 : Casting aluminium alloys, ingots [pigs], liquid metal, composition
- DIN 1725-5-Supp. 1 : Casting aluminium alloys, ingots [pigs], liquid metal, composition – alloying processes
- DIN 1745 : Wrought aluminium & aluminium alloy plate, sheet & strip >0.35 mm thickness
- DIN 1746 : Wrought aluminium & aluminium alloy tubes
- DIN 1747 : Wrought aluminium & aluminium alloy rod & bar
- DIN 1748 : Wrought aluminium & aluminium alloy extruded sections
- DIN 1748-3 : Aluminium extruded sections, highest grade Al, High grade Al & wrought Al-alloys – design
- DIN 1748-4 : Wrought aluminium & aluminium alloy extruded profiles – permissible deviations
- DIN 1749 : Drop forgings of aluminium & wrought aluminium alloys
- DIN 17606 : Open die forgings of wrought aluminium alloys
- DIN 17611 : Anodized wrought aluminium & aluminium alloys semi-finished products, with coating thickness at least 10 microns, technical delivery conditions
- DIN 17615 : AlMgSi0.5 precision sections

- DIN 1769 : Wrought aluminium & aluminium alloy drawn rectangular bars with square edges, tolerances on dimensions & forms, static values
- DIN 1770 : Wrought aluminium & aluminium alloy extruded rectangular bars, tolerances on dimensions & forms, static values
- DIN 1771 : Aluminium & wrought aluminium alloy, extruded angles, dimensions, static values
- DIN 1783 : Wrought aluminium & aluminium alloy strips, plates & sheets with thicknesses >0.35 mm, cold-rolled, dimensions
- DIN 1784 : Wrought aluminium & aluminium alloy strips, plates & sheets with thicknesses from 0.021 to 0.35 mm, cold-rolled, dimensions
- DIN 1784-3 : Aluminium coiled strips & foils from 0.007 to 0.020 mm [7-20 microns], cold-rolled, dimensions
- DIN 1788 : Wrought aluminium & aluminium alloy strip & sheet with thicknesses from 0.021 to 0.35 mm, cold-rolled, properties
- DIN 1790 : Wrought aluminium & aluminium alloy wire
- DIN 1795 : Wrought aluminium & aluminium alloy, seamless drawn round tubes, dimensions, tolerances on dimensions & forms; Supplement 2 – tolerances on preferred sizes
- DIN 1796 : Wrought aluminium & aluminium alloy, drawn square bars with sharp edges, dimensions, tolerances on dimensions & forms
- DIN 1797 : Wrought aluminium & aluminium alloy, drawn hexagonal bars with sharp edges, dimensions, tolerances on dimensions & forms
- DIN 1798 : Wrought aluminium & aluminium alloy, drawn round bars, dimensions, tolerances on dimensions & forms
- DIN 1799 : Wrought aluminium & aluminium alloy, extruded round bars, dimensions, tolerances on dimensions & forms
- DIN EN 2004-1, Publication:1993-09 : Aerospace series; test methods for aluminium & aluminium alloy products; part 1: determination of electrical conductivity of wrought aluminium alloys; German version EN 2004-1:1993.
- DIN EN 2004-4 (Norm-Entwurf), Publication:1992-10 : Aerospace series; test methods for aluminium & aluminium alloys products; part 4: stress corrosion test by alternate immersion for high strength aluminium alloy wrought products.
- DIN EN 2004-5, Publication:1993-09 : Aerospace series; test methods for aluminium & aluminium alloy products; part 5: determination of cladding thickness & copper diffusion of clad semi-finished products; German version EN 2004-5:1993.
- DIN EN 2004-7 (Norm-Entwurf), Publication:1996-07 : Aerospace series - Test methods for aluminium & aluminium alloy products - Part 7: Reference blocks for the calibration of measuring equipment used in the determination of electrical conductivity of wrought aluminium & aluminium alloys.
- DIN EN 2004-10 (Norm-Entwurf), Publication:1994-05 : Aerospace series; test methods for aluminium & aluminium alloy products; part 10: preparation of micrographic specimens for aluminium alloys.
- DIN EN 2599 (Norm-Entwurf), Publication:1996-05 : Aerospace series - Strip in aluminium & aluminium alloys - Thickness 0 25 mm <a> 3, 2 mm; dimensions.

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DIN Standards (Aluminium) - continued.

- DIN EN 2615 (Norm-Entwurf), Publication:1990-08 : Aerospace series; wire to close tolerance in aluminium & aluminium alloys 1.6 D 9.6 mm; dimensions.
- DIN EN 2616 (Norm-Entwurf), Publication:1990-08 : Aerospace series; wire for rivets in aluminium & aluminium alloys, large tolerances D 10 mm; dimensions.
- DIN 5513, Publication:1989-02 : Materials for rail vehicles; aluminium & aluminium alloys.
- DIN 8513-4 : Brazing & braze weld filler metals. aluminium-base brazing alloys.
- DIN 9107 : Wrought aluminium & aluminium alloy, seamless extruded round tubes, dimensions, tolerances on dimensions & forms
- DIN 9712 : Aluminium & Magnesium beams, extruded, dimensions, static values
- DIN 9713 : Aluminium & wrought aluminium alloy, extruded channel sections, dimensions, static values
- DIN 9714 : Aluminium & wrought aluminium alloy, extruded T-sections, dimensions, static values
- DIN EN 12373-3 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 3: Estimation of loss of absorptive power of anodic oxidation coatings after sealing; dye spot test with prior acid treatment; German version prEN 12373-3:1996.
- DIN EN 12373-5 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment; German version prEN 12373-5:1996.
- DIN EN 12373-6 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment; German version prEN 12373-6:1996.
- DIN EN 12373-7 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 7: Determination of the comparative fastness to ultra-violet light & heat of coloured anodic oxidation coatings; German version prEN 12373-7:1996.
- DIN EN 12373-11 (Norm-Entwurf), Publication:1997-02 : Aluminium & aluminium alloys - Anodizing - Part 11: Measurement of specular reflectance & specular gloss of anodic oxidation coatings at angles of 20, 45, 60 oder 85; German version prEN 12373-11:1996.
- DIN EN 12373-13 (Norm-Entwurf), Publication:1997-02 : Aluminium & aluminium alloys - Anodizing - Part 13: Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments; German version prEN 12373-13:1996.
- DIN 29531, Publication:1990-09 : Aerospace; castings of aluminium & magnesium alloys; technical specification.
- DIN 29547 : Aerospace: Seamless structural tubes in wrought aluminium alloys (obsolete)
- DIN 29850 : Aerospace: Heat treatment of wrought aluminium alloys
- DIN 29850 : Aerospace: Heat-treatment of wrought aluminium alloys
- DIN 40501-1 : Aluminium for electrical purposes: E-Al plate, sheet & strip
- DIN 40501-2 : Aluminium for electrical purposes: E-Al & E-AlMgSi0.5 tubes
- DIN 40501-3 : Aluminium for electrical purposes: E-Al & E-AlMgSi0.5 bars & sections
- DIN 40501-4 : Aluminium for electrical engineering. Pure aluminium wires
- DIN 46420 : Aluminium for electrical purposes. Round, drawn wire, dimensions
- DIN 46424 : Switch-gear. Extruded channel sections for busbars
- DIN 46425 : Aluminium for electrical purposes. Round, exactly-drawn wire, dimensions
- DIN 50939 : Corrosion protection, chromating of aluminium, principles & test methods
- DIN 50949 : Nondestructive testing of anodic oxidation coatings on pure aluminium & aluminium alloys by measurement of admittance
- DIN 59600 : Strips, plates & sheets of aluminium & wrought aluminium alloys, hot-rolled, dimensions
- DIN 59604 : Wrought aluminium & aluminium alloy slugs for impact extrusion
- DIN 59605 : Embossed plate & sheet of wrought aluminium alloy
- DIN 59606 : Wrought aluminium & aluminium alloy sheet & strip for cans & sealing caps
- DIN 59675 : High grade aluminium & wrought aluminium alloy wire & bars for rivets, drawn
- DIN 59700 : Wrought aluminium & aluminium alloy, extruded square bars, dimensions, tolerances on dimensions & forms
- DIN 59701 : Wrought aluminium & aluminium alloy, extruded hexagonal bars, dimensions, tolerances on dimensions & forms
- DIN 59751 : Wrought aluminium, tubes & hollow hexagonal sections, for free-cutting machining on automatics, seamless drawn, dimensions
- DIN 65207 : Aerospace: Tolerances for wrought aluminium alloy folded profiles/sections
- DIN 65582 : Aerospace: Heat treatment of aluminium- & magnesium-alloy castings
- DIN V 65900-4 : Aerospace: Metallic materials – relationship between AECMA designation system (AECMA-TR-3900: 1993)

German LN Standards

- LN 1795 : Aerospace: Structural tubes in wrought aluminium alloys, seamless drawn, dimension & masses
- LN 1796 : Aerospace: Square bars of wrought aluminium alloys, drawn, dimension & masses
- LN 1797 : Aerospace: Hexagonal bars of wrought aluminium alloys, drawn, dimensions & masses
- LN 1798 : Aerospace: Round bars of wrought aluminium alloys, drawn, dimension & masses
- LN 1799 : Aerospace: Round bars of wrought aluminium alloys, extruded, dimension & masses
- LN 9073 : Aerospace: Sheet & plate in wrought aluminium alloys, standard plane, rolled, dimension & masses
- LN 9074 : Aerospace: Sheet & plate in wrought aluminium alloys, skin quality, rolled, dimension & masses

German LN Standards (Aluminium) - continued.

- LN 9087 : Aerospace: Extruded profiles, beaded angles, in wrought aluminium alloys dimensions, static values, masses
- LN 9410 : Aerospace: Wedge sections, extruded, in wrought aluminium alloys, dimension & masses
- LN 9411 : Aerospace: Folded profile, angle in wrought aluminium alloys, dimensions, static values, masses
- LN 9412 : Aerospace: Folded profile, angle with internally lipped flanges, in wrought aluminium alloys, dimension, static values, masses
- LN 9413 : Aerospace: Folded profile, channel, in wrought aluminium alloys, dimension, static values, masses
- LN 9414 : Aerospace: Folded profile, channel with internally lipped flanges, in wrought aluminium alloys, dimension, static values, masses
- LN 9415 : Aerospace: Folded profile, Z-section with one lipped flange, in wrought aluminium alloys, dimension, static values, masses
- LN 9416 : Aerospace: Folded profile, LZ-section, in wrought aluminium alloys, dimension, static values, masses
- LN 9417 : Aerospace: Folded profile, top hat section, in wrought aluminium alloys, dimension, static values, masses
- LN 9419 : Aerospace: Folded profile, bowler hat section, in wrought aluminium alloys, dimension, static values, masses
- LN 9496 : Aerospace: Extruded profile, angle, in wrought aluminium alloys, dimension, static values, masses
- LN 9497 : Aerospace: Extruded profile, T-section, in wrought aluminium alloys, dimension, static values, masses
- LN 9498 : Aerospace: Extruded profile, channel section, in wrought aluminium alloys, dimension, static values, masses
- LN 29545 : Aerospace: Wedges in wrought aluminium alloys, dimension & masses
- LN 29557-3 : Aerospace: Laminated shim of wrought aluminium & aluminium alloys, dimensions, masses

AFNOR Standards

NF Standards

- Projet A 00-500-4 Août 1996 : Fonderie Conditions Techniques de Fourniture Partie 4 : Specifications Complémentaires Pour Les Pièces Moulées En Alliages D'aluminium Projet
- NF A 00-501-3 Mars 1991 : Produits de fonderie. Conditions techniques générales de commande et de fournitures. Partie 3 : pièces moulées par gravité, basse pression et dépression, en alliages d'aluminium et en alliages de magnésium. Statut :Homologuée
- NF A 01-010 Octobre 1971 : Aluminium et alliages d'aluminium. Cuivre et alliages de cuivre. Échantillons spécimens et éprouvettes pour essais. Statut :Enregistrée
- NF F 01-820 Février 1992 : Matériel roulant ferroviaire. Joints soudés de produits en alliage d'aluminium pour ossature de caisse. Caractérisation. Statut :Homologuée

- NF A 02-004 Août 1977 : Aluminium et alliages d'aluminium de fonderie. Zinc et alliages de zinc de fonderie. Magnésium et ses alliages. Désignation conventionnelle des matériaux. Statut :Enregistrée
- A 02-011 Novembre 1970 : Aluminium et alliages d'aluminium. Vocabulaire des traitements thermiques et mécaniques.. Statut :Fascicule de doc.
- A 02-114 Octobre 1987 : Aluminium et alliages d'aluminium. Correspondance entre la désignation normalisée utilisée en France et à l'étranger.. Statut :Fascicule de doc.
- NF A 03-253 Avril 1972 : Aluminium et alliages d'aluminium - Cuivre et alliages de cuivre. Essai de dureté Vickers - Charges comprises entre 0, 2 kgf et 120 kgf Statut :Enregistrée
- NF A 03-260 Avril 1972 : Aluminium et alliages d'aluminium - Cuivre et alliages de cuivre. Essai de pliage simple Statut :Enregistrée
- NF A 03-268 Octobre 1971 : Aluminium et alliages d'aluminium - Cuivre et alliages de cuivre. Essai de torsion simple des fils Statut :Enregistrée
- NF A 04-150 Novembre 1984 : Produits de fonderie - Contrôle par radiographie des pièces moulées en alliages d'aluminium et de magnésium. Statut :Homologuée
- Projet A 04-190 Avril 1997 : Fonderie Controle Par Radiographie Projet
- NF A 04-503 Juillet 1988 : Demi-produits en aluminium, cuivre, nickel et leurs alliages. Détermination de la grosseur de grain. Aluminium et alliages d'aluminium. Statut :Homologuée
- NF A 04-505 Juillet 1988 : Demi-produits en aluminium, cuivre, nickel et leurs alliages. Détermination de la grosseur de grain. Nickel et nickels alliés. Statut :Homologuée
- NF A 05-301 Septembre 1981 : Alliages d'aluminium - Essai de corrosion sous contrainte des produits épais Statut :Enregistrée
- NF A 05-306 Décembre 1984 : Alliages d'aluminium (série 5XXX) - Essai de corrosion feuilletante. Statut :Homologuée
- Projet A 05-520 Juin 1993 : Corrosion Des Alliages D'aluminium Determination De La Resistance A La Corrosion Fissurante Sous Contrainte Projet
- NF L 06-383 Novembre 1987 : Assemblages soudés et brasés pour constructions aérospatiales. Assemblages soudés par résistance par points ou à la molette. Qualité des assemblages soudés. Statut :Homologuée
- NF L 06-510 Août 1983 : Sélection des fraises cylindriques deux tailles à queue, à utiliser dans l'industrie aérospatiale, pour l'usinage en commande numérique des alliages d'aluminium.. Statut :Homologuée
- NF A 06-551 Octobre 1976 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du cuivre (méthode au cuprazon). Statut :Enregistrée
- NF A 06-552 Juillet 1964 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du cuivre. Statut :Homologuée
- NF A 06-553 Avril 1966 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du zinc. Statut :Homologuée
- A 06-554 Mai 1966 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage polarographique du zinc. Statut :Fascicule de doc.

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AFNOR NF Standards (Aluminium) - continued.

- A 06-563 Avril 1971 : Analyse chimique des alliages d'aluminium - Dosage spectrophotométrique de l'antimoine. Statut : Fascicule de doc.
- NF A 06-564 Décembre 1969 : Analyse chimique des alliages d'aluminium anti-friction - Dosage volumétrique de l'étain. Statut : Enregistrée
- NF A 06-568 Novembre 1971 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique de l'étain. Statut : Enregistrée
- A 06-569 Février 1972 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique de l'étain. Statut : Fascicule de doc.
- NF A 06-570 Juillet 1964 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du silicium total. Statut : Homologuée
- NF A 06-571 Juillet 1964 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du fer. Statut : Homologuée
- NF A 06-574 Avril 1966 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du titane. Statut : Homologuée
- NF A 06-575 Mai 1971 : Analyse chimique des alliages d'aluminium - Dosage gravimétrique du nickel. Statut : Homologuée
- NF A 06-576 Avril 1966 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du manganèse. Statut : Homologuée
- NF A 06-577 Décembre 1984 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage colorimétrique du cobalt. Statut : Homologuée
- NF A 06-579 Avril 1966 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du magnésium. Statut : Homologuée
- A 06-580 Septembre 1965 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage polarographique du cadmium. Statut : Fascicule de doc.
- NF A 06-581 Décembre 1984 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage colorimétrique du chrome. Statut : Homologuée
- NF A 06-582 Avril 1959 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du zirconium. Statut : Homologuée
- NF A 06-583 Décembre 1984 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du bismuth. Statut : Homologuée
- NF A 06-584 Décembre 1984 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du béryllium. Statut : Homologuée
- NF A 06-585 Juin 1965 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du plomb. Statut : Homologuée
- NF A 06-586 Mai 1965 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du bore. Statut : Enregistrée
- NF A 06-587 Juin 1965 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage du mercure. Statut : Homologuée
- NF A 06-588 Novembre 1970 : Analyse chimique de l'aluminium et des alliages d'aluminium. Dosage spectrophotométrique du vanadium. Statut : Enregistrée
- NF A 06-602 Décembre 1984 : Analyse chimique des alliages de titane. Dosage de l'aluminium dans les alliages Ti-Al-V. Méthode titrimétrique par l'EDTA. Statut : Homologuée
- NF A 06-998 Décembre 1960 : Analyse chimique des alliages d'imprimerie Statut : Homologuée
- NF L 07-152 Mai 1974 : Représentation symbolique sur les dessins du diamètre des rivets en alliages d'aluminium. Statut : Homologuée
- A 07-500 Juin 1979 : Analyse par spectrométrie d'émission de l'aluminium et de ses alliages (émission par étincelle). Statut : Fascicule de doc.
- A 07-510 + F 1.2 Juin 1971 : Analyse des aluminiums non alliés par spectrographie d'émission. Statut : Fascicule de doc.
- A 07-515 Juin 1971 : Analyse des alliages aluminium-cuivre par spectrographie d'émission. Statut : Fascicule de doc.
- A 07-520 Juin 1971 : Analyse des alliages aluminium-silicium et aluminium-silicium-cuivre par spectrographie d'émission. Statut : Fascicule de doc.
- A 08-001 Avril 1979 : Analyse chimique des métaux et alliages légers - Application de la spectrométrie d'absorption atomique à l'analyse de l'aluminium, du magnésium et de leurs alliages. Statut : Fascicule de doc.
- A 08-547 Juin 1979 : Analyse chimique de l'aluminium et de ses alliages. Dosage du plomb - Méthode par absorption atomique. Statut : Fascicule de doc.
- A 08-553 Juillet 1979 : Analyse chimique de l'aluminium et de ses alliages. Dosage du zinc - Méthode par absorption atomique. Statut : Fascicule de doc.
- A 08-556 Avril 1979 : Analyse chimique de l'aluminium et de ses alliages. Dosage du chrome - Méthode par absorption atomique. Statut : Fascicule de doc.
- A 08-563 Décembre 1974 : Analyse chimique des alliages d'aluminium. Dosage à l'antimoine - Méthode par absorption atomique. Statut : Fascicule de doc.
- A 08-568 Décembre 1974 : Analyse chimique des alliages d'aluminium. Dosage de l'étain - Méthode par absorption atomique. Statut : Fascicule de doc.
- NF A 08-650 Octobre 1992 : Analyse chimique du titane et alliages de titane. Dosage des éléments aluminium, vanadium et fer dans les alliages de nuance TA6V. Méthode par spectrométrie d'absorption atomique dans la flamme ou par spectrométrie d'émission de plasma. Statut : Homologuée
- NF A 08-651 Décembre 1993 : Analyse chimique du titane et alliages de titane. Dosage des éléments en faible teneur dans les alliages de nuance TA6V. Méthode par spectrométrie d'absorption atomique dans la flamme ou par spectrométrie d'émission de plasma. Statut : Homologuée
- L 09-775 + ERRATUM Octobre 1984 : Codification des références relatives aux produits semi-ouvrés en métaux et alliages non ferreux, normalisés, sélectionnés pour les constructions aéronautiques Statut : Fascicule de doc.
- L 09-776 Octobre 1984 : Codification des références relatives aux produits semi-ouvrés en alliages d'aluminium et titane, normalisés, sélectionnés pour les constructions aéronautiques. Statut : Fascicule de doc.

AFNOR NF Standards (Aluminium) - continued.

- NF L 10-470 Novembre 1982 : Conditions de contrôle et d'essai des barres corroyées en cuivre et alliages de cuivre pour constructions aérospatiales.
Statut :Homologuée
- A 11-100 Août 1983 : Analyse chimique du ferro-niobium. Dosages du silicium, tantale, titane, niobium, étain, aluminium et fer après séparation sur résines échangeuses d'ions Statut :Fascicule de doc.
- J 13-005 Janvier 1968 : Aluminium et alliages d'aluminium. Produits laminés et filés - Liste des alliages utilisables. Statut :Fascicule de doc.
- NF L 15-113 Septembre 1972 : Tôles en alliages d'aluminium tolérancées sur l'ensemble de la surface. Statut :Homologuée
- NF L 15-115 Août 1973 : Tôles en alliages d'aluminium. Statut :Homologuée
- NF L 15-152 Juillet 1978 : Bandes en aluminium et alliages d'aluminium. Statut :Homologuée
- NF L 15-312 Septembre 1972 : Barres rondes étirées en alliages d'aluminium. Statut :Homologuée
- NF L 15-314 Septembre 1972 : Barres rondes filées en alliages d'aluminium. Statut :Homologuée
- NF L 15-322 Septembre 1972 : Barres hexagonales étirées en alliages d'aluminium. Dimensions et tolérances. Statut :Homologuée
- NF L 15-332 Septembre 1972 : Barres carrées, filées et étirées, en alliages d'aluminium. Statut :Homologuée
- NF L 15-340 Septembre 1972 : Méplats filés en alliages d'aluminium. Statut :Homologuée
- NF L 15-501 Décembre 1968 : Profilés filés en alliages d'aluminium. Tolérances générales Statut :Homologuée
- NF L 15-512 Avril 1973 : Cornières à ailes égales et inégales filées en alliages d'aluminium. Statut :Homologuée
- NF L 15-520 Avril 1973 : Cornières à boudin filées en alliages d'aluminium. Statut :Homologuée
- NF L 15-530 Avril 1973 : Profilés en U filés en alliages d'aluminium. Statut :Homologuée
- NF L 15-540 Avril 1973 : Profilés en T filés en alliages d'aluminium. Statut :Homologuée
- NF L 15-560 Août 1973 : Profilés pliés en oméga en alliages d'aluminium. Statut :Homologuée
- NF L 15-570 Août 1973 : Profilés pliés en zéde en alliages d'aluminium. Statut :Homologuée
- NF L 15-611 Avril 1973 : Tubes circulaires étirés en alliages d'aluminium. Tolérances courantes. Statut :Homologuée
- NF L 15-612 Avril 1973 : Tubes circulaires étirés en alliages d'aluminium. Tubes de précision. Statut :Homologuée
- NF L 15-640 Septembre 1973 : Tubes carrés étirés en alliages d'aluminium. Statut :Homologuée
- NF L 15-641 Septembre 1973 : Tubes rectangulaires étirés en alliages d'aluminium. Statut :Homologuée
- NF L 15-660 Mai 1978 : Tubes profilés torpédo en alliages d'aluminium. Statut :Homologuée
- NF L 16-001 Mai 1991 : Industrie aéronautique. Peintures et vernis. Nature et méthodes de préparation de surface des éprouvettes en alliages d'aluminium. Statut :Homologuée
- NF L 19-001 Décembre 1995 : Série aérospatiale. Matériaux alvéolaires à cellules tubulaires (M.A.C.T.) en alliages d'aluminium. Généralités. Statut :Homologuée
- NF L 19-010 Décembre 1995 : Série aérospatiale. Matériaux alvéolaires à cellules tubulaires (M.A.C.T.) hexagonales en alliage d'aluminium 3003. Norme de produit. Statut :Homologuée
- NF L 19-011 Décembre 1995 : Série aérospatiale. Matériaux alvéolaires à cellules tubulaires (M.A.C.T.) hexagonales en alliage d'aluminium 5052. Norme de produit. Statut :Homologuée
- NF L 19-013 Décembre 1995 : Série aérospatiale. Matériaux alvéolaires à cellules tubulaires (M.A.C.T.) hexagonales en alliage d'aluminium 5056. Norme de produit. Statut :Homologuée
- NF L 19-014 Décembre 1995 : Série aérospatiale. Matériaux alvéolaires à cellules tubulaires (M.A.C.T.) hexagonales en alliage d'aluminium 2024. Norme de produit. Statut :Homologuée
- NF L 19-101-1 Février 1992 : Aéronautique et espace. Matériaux alvéolaires à cellules tubulaires (M.A.C.T) en alliages d'aluminium. Spécification technique - Exigences générales. Statut :Homologuée
- NF L 19-101-2 Février 1992 : Aéronautique et espace. Matériaux alvéolaires à cellules tubulaires (M.A.C.T) en alliages d'aluminium. Spécification technique - Exigences particulières aux cellules tubulaires hexagonales. Statut :Homologuée
- NF F 19-303 Septembre 1996 : Matériel roulant ferroviaire. Peinture monocouche hydrodiluable pour aluminium et ses alliages. Statut :Homologuée
- NF L 21-106 Janvier 1975 : Fils à rivets en alliages d'aluminium, en acier, en alliages inoxydables et réfractaires - Dimensions. Statut :Homologuée
- NF L 21-201 Juillet 1972 : Rivets en alliages d'aluminium - Norme de produit. Statut :Homologuée
- NF L 21-211 Mars 1980 : Rivets à tête goutte de suif en alliages d'aluminium. Statut :Homologuée
- NF L 21-212 Mars 1980 : Rivets à tête cylindrique plate en alliages d'aluminium. Statut :Homologuée
- NF L 21-213 Mars 1980 : Rivets à tête fraisée 120 degrés en alliages d'aluminium.. Statut :Homologuée
- NF L 21-214 Mars 1980 : Rivets à tête fraisée 120 degrés bombée en alliages d'aluminium.. Statut :Homologuée
- NF L 21-216 Mars 1980 : Rivets à tête fraisée 90 degrés en alliages d'aluminium.. Statut :Homologuée
- NF L 21-271 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête cylindrique et à bague en alliage 2024. Statut :Homologuée
- NF L 21-272 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête fraisée 100 degrés et à bague en alliage d'aluminium 2024.. Statut :Homologuée
- P 22-202-1/2 Mai 1993 DTU 32.2. : Travaux de bâtiment. Construction métallique. Charpente en alliages d'aluminium.. Référence commerciale des parties 1/2 (changement de statut du DTU 32.2) Statut :Extrait de norme (condensé)
- NF P 22-202-1 Mai 1993 : Travaux De Batiment - Construction Métallique - Charpentes En Alliages D'aluminium - Partie 1 : Cahier Des Clauses Techniques. (Changement De Statut Du DTU 32.2 D'avril 1967). Vendue Uniquement Avec La Partie 2. Statut :Homologuée

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AFNOR NF Standards (Aluminium) - continued.

- NF P 22-202-2 Mai 1993 : Travaux De Batiment - Marches Privés - Construction Metallique - Charpente En Alliages D'aluminium - Partie 2 : Cahier Des Clauses Speciales. (Changement De Statut Du DTU 32.2 D'avril 1967). Vendue Uniquement Avec La Partie 1. Statut :Homologuée
- NF E 22-555 Décembre 1985 : Paliers lisses. Alliage d'aluminium pour paliers massifs. Statut :Homologuée
- NF P 24-301 Août 1980 : Spécifications techniques des fenêtres, portes-fenêtres et châssis fixes métalliques Statut :Homologuée
- NF L 25-110 Juillet 1979 : Charnières en alliage d'aluminium. Statut :Homologuée
- NF E 25-703 Décembre 1988 : Éléments de fixation. Rivets aveugles à rupture de tige dits "étanches". Caractéristiques - Méthodes d'essai. (2e tirage corrigé). Statut :Homologuée
- NF P 26-309 Février 1958 : Articles de quincaillerie moulés par gravité en alliages d'aluminium dits de première fusion. Statut :Homologuée
- NF E 29-741 Octobre 1991 : Récipients à gaz. Bouteilles à gaz en aluminium non allié ou en alliages d'aluminium, sans soudure. Construction - Essais. Statut :Homologuée
- E 29-742 Septembre 1992 : Bouteilles à gaz. Corps d'extincteurs "haute pression" sans soudure en aluminium non allié et en alliages d'aluminium. Construction - Essais. Statut :Expérimentale
- Projet E 29-743 Septembre 1995 : Bouteilles A Gaz Transportables Specifications Pour La Conception Et La Fabrication De Bouteilles A Gaz Rechargeables Et Transportables En Alliage D'aluminium Sans Soudure De Capacité Comprise Entre 0, 5 Litre Et 150 Litres Inclus Projet
- NF E 29-752 Décembre 1991 : Récipients à gaz. Bouteilles frettées avec corps en alliage d'aluminium sans soudure. Constructions - Essais. Statut :Homologuée
- Projet E 29-752 Mars 1996 : Bouteilles A Gaz Transportables Bouteilles Sans Soudure, Frettes En Matériau Composite Specifications Projet
- NF E 29-762 Juillet 1990 : Récipients à gaz. Bouteilles à gaz sans soudure en alliages d'aluminium. Essais de corrosion. Statut :Homologuée
- NF C 31-520 Août 1979 : Barres méplates en aluminium et alliages d'aluminium pour tableaux et canalisations électriques (à angles arrondis). Statut :Homologuée
- UTE C 32-015 Juin 1985 : Âmes des conducteurs et câbles isolés en alliage d'aluminium revêtu d'une couche de nickel - Guide précisant les caractéristiques des âmes et les essais de vérification correspondants (document provisoire). (complète par un rectificatif). Statut :Doc. de référence
- C 34-112 Octobre 1992 : Fils en alliage d'aluminium - Magnésium - Silicium pour conducteurs de lignes aériennes. Statut :Expérimentale
- Projet C 34-112 Juillet 1994 : Fil En Alliage D'aluminium-Magnésium-Silicium Pour Conducteurs De Lignes Aeriennes Projet
- C 34-125 Octobre 1992 : Conducteurs nus en alliages d'aluminium et en alliage d'aluminium-acier pour lignes aériennes. Statut :Expérimentale
- C 34-200 Octobre 1993 : Conducteurs nus pour lignes aériennes. Caractéristiques des produits de protection pour conducteurs nus en aluminium, en alliage d'aluminium ou en acier pour lignes aériennes. Statut :Expérimentale
- Projet C 34-200 Novembre 1995 : Caracteristiques Des Produits De Protection Pour Conducteurs Nus En Aluminium, En Alliage D'aluminium Ou En Acier Pour Lignes Aeriennes Projet
- P 34-206-1/2 Mai 1993 DTU 40.36. : Travaux de bâtiment. Couverture en plaques nervurées d'aluminium prélaqué ou non.. Référence commerciale des parties 1/2 (changement de statut du DTU 40.36) Statut :Extrait de norme (condensé)
- NF P 34-411 Mars 1983 : Couverture. Plaques ondulées ou nervurées en alliage d'aluminium. Statut :Homologuée
- NF P 34-504 Juin 1983 : Couverture. Plaques nervurées en alliage d'aluminium - Essais de flexion statique et dynamique Statut :Homologuée
- NF P 34-631 Mai 1983 : Couverture - Façonnés linéaires en aluminium ou alliage d'aluminium Statut :Homologuée
- Projet T 34-750-1 Février 1996 : Peintures Et Vernis Revêtements De L'aluminium Pour Applications Architecturales Partie 1 : Revêtements A Partir De Peintures En Poudre Projet
- NF H 35-089 Septembre 1993 : Industries de l'embouteillage. Fûts à bière cylindriques en alliage d'aluminium. Caractéristiques. Statut :Homologuée
- NF L 35-111 Juillet 1978 : Corps de bielle en alliage d'aluminium pour commandes de vol - Spécification technique (complétée par le modificatif 1, août 1979). Statut :Homologuée
- NF L 35-112 Septembre 1976 : Corps de bielles en alliage d'aluminium pour commandes de vol et structures d'aéronefs - Dimensions Statut :Homologuée
- NF H 44-006 Décembre 1988 : Générateurs d'aérosols. Récipients en aluminium et alliages d'aluminium. Tolérances des dimensions de base en rapport avec le dudgeonnage. Statut :Homologuée
- Projet A 50-001 Avril 1996 : Aluminium Et Alliages D'aluminium Termes Et Definitions Projet
- NF A 50-101 Avril 1990 : Aluminium et alliages d'aluminium. Alliages d'aluminium pour récipients à gaz, sans soudure. Nuances - Demi-produits : billettes. Statut :Homologuée
- Projet A 50-120 Août 1996 : Aluminium Et Alliages D'aluminium Produits Corroyés Exigences Particulières Pour Les Produits Destinés A La Fabrication Des Appareils A Pression Projet
- NF A 50-181 Novembre 1970 : Aluminium et alliages d'aluminium. Bandes minces et feuilles - Essais mécaniques - Traction - Emboutissage - Éclatement Statut :Enregistrée
- NF A 50-261 Janvier 1977 : Aluminium et alliages d'aluminium. Bandes minces et feuilles - Essais physiques - Porosité - Mouillabilité - Épaisseur - Adhérence entre spires Statut :Enregistrée
- NF A 50-301 Décembre 1991 : Aluminium et alliages d'aluminium - Mesure des indices de cornes à l'emboutissage. Statut :Homologuée
- NF A 50-401 Décembre 1988 : Aluminium et alliages d'aluminium. Fils machine obtenus par coulée et laminage en continu. Caractéristiques générales. Statut :Homologuée

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- NF A 50-402 Décembre 1988 : Aluminium et alliages d'aluminium. Fils machine pour conducteurs électriques. Caractéristiques. Statut :Homologuée
- NF A 50-403 Juillet 1989 : Aluminium et alliages d'aluminium. Fils machines pour soudure. Caractéristiques. Statut :Homologuée
- NF A 50-404 Juillet 1989 : Aluminium et alliages d'aluminium. Fils machines à usages mécaniques (hors soudure). Caractéristiques. Statut :Homologuée
- Projet A 50-434-1 Janvier 1997 : Aluminium Et Alliages D'aluminium Ebauches De Relaminage Pour Applications Generales - Partie 1 : Specifications Pour Ebauches Obtenues Par Laminage A Chaud Projet
- Projet A 50-443 Avril 1995 : Aluminium Et Alliages D'aluminium Feuille Mince Partie 4 : Proprietes Particulieres Projet
- NF A 50-452 Septembre 1984 : Aluminium et alliages d'aluminium. Produits prélaqués livrés en tôles ou en bandes - Caractéristiques Statut :Homologuée
- NF A 50-501 Septembre 1987 : Aluminium et alliages d'aluminium. Tubes soudés - Prescriptions générales. Statut :Homologuée
- NF A 50-506 Mars 1982 : Aluminium et alliages d'aluminium. Profils obtenus à froid sur machines à galet et sur presses plieuses - Caractéristiques générales Statut :Enregistrée
- Projet A 50-616 Décembre 1995 : Aluminium Et Alliages D'aluminium Barres Et Tubes Etires Partie 7 : Tubes Files Sur Aiguille, Tolerances Sur Dimensions Et Forme Projet
- Projet A 50-640-1 Décembre 1995 : Aluminium Et Alliages D'aluminium Profiles De Precision Files En Alliages En Aw-6060 Et En Aw-6063 Partie 1 : Conditions Techniques De Controle Et De Livraison Projet
- Projet A 50-650-1 Mars 1995 : Aluminium Et Alliages D'aluminium Fil Machine Partie 1 : Exigences Generales Et Conditions Techniques De Controle Et De Livraison Projet
- Projet A 50-670 Juin 1994 : Aluminium Et Alliages D'aluminium Fil Etire Partie 1 : Conditions Techniques De Controle Et De Livraison Projet
- Projet A 50-671 Août 1995 : Aluminium Et Alliages D'aluminium Fil Etire Partie 2 : Caracteristiques Mecaniques Projet
- Projet A 50-672 Juin 1994 : Aluminium Et Alliages D'aluminium Fil Etire Partie 3 : Tolerances Sur Dimensions Projet
- NF A 50-701 Juillet 1982 : Aluminium et alliages d'aluminium. Produits filés et filés étirés - Répartition en groupes selon composition Statut :Enregistrée
- NF A 50-702 Juillet 1984 : Aluminium et alliages d'aluminium. Barres de section circulaire filées - Tolérances sur dimensions et dimensions recommandées Statut :Homologuée
- NF A 50-703 Juillet 1984 : Aluminium et alliages d'aluminium. Barres de section carrée filées - Tolérances sur dimensions et dimensions recommandées Statut :Homologuée
- NF A 50-704 Juillet 1984 : Aluminium et alliages d'aluminium. Barres de section hexagonale filées - Tolérances sur dimensions et dimensions recommandées Statut :Homologuée
- NF A 50-705 Juillet 1984 : Aluminium et alliages d'aluminium. Méplats filés - Tolérances sur dimensions et dimensions recommandées Statut :Homologuée
- NF A 50-706 Août 1987 : Aluminium et alliages d'aluminium. Cornières - Tolérances de forme et dimensions Statut :Homologuée
- NF A 50-707 Décembre 1981 : Aluminium et alliages d'aluminium. Profilés de section simple filés en forme I - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 50-708 Mars 1982 : Aluminium et alliages d'aluminium. Profilés de section simple filés en forme T - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 50-709 Décembre 1981 : Aluminium et alliages d'aluminium. Profilés de section simple filés en forme U - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 50-710 Février 1981 : Aluminium et alliages d'aluminium. Profilés de section quelconque filés - Tolérances sur dimensions Statut :Enregistrée
- NF A 50-711 Septembre 1986 : Aluminium et alliages d'aluminium. Tubes de section circulaire filés livrés en longueurs droites pour usages généraux - Tolérances de forme et dimensions (2e tirage, février 1987, erratum incorporé). Statut :Homologuée
- NF A 50-712 Décembre 1986 : Aluminium et alliages d'aluminium. Tubes de section circulaire filés livrés en couronne pour usages généraux - Tolérances de forme et dimensions. Statut :Homologuée
- NF A 50-735 Décembre 1986 : Aluminium et alliages d'aluminium. Fils méplats étirés livrés en couronne - Tolérances de forme et dimensions. Statut :Homologuée
- NF A 50-736 Juillet 1970 : Aluminium et alliages d'aluminium. Fils tréfilés livrés en couronne - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 50-737 Juillet 1970 : Aluminium et alliages d'aluminium. Tubes de section circulaire étirés livrés en longueurs droites ou en couronnes - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 50-738 Février 1987 : Aluminium et alliages d'aluminium. Tubes de section carrée et rectangulaire étirés - Tolérances de forme et dimensions. Statut :Homologuée
- NF A 50-751 Juin 1970 : Aluminium et alliages d'aluminium. Tôles - Tolérances sur dimensions Statut :Enregistrée
- NF A 50-761 Juin 1970 : Aluminium et alliages d'aluminium. Bandes roulées - Tolérances sur dimensions Statut :Enregistrée
- NF A 50-801 Septembre 1987 : Aluminium et alliages d'aluminium. Tubes soudés de section circulaire - Tolérances de forme et dimensions. Statut :Homologuée
- NF A 50-802 Mai 1988 : Aluminium et alliages d'aluminium. Tubes soudés de gros diamètres. Dimensions et tolérances. Statut :Homologuée
- NF A 50-805 Septembre 1987 : Aluminium et alliages d'aluminium. Tubes soudés de section carrée ou rectangulaire - Tubes soudés de forme - Tolérances de forme et dimensions. Statut :Homologuée

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Projet A 50-810 Décembre 1994 : Aluminium Et Alliages D'aluminium Tubes Electro-Soudes Hf Partie 1 : Conditions Techniques De Controle Et De Livraison Projet

NF A 50-821 Février 1971 : Aluminium et alliages d'aluminium. Profils de formes obtenus à froid sur machines à galets - Dimensions et tolérances sur dimensions Statut :Enregistrée

NF A 50-825 Février 1971 : Aluminium et alliages d'aluminium. Profils obtenus à froid par pliage à la presse - Tolérances sur dimensions Statut :Enregistrée

Projet A 50-922 Mai 1996 : Aluminium Et Alliages D'aluminium Produits Corroyes Destines A La Forge Partie 3 : Tolerances Sur Dimensions Et Forme Projet

Projet A 50-930 Février 1992 : Pieces Forgees En Aluminium Et Alliages D'aluminium Corroyes Partie 1 : Conditions Techniques De Controle Et De Livraison Projet

Projet A 50-932 Décembre 1996 : Aluminium Et Alliages D'aluminium Pieces Forgees Partie 3 : Tolerances Sur Dimensions Et Forme Projet

NF L 52-150 Octobre 1986 : Matériels aéronautiques - Câbles électriques à conducteur en alliage d'aluminium - Caractéristiques. Statut :Homologuée

NF F 55-310 Décembre 1993 : Installations fixes ferroviaires. Potences et portiques de signalisation en alliage d'aluminium. Statut :Homologuée

NF A 57-105 (Jan. 1988) : Aluminium and Aluminium Alloys - Foundry Products.

NF A 57-702 Février 1981 : Produits de fonderie. Caractéristiques des pièces moulées par gravité, basse pression et dépression en aluminium ou en alliages d'aluminium Statut :Enregistrée

NF A 57-703 Juillet 1984 : Produits de fonderie. Pièces moulées sous pression en aluminium et en alliages d'aluminium - Caractéristiques Statut :Homologuée

NF A 57-711 Juillet 1984 : Produits de fonderie. Pièces moulées sous pression en aluminium, alliages d'aluminium, de magnésium et de zinc - Conditions de fourniture Statut :Homologuée

NF C 63-061 Décembre 1973 : Raccords de connexion pour conducteurs dont l'un au moins est isolé et en aluminium ou en alliage d'aluminium - Règles d'essais électriques Statut :Enregistrée

NF C 64-450 + AMDT 2 Novembre 1993 : Enveloppes en alliage d'aluminium coulé pour l'appareillage à haute tension sous pression de gaz. Statut :Homologuée

A 65-700 Décembre 1982 : Le magnésium et ses alliages - Caractéristiques - Mise en oeuvre - Applications Statut :Fascicule de doc.

NF A 66-002 Septembre 1985 : Produits de fonderie. Alliages d'aluminium et alliages de zinc - Tolérances dimensionnelles des pièces moulées sous pression. Statut :Homologuée

NF P 78-456 Avril 1986 : Vitrages isolants. Méthode de détermination de l'indice de pénétration de l'humidité Statut :Homologuée

NF F 80-152 Juillet 1981 : Rayons de pliage à froid des produits plats. Rayons minimaux de pliage des produits et demi-produits laminés en métaux non ferreux. Statut :Enregistrée

NF F 80-153 Décembre 1986 : Rayons de pliage à froid des produits plats. Rayons minimaux de pliage des produits prélaqués en aluminium et alliages d'aluminium livrés en tôles ou en bandes. Statut :Homologuée

NF F 80-200 Août 1988 : Matériel roulant ferroviaire. Tubes pour canalisations de fluides. Matières et dimensions - Sélection. Statut :Homologuée

NF A 81-331 Mai 1984 : Aluminium et alliages d'aluminium - Soudage - Brasage fort et soudobrasage - Produits d'apport - Symbolisation - Spécifications Statut :Homologuée

NF A 81-410 Mai 1984 : Aluminium et alliages d'aluminium - Soudage - Brasage fort et soudobrasage - Produits de base et choix des produits d'apport Statut :Homologuée

NF A 81-900 Mars 1973 : Aluminium et alliages d'aluminium - Soudage - Emploi et contrôle des flux décapants Statut :Enregistrée

NF F 82-001 Août 1990 : Matériel roulant ferroviaire. Produits filés soudables en alliage d'aluminium pour ossature de caisse. Statut :Homologuée

NF E 82-102 Décembre 1982 : Pièces forgées par matriçage en aluminium et alliages d'aluminium. Tolérances dimensionnelles Statut :Enregistrée

NF E 82-110 Décembre 1982 : Pièces forgées par matriçage en aluminium et alliages d'aluminium. Conditions techniques générales de fourniture Statut :Fascicule de doc.

NF A 87-010 Avril 1973 : Aluminium et alliages d'aluminium - Soudage - Préparation des bords Statut :Fascicule de doc.

M 88-109 Novembre 1994 : Citernes destinées au transport de matières dangereuses. Règles de fabrication des citernes en alliage d'aluminium. Statut :Expérimentale

NF A 89-220 Avril 1973 : Aluminium et alliages d'aluminium - Soudage. Classification et contrôle des joints soudés Statut :Enregistrée

Projet A 89-234 Février 1996 : Soudage Assemblages En Aluminium Et Alliages D'aluminium Soudables Soudes Par Faisceau D'electrons Et Par Faisceau Laser Guide Des Niveaux De Qualite Des Defaults Projet

NF A 89-310 Avril 1973 : Aluminium et alliages d'aluminium - Soudage - Assemblages élémentaires types - Critères de choix Statut :Fascicule de doc.

Projet A 89-500 Novembre 1995 : Controle Non Destructif Des Assemblages Soudes Regles Generales Projet

Projet A 89-510 Juillet 1994 : Controle Non Destructif Des Assemblages Soudes Examen Radiographique Des Assemblages Soudes Par Fusion Projet

NF A 89-562 Février 1987 : Examen aux rayons X des joints bout à bout et des piquages soudés par fusion sur aluminium et ses alliages d'épaisseur comprise entre 5 mm et 50 mm - Pratiques recommandées. Statut :Homologuée

NF S 90-539 Janvier 1975 : Pièces constitutives des prothèses et des orthèses. Articulation malléolaire pour prothèse du membre inférieur en alliage léger ou en matière plastique. Statut :Homologuée

NF A 91-400 Juillet 1987 : Anodisation de l'aluminium et de ses alliages - Vocabulaire. Statut :Homologuée

NF A 91-401 Octobre 1966 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Nomenclature des méthodes d'essais Statut :Homologuée

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- NF A 91-402 Octobre 1981 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Mesure de l'épaisseur - Coupe micrographique. Statut :Enregistrée
- NF A 91-403 Juillet 1985 : Aluminium et alliages d'aluminium anodisés - Mesurage de l'épaisseur - Mesurage non destructif par microscope à coupe optique. Statut :Homologuée
- NF A 91-404 Octobre 1966 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages - Mesure de l'épaisseur - Mesures électriques (courant de Foucault) Statut :Homologuée
- NF A 91-405 Mars 1983 : Traitement de surface des métaux - Anodisation de l'aluminium et de ses alliages - Contrôle de l'isolement électrique par mesurage de la tension de claquage Statut :Enregistrée
- NF A 91-406 Juillet 1985 : Aluminium et alliages d'aluminium anodisés - Mesurage de la masse par unité de surface - Méthode gravimétrique. Statut :Homologuée
- NF A 91-407 Octobre 1981 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages - Contrôle de colmatage par mesurage de la perte de masse après immersion en solution acide Statut :Enregistrée
- NF A 91-408 Juillet 1985 : Aluminium et alliages d'aluminium anodisés - Contrôle du colmatage - Essai à la goutte de bleu sanodal G Statut :Homologuée
- NF A 91-409 Juin 1987 : Anodisation de l'aluminium et de ses alliages - Appréciation de la perte du pouvoir absorbant des couches d'oxydes anodiques après colmatage - Essai à la goutte de colorant avec action acide préalable. Statut :Homologuée
- NF A 91-410 Octobre 1966 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Contrôle de la continuité - Essai au sulfate de cuivre Statut :Homologuée
- NF A 91-411 Octobre 1966 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Contrôle de la résistance à la corrosion - Essais d'immersions - Émersions alternées en solution saline Statut :Homologuée
- NF A 91-412 Août 1982 : Traitement de surface des métaux - Anodisation de l'aluminium et de ses alliages. Essai accéléré de résistance à la lumière artificielle des couches anodiques colorées Statut :Enregistrée
- NF A 91-413 Septembre 1981 : Traitement de surface des métaux - Anodisation de l'aluminium et de ses alliages. Évaluation de la résistance des couches anodiques à la formation de criques par déformation Statut :Enregistrée
- NF A 91-414 Septembre 1981 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Contrôle du colmatage - Mesurage de l'admittance ou de l'impédance Statut :Enregistrée
- NF A 91-415 Septembre 1981 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Détermination de la solidité à la lumière ultraviolette des couches anodiques colorées Statut :Enregistrée
- NF A 91-416 Juin 1982 : Traitement de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Évaluation de la qualité des couches anodiques colmatées par mesurage de la perte de masse après immersion en solution phosphochromique Statut :Enregistrée
- A 91-424 Février 1988 : Traitements de surface. Aluminium et alliages d'aluminium anodisés. Détermination de la couleur et de la différence de couleur des couches anodiques colorées. Statut :Fascicule de doc.
- NF A 91-450 Décembre 1981 : Traitements de surface des métaux - Anodisation (oxydation anodique) de l'aluminium et de ses alliages. Couches anodiques sur aluminium - Spécifications générales Statut :Enregistrée
- A 91-451 Septembre 1988 : Traitements de surface. Aluminium et alliages d'aluminium anodisés. Qualification des produits d'entretien. Statut :Expérimentale
- Projet A 91-45521 Avril 1997 : Aluminium Et Alliages D'aluminium Anodisation Partie 21 : Methode De Specification Des Caracteristiques Des Revêtements Decoratifs Et Protecteurs Obtenus Par Oxydation Anodique Sur Aluminium Projet
- Projet A 91-475 Novembre 1996 : Couches De Conversion Phosphatees Des Metaux Methode De Specifications Des Exigences Projet
- NF A 92-020 Septembre 1990 : Émaux vitrifiés déposés sur l'aluminium et ses alliages. Fabrication des échantillons pour essai. Statut :Homologuée
- NF A 92-021 Septembre 1990 : Émaux vitrifiés déposés sur l'aluminium et ses alliages. Essais d'adhérence. Statut :Homologuée
- NF P 93-330 Décembre 1995 : Équipement de chantier. Bennes à béton métalliques pour chantiers de bâtiment et travaux publics. Exigences - Essais. Statut :Homologuée
- NF P 93-340 Juin 1994 : Équipement de chantier. Garde-corps métallique provisoire de chantier (GCMPC). Statut :Homologuée
- NF P 93-352 Décembre 1993 : Équipement de chantier. Plate-forme individuelle roulante. Statut :Homologuée
- NF P 93-353 Décembre 1994 : Équipement de chantier. Plate-forme individuelle roulante légère. Statut :Homologuée
- NF P 93-501 Décembre 1988 : Équipements de chantier. Échafaudages de service à éléments préfabriqués. Méthodes d'essais. Statut :Homologuée
- XP S 94-081-1 Mars 1996 : Implants chirurgicaux. Alliage à base de titane, d'aluminium 6 et de niobium 7. Partie 1 : barres et billettes. Statut :Expérimentale
- XP S 94-081-2 Mars 1996 : Implants chirurgicaux. Alliage à base de titane, d'aluminium 6 et de niobium 7. Partie 2 : produits semi-finis obtenus par forgeage ou par usinage. Statut :Expérimentale
- NF P 97-402 Novembre 1982 : Candelabres d'éclairage public. Matériaux. Statut :Enregistrée
- NF P 97-403 Novembre 1982 : Candelabres d'éclairage public. Protection de surface des candelabres d'éclairage public métalliques. Statut :Enregistrée
- P 98-422 Août 1994 : Barrières de sécurité routières. Barrières de sécurité en béton armé et en métal BN1 et BN2. Composition, fonctionnement, performances de retenue, conditions d'implantation et de montage, éléments constitutifs. Statut :Expérimentale

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- NF EN 286-4 Décembre 1994 : Récipients à pression simples, non soumis à la flamme, destinés à contenir de l'air ou de l'azote. Partie 4 : récipients à pression en alliages d'aluminium destinés aux équipements pneumatiques de freinage et aux équipements pneumatiques auxiliaires du ma Statut :Homologuée
- NF EN 287-2 Juin 1992 : Épreuve de qualification des soudeurs. Soudage par fusion. Partie 2 : aluminium et ses alliages. Statut :Homologuée
- NF EN 288-4 Mai 1993 : Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques. Partie 4 : épreuve de qualification d'un mode opératoire de soudage à l'arc sur l'aluminium et ses alliages. Statut :Homologuée
- NF EN 485-1 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- NF EN 485-2 Décembre 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- NF EN 485-3 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 3 : tolérances sur forme et dimensions des produits laminés à chaud. Statut :Homologuée
- NF EN 485-4 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 4 : tolérances sur forme et dimensions des produits laminés à froid. Statut :Homologuée
- NF EN 486 Mars 1994 : Aluminium et alliages d'aluminium. Billettes de filage. Spécifications. Statut :Homologuée
- NF EN 487 Mars 1994 : Aluminium et alliages d'aluminium. Plaques de laminage. Spécifications. Statut :Homologuée
- NF EN 515 Octobre 1993 : Aluminium et alliages d'aluminium. Produits corroyés. Désignation des états métallurgiques. Statut :Homologuée
- NF EN 541 Avril 1995 : Aluminium et alliages d'aluminium. Produits laminés pour boîtes, capsules rigides et couvercles. Spécifications. Statut :Homologuée
- NF EN 546-1 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- NF EN 546-2 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- NF EN 546-3 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 3 : tolérances sur dimensions. Statut :Homologuée
- NF EN 570 Octobre 1994 : Aluminium et alliages d'aluminium. Pions de filage par choc obtenus à partir de produits corroyés. Spécifications. Statut :Homologuée
- NF EN 573-1 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 1 : système de désignation numérique. Statut :Homologuée
- NF EN 573-2 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 2 : système de désignation fondé sur les symboles chimiques. Statut :Homologuée
- NF EN 573-3 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 3 : composition chimique. Statut :Homologuée
- NF EN 573-4 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 4 : forme des produits. Statut :Homologuée
- NF EN 575 Septembre 1995 : Aluminium et alliages d'aluminium. Alliages mères obtenus par fusion. Spécifications. Statut :Homologuée
- NF EN 576 Septembre 1995 : Aluminium et alliages d'aluminium. Lingots pour refusion en aluminium non allié. Spécifications. Statut :Homologuée
- NF EN 577 Septembre 1995 : Aluminium et alliages d'aluminium. Métal liquide. Spécifications. Statut :Homologuée
- NF EN 586-2 Août 1994 : Aluminium et alliages d'aluminium. Pièces forgées. Partie 2 : caractéristiques mécaniques et autres caractéristiques exigées. Statut :Homologuée
- NF EN 601 Décembre 1994 : Aluminium et alliages d'aluminium. Pièces moulées. Composition chimique des pièces moulées destinées à entrer en contact avec les aliments. Statut :Homologuée
- NF EN 602 Décembre 1994 : Aluminium et alliages d'aluminium. Produits corroyés. Composition chimique des demi-produits utilisés pour la fabrication d'articles destinés à entrer en contact avec les aliments. Statut :Homologuée
- NF EN 603-1 Décembre 1996 : Aluminium et alliages d'aluminium. Produits corroyés destinés à la forge. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- NF EN 603-2 Décembre 1996 : Aluminium et alliages d'aluminium. Produits corroyés destinés à la forge. Partie 2 : caractéristiques mécaniques.
- NF EN 604-1 Mai 1997 : Aluminium et alliages d'aluminium - produits coules et destinés à la forge - Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- NF EN 604-2 Mai 1997 : Aluminium et alliages d'aluminium - produits coules et destinés à la forge - Partie 2 : tolérances sur dimensions et forme.
- NF EN 683-1 Janvier 1997 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- NF EN 683-2 Novembre 1996 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- NF EN 683-3 Novembre 1996 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 3 : tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 754-1 Juin 1997 : Aluminium Et Alliages D'aluminium - Barres Et Tubes Etires - Partie 1 : Conditions Techniques De Contrôle Et De Livraison. (Remplace En Partie NF A 01-101, Novembre 1972) Statut :Homologuée
- NF EN 754-2 Juin 1997 : Aluminium Et Alliages D'aluminium - Barres Et Tubes Etires - Partie 2 : Caractéristiques Mécaniques. (Remplace En Partie NF A 50-411, Avril 1989) Statut :Homologuée

AFNOR NF EN Standards (Aluminium) - continued.

- NF EN 754-3 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 3 : barres rondes, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 754-4 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 4 : barres carrées, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 754-5 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 5 : barres rectangulaires, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 754-6 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 6 : barres hexagonales, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 755-1 Juillet 1997 : Aluminium Et Alliages D'aluminium - Barres, Tubes Et Profils Filés - Partie 1 : Conditions Techniques De Controle Et De Livraison. (Remplace NF A 01-101, Novembre 1972) Statut :Homologuée
- NF EN 755-2 Juillet 1997 : Aluminium Et Alliages D'aluminium - Barres, Tubes Et Profils Filés - Partie 2 : Caracteristiques Mecaniques. (Remplace En Partie NF A 50-411, Avril 1989) Statut :Homologuée
- NF EN 755-3 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 3 : barres rondes, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 755-4 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 4 : barres carrées, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 755-5 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 5 : barres rectangulaires, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 755-6 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 6 : barres hexagonales, tolérances sur dimensions et forme. Statut :Homologuée
- NF EN 851 Septembre 1995 : Aluminium et alliages d'aluminium. Disques et ébauches pour disques pour applications culinaires. Spécifications. Statut :Homologuée
- NF EN 941 Août 1995 : Aluminium et alliages d'aluminium. Disques et ébauches pour disques pour applications générales. Spécifications. Statut :Homologuée
- NF EN 1370 Février 1997 Fonderie. : Contrôle de la rugosité de surface par comparateurs visotactiles.. Statut :Homologuée
- NF EN 1386 Mai 1997 : Aluminium Et Alliages D'aluminium - Toles Relief Specifications - Statut :Homologuée
- NF EN 1396 Mars 1997 : Aluminium et alliages d'aluminium. Tôles et bandes revêtues en bobine pour applications générales. Spécifications. Statut :Homologuée
- NF EN 1669 Décembre 1996 : Aluminium et alliages d'aluminium. Méthodes d'essai. Mesure de l'indice de cornes à l'emboutissage pour les tôles et les bandes. Statut :Homologuée
- NF EN 1676 Décembre 1996 : Aluminium et alliages d'aluminium. Lingots pour refusion en aluminium allié. Spécifications. Statut :Homologuée
- NF EN 1780-1 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 1 : système de désignation numérique. Statut :Homologuée
- NF EN 1780-2 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 2 : système de désignation basé sur les symboles chimiques. Statut :Homologuée
- NF EN 1780-3 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 3 : règles d'écriture pour la composition chimique. Statut :Homologuée
- NF EN 2004-1 Novembre 1993 : Série aérospatiale. Méthodes d'essais applicables aux produits en aluminium et alliages d'aluminium. Partie 1 : détermination de la conductivité électrique des alliages d'aluminium corroyés. Statut :Homologuée
- NF EN 2004-5 Novembre 1993 : Série aérospatiale. Méthodes d'essais applicables aux produits en aluminium et alliages d'aluminium. Partie 5 : mesure de l'épaisseur du placage et de la diffusion du cuivre dans le placage des demi-produits plaques. Statut :Homologuée
- NF EN 2070-1 Décembre 1993 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 1 : exigences générales. Statut :Homologuée
- NF EN 2070-2 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 2 : tôles minces, bandes profilés pliés et tôles épaisses. Statut :Homologuée
- NF EN 2070-3 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium. Spécification technique - Partie 3 : barres et profilés. Statut :Homologuée
- NF EN 2070-4 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 4 : tubes pour application structurale. Statut :Homologuée
- NF EN 2070-5 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 5 : tubes pour canalisations sous pression. Statut :Homologuée
- NF EN 2070-6 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 6 : fils à rivets. Statut :Homologuée
- NF EN 2070-7 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 7 : produits corroyés destinés à la forge. Statut :Homologuée
- NF EN 2076-1 Novembre 1993 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 1 - Exigences générales. Statut :Homologuée
- NF EN 2076-2 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 2 - Lingots pour refusion. Statut :Homologuée

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AFNOR NF EN Standards (Aluminium) - continued.

- NF EN 2076-3 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 3 - Pièces types et pièces de série. Statut :Homologuée
- NF EN 2082-1 Décembre 1993 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 1 : exigences générales. Statut :Homologuée
- NF EN 2082-2 Avril 1990 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 2 : produits destinés à la forge. Statut :Homologuée
- NF EN 2082-3 Avril 1990 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 3 : pièces types et pièces de série. Statut :Homologuée
- NF EN 2089 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T6 ou T62 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- NF EN 2092 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T6 ou T62 - Tôles et bandes plaquées - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- NF EN 2093 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74 - Pièces forgées 20 mm < a < 150 mm. Statut :Homologuée
- NF EN 2094 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74 - Pièces matricées 3 mm < a < 150 mm. Statut :Homologuée
- NF EN 2100 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T4511 - Barres et profilés filés a ou D < 200 mm. Statut :Homologuée
- NF EN 2101 Janvier 1992 : Série aérospatiale. Anodisation chromique de l'aluminium et des alliages d'aluminium corroyés. Statut :Homologuée
- NF EN 2122 Avril 1996 : Serie Aerospatiale - Rondelles Plates, En Alliage D'aluminium, Anodisees Ou Chromatees (Remplace NF EN 2122, Novembre 1994) Statut :Homologuée
- NF EN 2126 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T651 - Tôles épaisses - 6 mm < a < 80 mm. Statut :Homologuée
- NF EN 2127 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T73511 - Barres et profilés filés a ou D < 100 mm. Statut :Homologuée
- NF EN 2128 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T7351 - Barres étirées 6 mm < a ou D < 75 mm. Statut :Homologuée
- NF EN 2144 Novembre 1994 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2117. Série base inches. Statut :Homologuée
- NF EN 2145 Novembre 1994 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2117, anodisés ou chromatés. Série base inches. Statut :Homologuée
- NF EN 2146 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2017A, série base inches. Statut :Homologuée
- NF EN 2148 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 5056A, série base inches. Statut :Homologuée
- NF EN 2149 Juin 1996 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 5056A, anodisés ou chromatés, série base inches.
- NF EN 2257 Juillet 1997 : Serie Aerospatiale - Tubes Circulaires Pour Structures En Aluminium Et Alliages D'aluminium - Diametres 6mm Inferieur Ou Egal D Inferieur Ou Egal 100mm - Epaisseur 1mm Inferieur Ou Egal A Inferieur Ou Egal 6mm - Dimensions. Statut :Homologuée
- NF EN 2258 Juillet 1997 : Serie Aerospatiale - Tubes Circulaires Pour Canalisations En Aluminium Et Alliages D'aluminium - Diametres 3, 2mm Inferieur Ou Egal D Inferieur Ou Egal 100mm - Epaisseur 0, 6mm Inferieur Ou Egal A Inferieur Ou Egal 2, 5mm - Dimensions. Statut :Homologuée
- NF EN 2284 Janvier 1992 : Série aérospatiale. Anodisation sulfurique de l'aluminium et des alliages d'aluminium corroyés. Statut :Homologuée
- NF EN 2285 Mai 1990 : Série aérospatiale. Bagues cylindriques en alliage d'aluminium à garniture autolubrifiante. Dimensions et charges. Statut :Homologuée
- NF EN 2286 Mai 1990 : Série aérospatiale. Bagues à épaulement en alliage d'aluminium à garniture autolubrifiante. Dimensions et charges. Statut :Homologuée
- NF EN 2289 Novembre 1996 : Série aérospatiale. Corps de bielle en alliage d'aluminium pour commandes de vol. Spécification technique. Statut :Homologuée
- NF EN 2318 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2024 - T3511 - Barres et profilés filés 1, 2 mm < a ou D < 150 mm. Statut :Homologuée
- NF EN 2326 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P6082 - T6 - Barres et profilés filés a ou D < 200 mm. Statut :Homologuée
- NF EN 2365 Août 1989 : Série aérospatiale. Bagues en alliage d'aluminium. Statut :Homologuée
- NF EN 2381 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T7452 - Pièces forgées 40 mm < a < 150 mm. Statut :Homologuée
- NF EN 2384 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T6511 - Barres et profilés filés a ou D < 150 mm. Statut :Homologuée
- NF EN 2385 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74511 - Barres et profilés filés a ou D < 125 mm. Statut :Homologuée
- NF EN 2395 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T4 ou T42 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- XP EN 2500-2PR Février 1997 : Série aérospatiale. Instructions pour la préparation et l'utilisation des normes de matériaux métalliques. Partie 2 : exigences spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- NF EN 2536 Novembre 1995 : Série aérospatiale. Anodisation dure des alliages d'aluminium. Statut :Homologuée
- NF EN 2551 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normales avec dôme, en alliage d'aluminium en 2117, série base inches. Statut :Homologuée
- NF EN 2552 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 2117, série base inches. Statut :Homologuée

AFNOR NF EN Standards (Aluminium) - continued.

- NF EN 2553 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 2017A, série base inches. Statut :Homologuée
- NF EN 2555 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 5056A, série base inches. Statut :Homologuée
- NF EN 2556 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 5056A, anodisés ou chromatisés, série base inches. Statut :Homologuée
- NF EN 2630 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P7009- T74511 - Barres et profilés filés - a ou D inférieur ou égal à 125 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- NF EN 2632 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075- T73511 - Barres et profilés filés - a ou D inférieur ou égal à 100 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- NF EN 2633 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024- T3511 - Barres et profilés filés - a ou D compris entre 1.2 mm et 150 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- NF EN 2636 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082- T6 - Barres et profilés filés - a ou D inférieur ou égal à 200 mm, avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- NF EN 2693 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P5086 - H111 - Tôles et bandes - a compris entre 0.3 mm et 6mm. Statut :Homologuée
- NF EN 2694 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P6061 - T6 ou T62 - Tôles et bandes - a compris entre 0.4 mm et 6 mm. Statut :Homologuée
- NF EN 2695 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P6081 - T6 - Tôles et bandes - a compris entre 0.3 mm et 6 mm. Statut :Homologuée
- NF EN 2696 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T6 ou T62 - Tôles et bandes - a compris entre 0.4 mm et 6 mm. Statut :Homologuée
- NF EN 2912 Mai 1996 : Série aérospatiale. Rondelles plates larges, en alliage d'aluminium, anodisées ou chromatisées. Statut :Homologuée
- EN 3474PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-, T81 - Tôles et bandes - a compris entre 0.25 mm et 6 mm. Statut :Expérimentale
- XP EN 3869PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Joints en élastomère fluorocarboné et armature en alliage d'aluminium. Statut :Expérimentale
- EN 3996PR Novembre 1994 : Série aérospatiale. Aluminium Al-P1100-, H14 - Tôles et bandes - a compris entre 0.3 mm et 6 mm. Statut :Expérimentale
- EN 3997PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-, T3 - Tôles et bandes - a compris entre 0.4 mm et 6 mm. Statut :Expérimentale
- EN 3998PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-, T42 - Tôles et bandes - a compris entre 0.4 mm et 6 mm. Statut :Expérimentale
- EN 4004PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P3103-, H16 - Tôles et bandes - a compris entre 0.4mm et 6 mm. Statut :Expérimentale
- EN 4005PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P5052-, O - Tôles et bandes - a compris entre 0.3 mm et 6 mm. Statut :Expérimentale
- EN 4006PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082, T4 ou T42 - Tôles et bandes - a compris entre 0.4 mm et 6 mm.. Statut :Expérimentale
- EN 4007PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082-, T6 ou T62 - Tôles et bandes - a compris entre 0.4 mm et 6 mm. Statut :Expérimentale
- EN 4099PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-, T62 - Tôles et bandes plaquées - a compris entre 0.5 mm et 6 mm. Statut :Expérimentale
- EN 4100PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-, T62 - Tôles et bandes - a compris entre 0.5 mm et 6 mm. Statut :Expérimentale
- EN 4101PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-, T4 - Tôles et bandes avec aptitude améliorée à l'étirage sur forme - a compris entre 0.4 mm et 6 mm. Statut :Expérimentale
- EN 4102PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-, T81 - Tôles et bandes plaquées - a compris entre 0.5 mm et 6 mm. Statut :Expérimentale
- XP EN 4500-2PR Avril 1997 : Serie Aerospatiale - Materiaux Metalliques - Regles Pour La Redaction Et La Presentation Des Normes De Materiaux - Partie 2 : Regles Specifiques A L'aluminium, Aux Alliages D'aluminium Et De Magnesium. Statut :Expérimentale
- XP EN 4500-2PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 2 : règles spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- NF EN 10154 Août 1996 : Bandes et tôles en acier revêtues en continu par immersion à chaud d'une couche d'aluminium-silicium (AS). Conditions techniques de livraison. Statut :Homologuée
- NF EN 10214 Novembre 1995 : Bandes et tôles en acier revêtues à chaud en continu d'alliage zinc-aluminium (ZA). Conditions techniques de livraison. Statut :Homologuée
- NF EN 10215 Novembre 1995 : Bandes et tôles en acier revêtues d'alliage aluminium-zinc (AZ) à chaud en continu. Conditions techniques de livraison. Statut :Homologuée
- NF EN 22063 Janvier 1994 : Revêtements métalliques et inorganiques. Projection thermique. Zinc, aluminium et alliages de ces métaux. Statut :Homologuée
- NF EN 23134-1 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 1 : matériaux. Statut :Homologuée
- NF EN 23134-2 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 2 - Formes brutes. Statut :Homologuée
- NF EN 23134-3 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 3 - Produits corroyés. Statut :Homologuée

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AFNOR NF EN Standards (Aluminium) - continued.

- NF EN 30042 Juillet 1994 : Assemblages en aluminium et alliages d'aluminium soudables soudés à l'arc. Guide des niveaux d'acceptation des défauts.
Statut :Homologuée
- NF EN 50064 + AMDT 1 Novembre 1993 : Enveloppes en aluminium et alliage d'aluminium corroyés pour l'appareillage à haute tension sous pression de gaz.
Statut :Homologuée
- NF EN 50069 + AMDT 1 Novembre 1993 : Enveloppes soudées en alliage d'aluminium comportant des parties moulées et des parties en métal corroyé pour l'appareillage à haute tension sous pression de gaz.
Statut :Homologuée

NF ISO Standards

- NF ISO 2767 Juillet 1988 : Traitements de surface. Aluminium et alliage d'aluminium anodisés. Réflectivité spéculaire à 45 degrés - Réflectivité totale - Netteté d'image. Statut :Homologuée
- NF ISO 6719 Juillet 1988 : Traitements de surface. Aluminium et alliage d'aluminium anodisés. Mesurage des caractéristiques de réflectivité des surfaces d'aluminium à l'aide d'instruments intégrateurs sphériques. Statut :Homologuée
- NF ISO 7668 Juillet 1988 : Traitements de surface. Aluminium et alliage d'aluminium anodisés. Mesurage des caractéristiques de réflectance et de brillant spéculaires à angle fixe de 20 degrés, 45 degrés, 60 degrés ou 85 degrés. Statut :Homologuée
- NF ISO 7669 Juillet 1988 : Traitements de surface. Aluminium et alliage d'aluminium anodisés. Mesurage de la réflectivité totale à l'aide d'un réflectomètre photoélectrique. Statut :Homologuée
- NF ISO 8251 Juillet 1988 : Traitements de surface. Aluminium et alliages d'aluminium anodisés. Détermination de la résistance à l'usure et de l'indice d'usure des couches d'oxyde anodiques par essai à la roue abrasive. Statut :Homologuée
- NF ISO 8993 Décembre 1989 : Aluminium et alliages d'aluminium anodisés. Système de cotation de la corrosion par piqûres - Méthode reposant sur des images-types. Statut :Homologuée
- NF ISO 8994 Décembre 1989 : Aluminium et alliages d'aluminium anodisés. Système de cotation de la corrosion par piqûres - Méthode par quadrillage. Statut :Homologuée
- NF ISO 9717 Juillet 1991 : Couches de conversion au phosphate sur métaux - Méthode de spécification des caractéristiques. (2e tirage, juillet 1991).
Statut :Homologuée

NF Others

- REGLES AL Juillet 1976 : Règles AL - Règles de conception et de calcul des charpentes en alliages d'aluminium.. Statut :Document de DTU
- FD CR 12187 Avril 1996 : Soudage. Lignes directrices pour un groupement des matériaux pour le soudage.
Statut :Fascicule de doc.
- FD CR 12361 Octobre 1996 : Essais destructifs des soudures sur matériaux métalliques. Réactifs pour examen macroscopique et microscopique.
Statut :Fascicule de doc.

EN Standards

European EN specifications for metal alloys are currently being generated & adopted. These will progressively supersede the various national standards for aluminium alloys, as with other materials. However, it will be some years before this process is completed & fully implemented in all European countries. Aerospace EN designations apply to particular alloys, forms & conditions (many of these are still at the provisional stage). However, there are several EN specifications which cover the basic characteristics of general engineering aluminium alloys:

- ❑ Chemical composition specifications for **wrought** aluminium alloys are now contained in a single CEN specification: EN 573 - Aluminium & aluminium alloys - Chemical composition & form of wrought products.
- ❑ Temper designations for **wrought** aluminium alloys are also contained in a single CEN specification: EN 515 - Aluminium & aluminium alloys - Wrought products temper designations.
- ❑ EN 485 now contains conditions for delivery, properties & tolerances for **wrought** aluminium alloy products.

Similar specifications will be issued in the future to cover **cast** aluminium alloys.

- EN 12373-11 (Norm-Entwurf), Publication:1997-02 : Aluminium & aluminium alloys - Anodizing - Part 11: Measurement of specular reflectance & specular gloss of anodic oxidation coatings at angles of 20, 45, 60 oder 85; German version prEN 12373-11:1996.
- EN 12373-13 (Norm-Entwurf), Publication:1997-02 : Aluminium & aluminium alloys - Anodizing - Part 13: Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments; German version prEN 12373-13:1996.
- EN 12373-3 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 3: Estimation of loss of absorptive power of anodic oxidation coatings after sealing; dye spot test with prior acid treatment; German version prEN 12373-3:1996.
- EN 12373-5 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment; German version prEN 12373-5:1996.
- EN 12373-6 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment; German version prEN 12373-6:1996.
- EN 12373-7 (Norm-Entwurf), Publication:1996-11 : Aluminium & aluminium alloys - Anodizing - Part 7: Determination of the comparative fastness to ultra-violet light & heat of coloured anodic oxidation coatings; German version prEN 12373-7:1996.
- EN 1370 Février 1997 Fonderie. : Contrôle de la rugosité de surface par comparateurs visotactiles..
Statut :Homologuée
- EN 1386 Mai 1997 : Aluminium et alliages d'aluminium - Toles relief specifications - Statut :Homologuée
- EN 1386 Mai 1997 : Aluminium et alliages d'aluminium - Toles relief specifications - Statut :Homologuée

EN Standards (Aluminium) - continued.

- EN 1396 Mars 1997 : Aluminium et alliages d'aluminium. Tôles et bandes revêtues en bobine pour applications générales. Spécifications. Statut :Homologuée
- EN 1669 Décembre 1996 : Aluminium et alliages d'aluminium. Méthodes d'essai. Mesure de l'indice de cornes à l'emboutissage pour les tôles et les bandes. Statut :Homologuée
- EN 1676 Décembre 1996 : Aluminium et alliages d'aluminium. Lingots pour refusion en aluminium allié. Spécifications. Statut :Homologuée
- EN1706PR (1996) : Aluminium and Aluminium Alloys - Aluminium Alloy Ingots. [Note: Provisional standard therefore alloy nomenclatures may change].
- EN 1780-1 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 1 : système de désignation numérique. Statut :Homologuée
- EN 1780-2 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 2 : système de désignation basé sur les symboles chimiques. Statut :Homologuée
- EN 1780-3 Décembre 1996 : Aluminium et alliages d'aluminium. Système de désignation applicable aux lingots pour refusion en aluminium allié ou non allié, aux alliages-mères et aux produits moulés. Partie 3 : règles d'écriture pour la composition chimique. Statut :Homologuée
- EN 2004 : Test methods for aluminium & alloy products
- EN 2004-1 : Determination of electrical conductivity of wrought aluminium alloys
- EN 2004-1 Novembre 1993 : Série aérospatiale. Méthodes d'essais applicables aux produits en aluminium et alliages d'aluminium. Partie 1 : détermination de la conductivité électrique des alliages d'aluminium corroyés. Statut :Homologuée
- EN 2004-1, Publication:1993-09 : Aerospace series; test methods for aluminium & aluminium alloy products; part 1: determination of electrical conductivity of wrought aluminium alloys; German version EN 2004-1:1993.
- EN 2004-10 (Norm-Entwurf), Publication:1994-05 : Aerospace series; test methods for aluminium & aluminium alloy products; part 10: preparation of micrographic specimens for aluminium alloys.
- EN 2004-4 (Norm-Entwurf), Publication:1992-10 : Aerospace series; test methods for aluminium & aluminium alloys products; part 4: stress corrosion test by alternate immersion for high strength aluminium alloy wrought products.
- EN 2004-5 : Determination of cladding thickness & Cu-diffusion of clad semi-finished products
- EN 2004-5 Novembre 1993 : Série aérospatiale. Méthodes d'essais applicables aux produits en aluminium et alliages d'aluminium. Partie 5 : mesure de l'épaisseur du placage et de la diffusion du cuivre dans le placage des demi-produits plaques. Statut :Homologuée
- EN 2004-5, Publication:1993-09 : Aerospace series; test methods for aluminium & aluminium alloy products; part 5: determination of cladding thickness & copper diffusion of clad semi-finished products; German version EN 2004-5:1993.
- EN 2004-7 (Norm-Entwurf), Publication:1996-07 : Aerospace series - Test methods for aluminium & aluminium alloy products - Part 7: Reference blocks for the calibration of measuring equipment used in the determination of electrical conductivity of wrought aluminium & aluminium alloys.
- EN 2070 : Specification for aluminium & aluminium alloy wrought products. Technical specification
- EN 2070-1 : General requirements
- EN 2070-1 Décembre 1993 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 1 : exigences générales. Statut :Homologuée
- EN 2070-2 : Sheet, strip formed profiles & plate
- EN 2070-2 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 2 : tôles minces, bandes profilés pliés et tôles épaisses. Statut :Homologuée
- EN 2070-3 : Bar & section
- EN 2070-3 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium. Spécification technique - Partie 3 : barres et profilés. Statut :Homologuée
- EN 2070-4 : Tube for structures
- EN 2070-4 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 4 : tubes pour application structurale. Statut :Homologuée
- EN 2070-5 : Tube used under pressure
- EN 2070-5 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 5 : tubes pour canalisations sous pression. Statut :Homologuée
- EN 2070-6 : Rivet wire
- EN 2070-6 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 6 : fils à rivets. Statut :Homologuée
- EN 2070-7 : Wrought forging stock
- EN 2070-7 Mai 1990 : Série aérospatiale. Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique. Partie 7 : produits corroyés destinés à la forge. Statut :Homologuée
- EN 2072 : 1050A-H14 sheet & strip)
- EN 2073PR : 1050A-H14 tube for structures, $5 \leq d \leq 100\text{mm}$
- EN 2076 : Aluminium & magnesium alloy ingots & castings. Technical specification
- EN 2076-1 : General requirements
- EN 2076-1 Novembre 1993 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 1 - Exigences générales. Statut :Homologuée
- EN 2076-2 : Ingots for remelting
- EN 2076-2 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 2 - Lingots pour refusion. Statut :Homologuée
- EN 2076-3 : Preproduction & production castings.
- EN 2076-3 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 3 - Pièces types et pièces de série. Statut :Homologuée

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EN Standards (Aluminium) - continued.

- EN 2082 : Specification for aluminium alloy forging stock & forgings. Technical specification
- EN 2082-1 : General requirements
- EN 2082-1 Décembre 1993 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 1 : exigences générales. Statut :Homologuée
- EN 2082-2 : Forging stock
- EN 2082-2 Avril 1990 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 2 : produits destinés à la forge. Statut :Homologuée
- EN 2082-3 : Preproduction & production forgings.
- EN 2082-3 Avril 1990 : Série aérospatiale. Produits destinés à la forge, pièces forgées et pièces matricées en alliage d'aluminium - Spécification technique. Partie 3 : pièces types et pièces de série. Statut :Homologuée
- EN 2085PR : 2618A-T6 forgings, ≤ 150 mm
- EN 2086PR : 2618A-T851 [AL-P11-T851] forged bars & slabs, ≤ 150 mm
- EN 2087PR : 2014A-T6/T62 clad sheet & strip
- EN 2088PR : 2014A-T4/T42 clad sheet & strip
- EN 2089 : 2014A-T6 sheet & strip
- EN 2089 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T6 ou T62 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- EN 2090PR : 2024-T3 clad sheet & strip, $0.4\text{mm} < a < 6\text{mm}$
- EN 2091PR : 2024-T4 clad sheet & strip, $0.4\text{mm} < a < 6\text{mm}$
- EN 2092 : 7075-T6/T62 .4-6mm sheet & strip
- EN 2092 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T6 ou T62 - Tôles et bandes plaquées - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- EN 2093 : 7009-T74 Forgings $>20\text{mm}$ & $<150\text{mm}$
- EN 2093 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74 - Pièces forgées 20 mm $< a < 150$ mm. Statut :Homologuée
- EN 2094 : 7009-T74 Die Forgings $>3\text{mm}$ & $<150\text{mm}$
- EN 2094 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74 - Pièces matricées 3 mm $< a < 150$ mm. Statut :Homologuée
- EN 2100 : 2014A-T4511 bar & drawn profiles
- EN 2100 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T4511 - Barres et profilés filés a ou D < 200 mm. Statut :Homologuée
- EN 2101 : Specification for chromic acid anodizing of aluminium & aluminium alloys
- EN 2101 Janvier 1992 : Série aérospatiale. Anodisation chromique de l'aluminium et des alliages d'aluminium corroyés. Statut :Homologuée
- EN 2114PR : 1050A-H14 wire for solid rivets, $d \leq 10\text{mm}$
- EN 2116PR : 2017A-H13 wire for solid rivets, $d \leq 10\text{mm}$
- EN 2117PR : 5056A-H32 wire for solid rivets, $d \leq 10\text{mm}$
- EN 2122 : Flat washers in aluminium alloy, anodized or chromated
- EN 2122 Avril 1996 : Serie Aerospatiale - Rondelles Plates, En Alliage D'aluminium, Anodisees Ou Chromatees (Remplace NF EN 2122, NOVEMBRE 1994) Statut :Homologuée
- EN 2123PR : 2618A-T851 plates, $6\text{mm} \leq a \leq 140\text{mm}$
- EN 2124PR : 2214-T651 plate, $6\text{mm} \leq a \leq 140\text{mm}$);
- EN 2126 : 7075-T651 6-80mm sheet
- EN 2126 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T651 - Tôles épaisses - 6 mm $< a < 80$ mm. Statut :Homologuée
- EN 2127 : 7075-T73511 $<100\text{mm}$ bar & drawn profiles
- EN 2127 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T73511 - Barres et profilés filés a ou D < 100 mm. Statut :Homologuée
- EN 2128 : 7075-T7351 6-75mm drawn bars
- EN 2128 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T7351 - Barres étirées 6 mm $< a$ ou D < 75 mm. Statut :Homologuée
- EN 2143 : Rivets (solid universal head) in aluminium alloy 1050A, inch-based series.
- EN 2144 : Rivets (solid universal head) in aluminium alloy 2117, inch-based series.
- EN 2144 Novembre 1994 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2117. Série base inches. Statut :Homologuée
- EN 2145 : Rivets (solid universal head) in aluminium alloy 2117, anodized or chromated, inch-based series.
- EN 2145 Novembre 1994 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2117, anodisés ou chromatés. Série base inches. Statut :Homologuée
- EN 2146 : Rivets (solid universal head) in aluminium alloy 2017A, inch-based series.
- EN 2146 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 2017A, série base inches. Statut :Homologuée
- EN 2148 : Rivets (solid universal head) in aluminium alloy 5056A, inch-based series.
- EN 2148 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 5056A, série base inches. Statut :Homologuée
- EN 2149 : Rivets (solid universal head) in aluminium alloy 5056A, anodized or chromated, inch-based series.
- EN 2149 Juin 1996 : Série aérospatiale. Rivets ordinaires, à tête ronde aplatie, en alliage d'aluminium 5056A, anodisés ou chromatés, série base inches. Statut :Homologuée
- EN 22063 : Metallic & other inorganic coatings. Thermal spraying. Zinc, aluminium & their alloys.
- EN 22063 Janvier 1994 : Revêtements métalliques et inorganiques. Projection thermique. Zinc, aluminium et alliages de ces métaux. Statut :Homologuée
- EN 2256PR : 2618A-T852 [AL-P11-T852] forged bars & slabs, $\leq 150\text{mm}$
- EN 2257 Juillet 1997 : Serie aerospatiale - Tubes circulaires pour structures en aluminium et alliages d'aluminium - diametres 6mm inferieur ou egal D inferieur ou egal 100mm - epaisseur 1mm inferieur ou egal A inferieur ou egal 6mm - dimensions. Statut :Homologuée
- EN 2258 Juillet 1997 : Serie aerospatiale - Tubes circulaires pour canalisations en aluminium et alliages d'aluminium - diametres 3.2mm inferieur ou egal D inferieur ou egal 100mm - epaisseur 0.6mm inferieur ou egal A inferieur ou egal 2.5mm - DIMENSIONS. Statut :Homologuée
- EN 2284 : Specification for sulphuric acid anodizing of aluminium & wrought aluminium alloys

EN Standards (Aluminium) - continued.

- EN 2284 Janvier 1992 : Série aérospatiale. Anodisation sulfurique de l'aluminium et des alliages d'aluminium corroyés. Statut :Homologuée
- EN 2285 : Specification for bushes, flanged, aluminium alloy with self-lubricating liner. Dimension & loads.
- EN 2285 : Specification for bushes, plain, aluminium alloy with self-lubricating liner. Dimension & loads.
- EN 2285 Mai 1990 : Série aérospatiale. Bagues cylindriques en alliage d'aluminium à garniture autolubrifiante. Dimensions et charges. Statut :Homologuée
- EN 2286 Mai 1990 : Série aérospatiale. Bagues à épaulement en alliage d'aluminium à garniture autolubrifiante. Dimensions et charges. Statut :Homologuée
- EN 2289 Novembre 1996 : Série aérospatiale. Corps de bielle en alliage d'aluminium pour commandes de vol. Spécification technique. Statut :Homologuée
- EN 23134 : Light metals & their alloys. Terms & definitions
- EN 23134-1 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 1 : matériaux. Statut :Homologuée
- EN 23134-2 : Unwrought products
- EN 23134-2 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 2 - Formes brutes. Statut :Homologuée
- EN 23134-3 : Wrought products
- EN 23134-3 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 3 - Produits corroyés. Statut :Homologuée
- EN 23134-4 : Castings
- EN 2315PR : 7075-T73510/T73511 bars & sections $\leq 100\text{mm}$);
- EN 2316PR : 7075-T73 bars & sections $\leq 100\text{mm}$);
- EN 2317PR : 7075-T73 drawn bars $\leq 75\text{mm}$);
- EN 2318 : 2024-T3511 bar & drawn profiles, $a > 1.2\text{mm} / d < 150\text{mm}$
- EN 2318 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2024 - T3511 - Barres et profilés filés 1, 2 mm $< a$ ou $D < 150\text{mm}$. Statut :Homologuée
- EN 2319PR : 2024-T3510 drawn bar, $a \leq 75\text{mm}$
- EN 2320PR : 2024-T3 drawn bar, $a \leq 75\text{mm}$
- EN 2321PR : 2024-T4 bar & section, $a \leq 150\text{mm}$
- EN 2323PR : 2014A-T651 bar $\leq 200\text{mm}$
- EN 2324PR : 2014A-T6 bar & section $\leq 150\text{mm}$
- EN 2325PR : 2014A-T6 bar $\leq 100\text{mm}$
- EN 2326 : 6082-T6 $< 200\text{mm}$ bar & drawn profiles
- EN 2326 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P6082 - T6 - Barres et profilés filés a ou $D < 200\text{mm}$. Statut :Homologuée
- EN 2365 : Specification for collars, aluminium alloy
- EN 2365 Août 1989 : Série aérospatiale. Bagues en alliage d'aluminium. Statut :Homologuée
- EN 2380PR : 7075-T73 forgings $\leq 125\text{mm}$);
- EN 2381 : 7009-T7452 Forgings $> 40\text{mm}$ & $< 150\text{mm}$
- EN 2381 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T7452 - Pièces forgées $40\text{mm} < a < 150\text{mm}$. Statut :Homologuée
- EN 2382PR : 2214-T6 forgings, $\leq 100\text{mm}$
- EN 2383PR : 2214-T4 forgings, $\leq 100\text{mm}$
- EN 2384 : 2014A-T6511 bar & drawn profiles
- EN 2384 : 2014A-T6511 bar & drawn profiles
- EN 2384 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T6511 - Barres et profilés filés a ou $D < 150\text{mm}$. Statut :Homologuée
- EN 2385 : 7009-T74511 bar & drawn profiles
- EN 2385 Janvier 1993 : Série aérospatiale. Alliage d'aluminium Al-P7009 - T74511 - Barres et profilés filés a ou $D < 125\text{mm}$. Statut :Homologuée
- EN 2386PR : 7075-T7352 hand forgings $\leq 150\text{mm}$);
- EN 2387PR : 2014A-T6 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2388PR : 2024-T351 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2389PR : 6082-T4 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2390PR : 6082-T6 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2391PR : 6061-T4 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2392PR : 6061-T6 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2393PR : 2017A-T4 drawn tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2394PR : 7075-T6511 bars & sections $\leq 125\text{mm}$);
- EN 2395 : 2014A-T4/T42 sheet & strip :
- EN 2395 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2014A - T4 ou T42 - Tôles et bandes - a compris entre $0,4\text{mm}$ et 6mm . Statut :Homologuée
- EN 2419PR : 2024-T351 plate, $6\text{mm} \leq a \leq 80\text{mm}$
- EN 2420PR : 6082-T6 bars
- EN 2421PR : 6082-T4 wire for rivets
- EN 2422PR : 2124-T351 plate, $25\text{mm} \leq a \leq 120\text{mm}$
- EN 2485PR : 2214-F Extruded or cast forging stock
- EN 2486PR : 2618A-F extruded or cast forging stock
- EN 2487PR : 7009-F extruded or cast forging stock
- EN 2488PR : 7075-F extruded or cast forging stock
- EN 2500-2PR Février 1997 : Série aérospatiale. Instructions pour la préparation et l'utilisation des normes de matériaux métalliques. Partie 2 : exigences spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- EN 2508PR : 5086-H111 drawn tube for structures :
- EN 2509PR : 2017A-T42 drawn tube for structures
- EN 2510PR : 2024-T42 drawn tube for structures
- EN 2511PR : 7075-T7351 plate, $6\text{mm} \leq a \leq 100\text{mm}$);
- EN 2512PR : 7175-T7351 plate, $6\text{mm} \leq a \leq 100\text{mm}$)
- EN 2536 : Hard-anodizing of aluminium alloys
- EN 2536 Novembre 1995 : Série aérospatiale. Anodisation dure des alliages d'aluminium. Statut :Homologuée
- EN 2550 : Rivets (solid 100° normal countersunk head) aluminium alloy 1050A, inch-based series
- EN 2551 : Rivets (solid 100° normal countersunk head with dome) aluminium alloy 2117, inch-based series
- EN 2551 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normales avec dôme, en alliage d'aluminium en 2117, série base inches. Statut :Homologuée

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EN Standards (Aluminium) - continued.

- EN 2552 : Rivets (solid 100° normal countersunk head with dome) aluminium alloy 2117, anodized or chromated, inch-based series
- EN 2552 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 2117, série base inches. Statut :Homologuée
- EN 2553 : Rivets (solid 100° normal countersunk head with dome) aluminium alloy 2017A, inch-based series
- EN 2553 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 2017A, série base inches. Statut :Homologuée
- EN 2555 : Rivets (solid 100° normal countersunk head with dome) aluminium alloy 5056A, inch-based series
- EN 2555 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 5056A, série base inches. Statut :Homologuée
- EN 2556 : Rivets (solid 100° normal countersunk head with dome) aluminium alloy 5056A, anodized or chromated, inch-based series
- EN 2556 Avril 1993 : Série aérospatiale. Rivets ordinaires, à tête fraisée 100 degrés normale avec dôme, en alliage d'aluminium 5056A, anodisés ou chromatés, série base inches. Statut :Homologuée
- EN 2599 (Norm-Entwurf), Publication:1996-05 : Aerospace series - Strip in aluminium & aluminium alloys - Thickness 0.25 mm <(kursiv)a> 3, 2 mm; dimensions.
- EN 2615 (Norm-Entwurf), Publication:1990-08 : Aerospace series; wire to close tolerance in aluminium & aluminium alloys 1.6 D 9.6 mm; dimensions.
- EN 2616 (Norm-Entwurf), Publication:1990-08 : Aerospace series; wire for rivets in aluminium & aluminium alloys, large tolerances D 10 mm; dimensions.
- EN 2628PR : 5056A-O wire for solid rivets, $d \leq 10\text{mm}$
- EN 2629PR : 6061
- EN 2630 : 7009-T74511 bar & drawn profiles, $a \leq 125\text{mm}$, peripheral coarse grain control
- EN 2630 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P7009- - T74511 - Barres et profilés filés - a ou D inférieur ou égal à 125 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- EN 2631PR : 7075-T6511 bars & sections $1.2\text{mm} \leq a/d \leq 125\text{mm}$, peripheral coarse grain control);
- EN 2632 : 7075-T73511 <100mm bar & drawn profiles, <100mm, controlled grain size
- EN 2632 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075- - T73511 - Barres et profilés filés - a ou D inférieur ou égal à 100 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- EN 2633 : 2024-T3511 bar & drawn profiles, $a > 1.2\text{mm} / d < 150\text{mm}$, peripheral coarse grain control
- EN 2633 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024- - T3511 - Barres et profilés filés - a ou D compris entre 1, 2 mm et 150 mm avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- EN 2634PR : 2014A-T4511 bars & sections $1.2\text{mm} \leq a/d \leq 200\text{mm}$, peripheral coarse grain control);
- EN 2635PR : 2014A-T6511 bars & sections $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 2636 : 6082-T6 <200mm bar & drawn profiles, peripheral coarse grain control
- EN 2636 Avril 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082- - T6 - Barres et profilés filés - a ou D inférieur ou égal à 200 mm, avec contrôle de la zone périphérique à gros grains. Statut :Homologuée
- EN 2637PR : 7075-T73 extruded bars & sections $1.2\text{mm} \leq a/d \leq 100\text{mm}$, peripheral coarse grain control);
- EN 2638PR : 2024-T3 extruded bars & sections, $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 2639PR : 2014A-T6 extruded bars & sections $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 2640PR : 2017A-T4 extruded bars & sections $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 2655PR : 2017A-T42 extruded bars & sections $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 2681PR : 7010-T736 die forgings, $a \leq 150\text{mm}$
- EN 2682PR : 7010-T73652 forgings, $50\text{mm} \leq a \leq 150\text{mm}$
- EN 2683PR : 7010-T7651 forgings, $80\text{mm} \leq a \leq 160\text{mm}$
- EN 2684PR : 7010-T7651 plate, $6\text{mm} \leq a \leq 140\text{mm}$
- EN 2685PR : 7010-T7652 forgings, $80\text{mm} \leq a \leq 160\text{mm}$
- EN 2686PR : 7010-T73651 hand forgings, $50\text{mm} \leq a \leq 150\text{mm}$
- EN 2687PR : 7010-T73651 plate, $6\text{mm} \leq a \leq 150\text{mm}$
- EN 2688PR : 7050-T736 die forgings, $a \leq 150\text{mm}$
- EN 2689PR : 7050-T73651 plate, $6\text{mm} \leq a \leq 150\text{mm}$
- EN 2690PR : 7050-T73652 hand forgings, $a \leq 125\text{mm}$
- EN 2691PR : 2017A-T3 sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$
- EN 2692PR : 2017A-T3 clad sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$
- EN 2693 : 5086-H111 sheet & strip :
- EN 2693 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P5086 - H111 - Tôles et bandes - a compris entre 0, 3 mm et 6mm. Statut :Homologuée
- EN 2694 : 6061-T6/T62 sheet & strip :
- EN 2694 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P6061 - T6 ou T62 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- EN 2695 : 6081-T6 sheet & strip :
- EN 2695 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P6081 - T6 - Tôles et bandes - a compris entre 0, 3 mm et 6 mm. Statut :Homologuée
- EN 2696 : 7075-T6/T62 .4-6mm sheet & strip :
- EN 2696 Mars 1994 : Série aérospatiale. Alliage d'aluminium Al-P7075 - T6 ou T62 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Homologuée
- EN 2697PR : 2214-T6 extruded bar & section, $1.2 \leq a/d \leq 100\text{mm}$, peripheral coarse grain control
- EN 2698PR : 7075-T6510 extruded bar & section, $1.2\text{mm} \leq a/d \leq 100\text{mm}$
- EN 2699PR : 5086-H111 drawn bar, $6\text{mm} \leq d \leq 50\text{mm}$);
- EN 2700PR : 6061-T6 drawn bar, $6\text{mm} \leq d \leq 75\text{mm}$, peripheral coarse grain control
- EN 2701PR : 2024-T3 drawn tube, $6\text{mm} \leq d/a \leq 12.5$
- EN 2702PR : 6061-T6 extruded bar & section, $1.2\text{mm} \leq a/d \leq 150\text{mm}$
- EN 2703PR : 2024-T42 clad sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$

EN Standards (Aluminium) - continued.

- EN 2704PR : 2024-T3511 drawn bar, $a \leq 75\text{mm}$
- EN 2705PR : 2017A-T44 drawn tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2706PR : 7009-T736510 bar & section, $1.2\text{mm} \leq a/d \leq 125\text{mm}$, peripheral coarse grain control)
- EN 2707PR : 7075-T6510 bar & section, $1.2\text{mm} \leq a/d \leq 125\text{mm}$, peripheral coarse grain control)
- EN 2708PR : 7075-T73510 bar & section, $1.2\text{mm} \leq a/d \leq 100\text{mm}$, peripheral coarse grain control)
- EN 2709PR : 2024-T3510 bar & section, $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control)
- EN 2710PR : 2014A-T4510 bar & section, $1.2\text{mm} \leq a/d \leq 200\text{mm}$, peripheral coarse grain control)
- EN 2711PR : 2014A-T6510 bar & section, $1.2\text{mm} \leq a/d \leq 150\text{mm}$, peripheral coarse grain control)
- EN 2804PR : 7075-T7651 plate, $6\text{mm} \leq a \leq 25\text{mm}$);
- EN 2806PR : 2024-T42 extruded sections, $1.2\text{mm} \leq a \leq 100\text{mm}$, peripheral coarse grain control);
- EN 2807PR : 7020-T6 extruded sections $1.2\text{mm} \leq a \leq 100\text{mm}$, peripheral coarse grain control
- EN 2813PR : 6061-T6 tube for hydraulics, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 2814PR : 2024-T3511 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 286-4 : Aluminium alloy pressure vessels designed for air-braking equipment & auxiliary pneumatic equipment for railway rolling stock.
- EN 286-4 Décembre 1994 : Récipients à pression simples, non soumis à la flamme, destinés à contenir de l'air ou de l'azote. Partie 4 : récipients à pression en alliages d'aluminium destinés aux équipements pneumatiques de freinage et aux équipements pneumatiques auxiliaires du ma Statut :Homologuée
- EN 287-2 : Aluminium & aluminium alloys – approval testing of welders for fusion welding.
- EN 287-2 Juin 1992 : Épreuve de qualification des soudeurs. Soudage par fusion. Partie 2 : aluminium et ses alliages. Statut :Homologuée
- EN 288-4 : Welding procedure tests for the arc welding of aluminium & its alloys
- EN 288-4 Mai 1993 : Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques. Partie 4 : épreuve de qualification d'un mode opératoire de soudage à l'arc sur l'aluminium et ses alliages. Statut :Homologuée
- EN 2912 Mai 1996 : Série aérospatiale. Rondelles plates larges, en alliage d'aluminium, anodisées ou chromatées. Statut :Homologuée
- EN 30042 Juillet 1994 : Assemblages en aluminium et alliages d'aluminium soudables soudés à l'arc. Guide des niveaux d'acceptation des défauts. Statut :Homologuée
- EN 3334PR : 7050-T651 plate, $6\text{mm} \leq a \leq 60\text{mm}$);
- EN 3337PR : 7010-T74511 extruded bars & sections $a/d \leq 130\text{mm}$, peripheral coarse grain control);
- EN 3338PR : 7050-T74511 extruded bars & sections $a/d \leq 130\text{mm}$, peripheral coarse grain control);
- EN 3339PR : 7010-T76 die forgings, $a \leq 200\text{mm}$
- EN 3340PR : 7050-T76 die forgings, $a \leq 200\text{mm}$
- EN 3341PR : 6061-T4 sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$)
- EN 3342PR : 6061-T4 drawn bar & section, $10\text{mm} \leq d \leq 150\text{mm}$
- EN 3343PR : 7010-T76511 extruded bars & sections $1\text{mm} \leq a/d \leq 130\text{mm}$, peripheral coarse grain control);
- EN 3344PR : 7050-T76511 extruded bars & sections $a/d \leq 130\text{mm}$, peripheral coarse grain control);
- EN 3346PR : 2014A-T3 tube for structures, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 3347PR : 2024-T8511 extruded bars & sections, $a/d \leq 150\text{mm}$, peripheral coarse grain control);
- EN 3348PR : 2024-T62 plate, $6\text{mm} \leq a/d \leq 50\text{mm}$)
- EN 3474PR : 2024-T81 sheet & strip, $0.25\text{mm} \leq a/d \leq 6\text{mm}$
- EN 3474PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-, T81 - Tôles et bandes - a compris entre 0, 25 mm et 6 mm. Statut :Expérimentale
- EN 3550PR : 2024-T8511 extruded bars & sections, $a/d \leq 150\text{mm}$);
- EN 3552PR : 2618A-T6 clad sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$);
- EN 3553PR : 2618A-T6511 extruded bar & section, $1.2\text{mm} \leq a \leq 100\text{mm}$);
- EN 3554PR : 7010-T7652 hand forgings, $a \leq 200\text{mm}$
- EN 3555PR : 7075-T79510 extruded bar & section, $1.2\text{mm} \leq a/d \leq 100\text{mm}$, coarse grain control
- EN 3657PR : 2024-T3510 drawn bar for machining, $d \leq 75\text{mm}$
- EN 3702PR : 6061-T4 tube for hydraulics, $0.6\text{mm} \leq a \leq 12.5\text{mm}$
- EN 3869PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Joints en élastomère fluorocarboné et armature en alliage d'aluminium. Statut :Expérimentale
- EN 3996PR : 1100-H14 sheet & strip, $0.3\text{mm} \leq a \leq 6\text{mm}$)
- EN 3996PR Novembre 1994 : Série aérospatiale. Aluminium Al-P1100-H14 - Tôles et bandes - a compris entre 0.3 mm et 6 mm. Statut :Expérimentale
- EN 3997PR : 2024-T3 sheet & strip, $0.4\text{mm} \leq a/d \leq 6\text{mm}$
- EN 3997PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-T3 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Expérimentale
- EN 3998PR : 2024-T42 sheet & strip, $0.4\text{mm} \leq a/d \leq 6\text{mm}$
- EN 3998PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-T42 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Expérimentale
- EN 4004PR : 3103-H16 sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$)
- EN 4004PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P3103-H16 - Tôles et bandes - a compris entre 0, 4mm et 6 mm. Statut :Expérimentale
- EN 4005PR : 5052-O sheet & strip, $0.3\text{mm} \leq a \leq 6\text{mm}$)
- EN 4005PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P5052-O - Tôles et bandes - a compris entre 0, 3 mm et 6 mm. Statut :Expérimentale
- EN 4006PR : 6082-T4/T42 sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$
- EN 4006PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082-T4 ou T42 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm.. Statut :Expérimentale
- EN 4007PR : 6082-T6/T62 sheet & strip, $0.4\text{mm} \leq a \leq 6\text{mm}$)

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EN Standards (Aluminium) - continued.

- EN 4007PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P6082-T6 ou T62 - Tôles et bandes - a compris entre 0, 4 mm et 6 mm. Statut :Expérimentale
- EN 4099PR : 2219-T62 clad sheet & strip, 0.5mm ≤ a ≤ 6mm
- EN 4099PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-T62 - Tôles et bandes plaquées - a compris entre 0, 5 mm et 6 mm. Statut :Expérimentale
- EN 4100PR : 2219-T62 sheet & strip, 0.5mm ≤ a ≤ 6mm
- EN 4100PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-, T62 - Tôles et bandes - a compris entre 0, 5 mm et 6 mm. Statut :Expérimentale
- EN 4101PR : 2024-T4 sheet & strip, 0.4mm ≤ a/d ≤ 6mm)
- EN 4101PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2024-T4 - Tôles et bandes avec aptitude améliorée à l'étrépage sur forme - a compris entre 0, 4 mm et 6 mm. Statut :Expérimentale
- EN 4102PR : 2219-T81 clad sheet & strip, 0.5mm ≤ a ≤ 6mm)
- EN 4102PR Novembre 1994 : Série aérospatiale. Alliage d'aluminium Al-P2219-T81 - Tôles et bandes plaquées - a compris entre 0, 5 mm et 6 mm. Statut :Expérimentale
- EN 4500-2PR Avril 1997 : Serie aerospaciale - Materiaux metalliques - Regles pour la redaction et la presentation des normes de materiaux - Partie 2 : regles specifiques a l'aluminium, aux alliages d'aluminium et de magnesium. Statut :Expérimentale
- EN 4500-2PR Avril 1997 : Serie aerospaciale - Materiaux metalliques - Regles pour la redaction et la presentation des normes de materiaux - Partie 2 : regles specifiques a l'aluminium, aux alliages d'aluminium et de magnesium. Statut :Expérimentale
- EN 4500-2PR Avril 1997 : Serie aerospaciale - Materiaux metalliques - Regles pour la redaction et la presentation des normes de materiaux - Partie 2 : regles specifiques a l'aluminium, aux alliages d'aluminium et de magnesium. Statut :Expérimentale
- EN 4500-2PR Février 1997 : Serie aerospaciale - Materiaux metalliques - Regles pour la redaction et la presentation des normes de materiaux - Partie 2 : regles specifiques a l'aluminium, aux alliages d'aluminium et aux alliages de magnesium. Statut :Expérimentale
- EN 4500-2PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 2 : règles spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- EN 4500-2PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 2 : règles spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- EN 485 : Aluminium & aluminium alloys. Sheet strip & plate
- EN 485-1 : Technical conditions for inspection & delivery
- EN 485-1 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 485-2 : Mechanical properties
- EN 485-2 Décembre 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- EN 485-3 : Tolerance on shape & dimensions for hot-rolled products
- EN 485-3 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 3 : tolérances sur forme et dimensions des produits laminés à chaud. Statut :Homologuée
- EN 485-4 : Tolerance on shape & dimensions for cold-rolled products
- EN 485-4 Juin 1994 : Aluminium et alliages d'aluminium. Tôles, bandes et tôles épaisses. Partie 4 : tolérances sur forme et dimensions des produits laminés à froid. Statut :Homologuée
- EN 486 : Aluminium & aluminium alloys. Extrusion ingots. Specifications
- EN 486 Mars 1994 : Aluminium et alliages d'aluminium. Billettes de filage. Spécifications. Statut :Homologuée
- EN 487 : Aluminium & aluminium alloys. Rolling ingots. Specifications
- EN 487 Mars 1994 : Aluminium et alliages d'aluminium. Plaques de laminage. Spécifications. Statut :Homologuée
- EN 50064 + AMDT 1 Novembre 1993 : Enveloppes en aluminium et alliage d'aluminium corroyés pour l'appareillage à haute tension sous pression de gaz. Statut :Homologuée
- EN 50069 + AMDT 1 Novembre 1993 : Enveloppes soudées en alliage d'aluminium comportant des parties moulées et des parties en métal corroyé pour l'appareillage à haute tension sous pression de gaz. Statut :Homologuée
- EN 515 : Aluminium alloys. Wrought products. Temper designations
- EN 515 Octobre 1993 : Aluminium et alliages d'aluminium. Produits corroyés. Désignation des états métallurgiques. Statut :Homologuée
- EN 541 : Aluminium & aluminium alloys. Rolled products for cans, closures & lids. Specifications
- EN 541 Avril 1995 : Aluminium et alliages d'aluminium. Produits laminés pour boîtes, capsules rigides et couvercles. Spécifications. Statut :Homologuée
- EN 546-1 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 546-2 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- EN 546-3 Décembre 1996 : Aluminium et alliages d'aluminium. Feuille mince. Partie 3 : tolérances sur dimensions. Statut :Homologuée
- EN 570 : Aluminium & aluminium alloys. Impact extrusion slugs obtained from wrought products. Specification.
- EN 570 Octobre 1994 : Aluminium et alliages d'aluminium. Pions de filage par choc obtenus à partir de produits corroyés. Spécifications. Statut :Homologuée
- EN 573 : Aluminium & aluminium alloys. Chemical composition & form of wrought products.
- EN 573-1 : Numerical designation system

EN Standards (Aluminium) - continued.

- EN 573-1 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 1 : système de désignation numérique. Statut :Homologuée
- EN 573-2 : Chemical symbol based designation system
- EN 573-2 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 2 : système de désignation fondé sur les symboles chimiques. Statut :Homologuée
- EN 573-3 : Chemical composition
- EN 573-3 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 3 : composition chimique. Statut :Homologuée
- EN 573-4 : Forms of products
- EN 573-4 Octobre 1994 : Aluminium et alliages d'aluminium. Composition chimique et forme des produits corroyés. Partie 4 : forme des produits. Statut :Homologuée
- EN 575 Septembre 1995 : Aluminium et alliages d'aluminium. Alliages mères obtenus par fusion. Spécifications. Statut :Homologuée
- EN 576 Septembre 1995 : Aluminium et alliages d'aluminium. Lingots pour refusion en aluminium non allié. Spécifications. Statut :Homologuée
- EN 577 Septembre 1995 : Aluminium et alliages d'aluminium. Métal liquide. Spécifications. Statut :Homologuée
- EN 586 : Aluminium & aluminium alloys. Forgings
- EN 586-2 Août 1994 : Aluminium et alliages d'aluminium. Pièces forgées. Partie 2 : caractéristiques mécaniques et autres caractéristiques exigées. Statut :Homologuée
- EN 596-2 : Mechanical properties & additional property requirements
- EN 601 : Aluminium & aluminium alloys. Castings. Chemical composition of castings for use in contact with food.
- EN 601 Décembre 1994 : Aluminium et alliages d'aluminium. Pièces moulées. Composition chimique des pièces moulées destinées à entrer en contact avec les aliments. Statut :Homologuée
- EN 602 : Aluminium & aluminium alloys. Wrought products. Chemical composition of semi-products used for the fabrication of articles in contact with food.
- EN 602 Décembre 1994 : Aluminium et alliages d'aluminium. Produits corroyés. Composition chimique des demi-produits utilisés pour la fabrication d'articles destinés à entrer en contact avec les aliments. Statut :Homologuée
- EN 603-1 Décembre 1996 : Aluminium et alliages d'aluminium. Produits corroyés destinés à la forge. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 603-2 Décembre 1996 : Aluminium et alliages d'aluminium. Produits corroyés destinés à la forge. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- EN 604-1 Mai 1997 : Aluminium et alliages d'aluminium - Produits coulés et destinés à la forge - Partie 1 : Conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 604-1 Mai 1997 : Aluminium et alliages d'aluminium - Produits coulés et destinés à la forge - Partie 1 : Conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 604-2 Mai 1997 : Aluminium et alliages d'aluminium - Produits coulés et destinés à la forge - Partie 2 : Tolérances sur dimensions et forme. Statut :Homologuée
- EN 604-2 Mai 1997 : Aluminium et alliages d'aluminium - Produits coulés et destinés à la forge - Partie 2 : Tolérances sur dimensions et forme. Statut :Homologuée
- EN 683-1 Janvier 1997 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 1 : conditions techniques de contrôle et de livraison. Statut :Homologuée
- EN 683-2 Novembre 1996 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 2 : caractéristiques mécaniques. Statut :Homologuée
- EN 683-3 Novembre 1996 : Aluminium et alliages d'aluminium. Bandes pour échangeurs thermiques. Partie 3 : tolérances sur dimensions et forme. Statut :Homologuée
- EN 754-1 Juin 1997 : Aluminium et alliages d'aluminium - Barres et tubes étirés - Partie 1 : Conditions techniques de contrôle et de livraison. (remplace en partie NF A 01-101, Novembre 1972) Statut :Homologuée
- EN 754-1 Juin 1997 : Aluminium et alliages d'aluminium - Barres et tubes étirés - Partie 1 : Conditions techniques de contrôle et de livraison. (remplace en partie NF A 01-101, Novembre 1972) Statut :Homologuée
- EN 754-2 Juin 1997 : Aluminium et alliages d'aluminium - Barres et tubes étirés - Partie 2 : Caractéristiques mécaniques. (remplace en partie NF A 50-411, Avril 1989) Statut :Homologuée
- EN 754-2 Juin 1997 : Aluminium et alliages d'aluminium - Barres et tubes étirés - Partie 2 : Caractéristiques mécaniques. (remplace en partie NF A 50-411, Avril 1989) Statut :Homologuée
- EN 754-3 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 3 : barres rondes, tolérances sur dimensions et forme. Statut :Homologuée
- EN 754-4 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 4 : barres carrées, tolérances sur dimensions et forme. Statut :Homologuée
- EN 754-5 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 5 : barres rectangulaires, tolérances sur dimensions et forme. Statut :Homologuée
- EN 754-6 Décembre 1995 : Aluminium et alliages d'aluminium. Barres et tubes étirés. Partie 6 : barres hexagonales, tolérances sur dimensions et forme. Statut :Homologuée
- EN 755-1 Juillet 1997 : Aluminium et alliages d'aluminium - Barres, tubes et profils files - Partie 1 : Conditions techniques de contrôle et de livraison. (remplace NF A 01-101, Novembre 1972) Statut :Homologuée
- EN 755-1 Juillet 1997 : Aluminium et alliages d'aluminium - Barres, tubes et profils files - Partie 1 : Conditions techniques de contrôle et de livraison. (remplace NF A 01-101, Novembre 1972) Statut :Homologuée
- EN 755-2 Juillet 1997 : Aluminium et alliages d'aluminium - Barres, tubes et profils files - Partie 2 : Caractéristiques mécaniques. (remplace en partie NF A 50-411, Avril 1989) Statut :Homologuée

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EN Standards (Aluminium) - continued.

EN 755-2 Juillet 1997 : Aluminium et alliages d'aluminium - Barres, tubes et profilés filés - Partie 2 : Caractéristiques mécaniques. (remplace en partie NF A 50-411, Avril 1989) Statut :Homologuée	3045 (1950). 3046 (1950). 3048 (1950). 3049 (1950). 3050 (1950).
EN 755-3 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 3 : barres rondes, tolérances sur dimensions et forme. Statut :Homologuée	3051 (1950). 3052 (1950). 3054 (1950).
EN 755-4 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 4 : barres carrées, tolérances sur dimensions et forme. Statut :Homologuée	3055 (1950). 3056 (1950). 3057 (1950).
EN 755-5 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 5 : barres rectangulaires, tolérances sur dimensions et forme. Statut :Homologuée	3058 (1950). 3059 (1950). 3599 (1989).
EN 755-6 Août 1995 : Aluminium et alliages d'aluminium. Barres, tubes et profilés filés. Partie 6 : barres hexagonales, tolérances sur dimensions et forme. Statut :Homologuée	3600 (1955). 3601 (1955). 3602 (1955).
EN 851 Septembre 1995 : Aluminium et alliages d'aluminium. Disques et ébauches pour disques pour applications culinaires. Spécifications. Statut :Homologuée	4513 (1960). 4514 (1960). 5074 (1974). 5075 (1979).
EN 941 Août 1995 : Aluminium et alliages d'aluminium. Disques et ébauches pour disques pour applications générales. Spécifications. Statut :Homologuée	5076-74 to 5077-74 (1974). 6250-68 to 6253-68 (1968). 7257
ISO 3134 : (see EN 23134 series)	7363 (1979). 7369 pt3 (1979). 7369-6 (1979). 7369-74 pt1 & pt2 (1974). 7369-74 pt4 & pt5 (1974).

AS – Australia

AS 1874-1988 (Jan. 1988) : Aluminium and Aluminium alloys: Ingots and Castings.

ÖNORM - Austria

M3429 (Dec. 1978) : Aluminium Alloys - Casting Alloys.

NBN - Belgium

P21-101 (July 1972) : Aluminium and Aluminium alloy castings, chemical composition & mechanical properties.

GOST - CIS (exUSSR)

2685-75 (Feb. 1985) : Aluminium Casting Alloys, Grades, Specifications & Test Methods.

DS - Denmark

DS 3002-4162 (May 1971) : Aluminium Alloys for Castings.

SFS - Finland

2560-2574 (1985) : Cast Aluminium Alloys.

UNI – Italy

Aluminium Casting Alloys:

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3043 (1950).
3044 (1950).

JIS - Japan

H2118 (Jan. 1990) : Aluminium Base Alloys in Ingot for Diecastings.
H2211 (Jan. 1992) : Aluminium Alloy Ingots for Castings.
H2212 (Jan. 1976) : Aluminium Base Alloy in Ingots for Diecastings.
H5302 (Jan. 1990) : Aluminium Alloys, Diecastings.

KS - Korea

D2330-1985 (Jan. 1985) : Aluminium Alloy Ingot for Castings.

NS - Norway

Aluminium Casting Alloys:

NS 17510 (1988).
NS 17512 (1988).
NS 17520 (1988).
NS 17525 (1988).
NS 17530 (1971).
NS 17535 (1989).

NS Norway (Aluminium) – Continued

NS 17540 (1989).
 NS 17550 (1971).
 NS 17570 (1971).
 NVS F 2022 (1988).
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GB – China (PRC)

1173-86 (May 1987) : Cast Aluminium Alloys, Technical Specifications.

SABS - South Africa

989 (1970)

UNE – Spain

Casting alloys:

38 211 (1971).
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SIS/SS - Sweden

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SS 1441 63 (1982).
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VSM - Switzerland

10895 (1976) : Aluminium Casting Alloys. Compositions and properties of casting and test bars.

MAGNESIUM ALLOYS

ASTM Standards

B107/B107M-94 : Magnesium-Alloy Extruded Bars, Rods, Shapes, Tubes, & Wire
 B199-87(1993)e1 : Magnesium-Alloy Permanent Mold Castings
 B275-96 : Codification of Certain Nonferrous Metals & Alloys, Cast & Wrought
 B296-96 : Temper Designations of Magnesium Alloys, Cast & Wrought
 B403-96 : Magnesium-Alloy Investment Castings
 B480-88 : Preparation of Magnesium & Magnesium Alloys for Electroplating
 B557-94 : Tension Testing Wrought & Cast Aluminum- & Magnesium-Alloy Products
 B557M-94 : Tension Testing Wrought & Cast Aluminum- & Magnesium-Alloy Products [Metric]
 B660-96 : Packaging of Aluminum & Magnesium Products
 B661-93 : Heat Treatment of Magnesium Alloys
 B769-94 : Shear Testing of Aluminum Alloys
 B80-93 : Magnesium-Alloy Sand Castings
 B843-93 : Magnesium Alloy Anodes for Cathodic Protection
 B879-97 : Applying Non-Electrolytic Conversion Coatings on Magnesium & Magnesium Alloys
 B90/B90M-93 : Magnesium-Alloy Sheet & Plate
 B91-92 : Magnesium-Alloy Forgings
 B93/B93M-94b : Magnesium Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, & Die Castings
 B94-94 : Magnesium-Alloy Die Castings
 D1732-67(1984) : Preparation of Magnesium Alloy Surfaces for Painting
 D2651-90 : Preparation of metal surfaces for adhesive bonding
 D3115-95 : Explosive Reactivity of Lubricants with Aerospace Alloys Under High Shear
 E1004-91 : Electromagnetic (Eddy-Current) Measurements of Electrical Conductivity
 E155-95e1 : Inspection of Aluminum & Magnesium Castings
 E35-88(1993)e1 : Chemical Analysis of Magnesium & Magnesium Alloys
 E505-96 : Inspection of aluminum & magnesium die castings

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ASTM Standards (Magnesium) – continued.

- E602-91 : Sharp-notch tension testing with cylindrical specimens
G102-89(1994)e1 : Calculation of corrosion rates & related information from electrochemical measurements
G82-83e1 : Development & Use of a Galvanic Series for Predicting Galvanic Corrosion Performance

British Standards (BSI)

- BS 2901-4 : Filler rods & wires for gas-shielded arc welding. Specification for aluminium & aluminium alloys & magnesium alloys
BS 2970 : Specification for magnesium & magnesium alloy ingots & castings
BS 3019-1 : Specification for TIG welding of aluminium, magnesium & their alloys
BS 3360 : (Replaced by EN23134)
BS 3370 : Specification for wrought magnesium alloys for general engineering purposes – plate, sheet & strip (replaces BS 3374)
BS 3372 : Specification for wrought magnesium alloys for general engineering purposes – forgings & cast forging stock
BS 3373 : Specification for wrought magnesium alloys for general engineering purposes – bars, sections, tubes, extruded forging stock (replaces BS 3371)
BS 3907-1 to -15 : Methods for the analysis of Magnesium & magnesium alloys

BS L Standards

- BS 3L 122 : Specification for ingots & castings of Mg-8% Al-Zn-Mn alloy, solution treated, Al 8, Zn 0.5, Mn 0.3
BS 3L 124 : Specification for ingots & castings of Mg-10% Al-Zn-Mn alloy, solution treated, Al 10, Zn 0.5, Mn 0.3
BS 3L 125 : Specification for ingots & castings of Mg-10% Al-Zn-Mn alloy, solution treated & precipitation treated, Al 10, Zn 0.5, Mn 0.3
BS 2L 126 : Specification for ingots & castings of Mg-Ce-Zn-Zr alloy, precipitation treated, rare earth metals 3, Zn 2.3, Zr 0.6
BS 2L 127 : Specification for ingots & castings of Mg-Zn-Zr alloy, precipitation treated, Zn 4.5, Zr 0.7
BS 2L 128 : Specification for ingots & castings of Mg-Zn-Ce-Zr alloy, precipitation treated, Zn 4.5, rare earth elements 1.2, Zr 0.7
BS 2L 500 : Procedure for inspecting & testing wrought magnesium-base alloys
BS 2L 503 : Specification for tube of Mg-6% Al-Zn, Al 6.0, Zn 1
BS 2L 504 : Specification for sheet & strip of Mg-3% Zn-Zr alloy, Zn 3.0, Zr 0.6
BS 2L 505 : Specification for bars & extruded sections of Mg-3% Zn-Zr alloy, not exceeding 100 mm diameter or minor sectional dimension, Zn 3.0, Zr 0.6
BS 2L 508 : Specification for bars & extruded sections of Mg-1.25% Zn-Zr alloy, suitable for welding by inert gas-shielded arc techniques, not exceeding 50 mm diameter or minor sectional dimension, Zn 1.25, Zr 0.6
BS 2L 509 : Specification for tube of Mg-1.25% Zn-Zr alloy, suitable for welding by inert gas-shielded arc techniques, Zn 1.25, Zr 0.6

- BS L 512 : Specification for bars & extruded sections of Mg-6% Al-Zn alloy, not exceeding 150 mm diameter or minor sectional dimension, Al 6.0 Zn 1.0 (replaces BS L 501)
BS L 513 : Specification for forging stock & forgings of Mg-6% Al-Zn alloy, not exceeding 150 mm diameter or minor sectional dimension, Al 6.0 Zn 1.0 (replaces BS L 502)
BS L 514 : Specification for forging stock & forgings of Mg-3% Zn-Zr alloy, Zn 3.0, Zr 0.6 (replaces BS L 506)
BS L 515 : Specification for sheet & strip of Mg-1.25% Zn-Zr alloy, suitable for welding by inert gas-shielded arc techniques, Zn 1.25, Zr 0.6 (replaces BS L 507)

DIN Standards

- DIN 1729-1 : Wrought magnesium alloys
DIN 1729-2 : Casting magnesium alloys, sand, gravity die, pressure
DIN 9005 : Drop forgings of wrought magnesium alloy
DIN 9711 : Magnesium extruded sections
DIN 9712 : Aluminium & magnesium beams, extruded, dimensions, static values
DIN 9715 : Magnesium semi-finished products, properties
DIN 17800 : Commercially pure magnesium
DIN 29531 : Aerospace; castings of aluminium & magnesium alloys; technical specification.
DIN 65033 : Aerospace: Aluminium & magnesium alloy forgings, technical specification

AFNOR Standards

- NF A 00-501-3 Mars 1991 : Produits de fonderie. Conditions techniques générales de commande et de fournitures. Partie 3 : pièces moulées par gravité, basse pression et dépression, en alliages d'aluminium et en alliages de magnésium. Statut :Homologuée
NF A 02-004 Août 1977 : Aluminium et alliages d'aluminium de fonderie. Zinc et alliages de zinc de fonderie. Magnésium et ses alliages. Désignation conventionnelle des matériaux. Statut :Enregistrée
NF A 02-007 Janvier 1973 : Demi-produits en magnésium et alliages de magnésium. Désignation conventionnelle des états de livraison.. Statut :Enregistrée
NF A 04-150 Novembre 1984 : Produits de fonderie - Contrôle par radiographie des pièces moulées en alliages d'aluminium et de magnésium. Statut :Homologuée
PROJET A 04-190 Avril 1997 : Fonderie controle par radiographie. Projet
A 06-001 Mai 1979 : Analyse par spectrographie des métaux légers - Dépouillement des circuits d'analyse - Interprétations statistiques. Statut :Fascicule de doc.
A 06-600 Mai 1971 : Analyse chimique du magnésium - Dosage polarographique du plomb. Statut :Fascicule de doc.
NF A 06-602 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage de l'aluminium. Statut :Homologuée
NF A 06-606 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage spectrophotométrique du fer. Statut :Homologuée

AFNOR NF Standards (Magnesium) – continued.

- NF A 06-609 Avril 1966 : Analyse chimique du magnésium et des alliages de magnésium. Dosage du zinc. Statut :Homologuée
- A 06-610 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage polarographique du zinc. Statut :Fascicule de doc.
- A 06-611 Mai 1966 : Analyse chimique du magnésium et des alliages de magnésium. Dosage ampérométrique du zinc. Statut :Fascicule de doc.
- NF A 06-612 Février 1976 : Analyse chimique du magnésium - Dosage spectrophotométrique du cuivre. Statut :Homologuée
- NF A 06-613 Février 1976 : Analyse chimique du magnésium et des alliages de magnésium. Dosage spectrophotométrique du cuivre. Statut :Homologuée
- NF A 06-616 Juillet 1981 : Analyse chimique du magnésium et des alliages de magnésium. Dosage spectrophotométrique du nickel. Statut :Enregistrée
- NF A 06-619 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage colorimétrique du silicium. Statut :Homologuée
- NF A 06-622 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage spectrophotométrique du manganèse. Statut :Homologuée
- NF A 06-624 Décembre 1984 : Analyse chimique du magnésium et des alliages de magnésium. Dosage spectrophotométrique du zirconium. Statut :Homologuée
- A 06-627 Juin 1971 : Analyse chimique du magnésium - Dosage du calcium (méthode par photométrie de flamme). Statut :Fascicule de doc.
- A 08-001 Avril 1979 : Analyse chimique des métaux et alliages légers - Application de la spectrométrie d'absorption atomique à l'analyse de l'aluminium, du magnésium et de leurs alliages. Statut :Fascicule de doc.
- L 09-775 + ERRATUM Octobre 1984 : Codification des références relatives aux produits semi-ouvrés en métaux et alliages non ferreux, normalisés, sélectionnés pour les constructions aéronautiques Statut :Fascicule de doc.
- NF L 16-002 Mai 1991 : Industrie aéronautique. Peintures et vernis. Nature et méthodes de préparation de surface des éprouvettes en alliages de magnésium. Statut :Homologuée
- NF A 57-102 Octobre 1984 : Alliages de magnésium en lingots utilisés en fonderie sous pression Statut :Homologuée
- PROJET A 57-500 Avril 1995 : Magnesium et alliages de magnesium lingots et pieces moulees en alliages de magnesium – Generalites. Projet
- PROJET A 57-501 Novembre 1996 : Magnesium et alliages de magnesium alliages de magnesium pour anodes coulees. Projet
- NF A 57-704 Juillet 1981 : Produits de fonderie. Caractéristiques des pièces moulées par gravité, basse pression et dépression en alliages de magnésium Statut :Enregistrée
- NF A 57-705 Octobre 1984 : Produits de fonderie. Pièces moulées sous pression en alliages de magnésium - Caractéristiques Statut :Homologuée

- NF A 57-711 Juillet 1984 : Produits de fonderie. Pièces moulées sous pression en aluminium, alliages d'aluminium, de magnésium et de zinc - Conditions de fourniture Statut :Homologuée
- A 65-700 Décembre 1982 : Le magnésium et ses alliages - Caractéristiques - Mise en oeuvre - Applications Statut :Fascicule de doc.
- NF A 65-717 Août 1981 : Demi-produits en alliages de magnésium. Composition et caractéristiques des produits laminés et produits filés d'usage courant Statut :Enregistrée
- NF A 65-727 Septembre 1988 : Demi-produits en alliages de magnésium. Méplats filés. Dimensions et tolérances. Statut :Homologuée
- NF A 65-737 Septembre 1988 : Demi-produits en alliages de magnésium. Barres filées de section circulaire. Dimensions et tolérances. Statut :Homologuée
- NF A 65-767 Décembre 1981 : Demi-produits en alliages de magnésium. Profilés en forme U - Tolérances sur dimensions et dimensions recommandées Statut :Enregistrée
- NF A 65-777 Septembre 1988 : Demi-produits en alliages de magnésium. Tubes filés de section circulaire. Tolérances sur dimensions. Statut :Homologuée

NF EN Standards

- NF EN 2076-1 Novembre 1993 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 1 - Exigences générales. Statut :Homologuée
- NF EN 2076-2 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 2 - Lingots pour refusion. Statut :Homologuée
- NF EN 2076-3 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 3 - Pièces types et pièces de série. Statut :Homologuée
- XP EN 2500-2PR Février 1997 : Série aérospatiale. Instructions pour la préparation et l'utilisation des normes de matériaux métalliques. Partie 2 : exigences spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- XP EN 4500-2PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 2 : règles spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- XP EN 4500-2PR Avril 1997 : Serie aerospaciale - Materiaux metalliques - regles pour la redaction et la presentation des normes de materiaux - Partie 2 : Regles specifiques a l'aluminium, aux alliages d'aluminium et de magnesium. Statut :Expérimentale
- NF EN 23134-1 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 1 : matériaux. Statut :Homologuée
- NF EN 23134-2 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 2 - Formes brutes. Statut :Homologuée
- NF EN 23134-3 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 3 - Produits corroyés. Statut :Homologuée

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EN Standards

- EN 2076 : Aluminium & magnesium alloy ingots & castings. Technical specifications
- EN 2076-1 Novembre 1993 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 1 - Exigences générales. Statut :Homologuée
- EN 2076-2 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 2 - Lingots pour refusion. Statut :Homologuée
- EN 2076-3 Mars 1990 : Série aérospatiale. Lingots et pièces moulées en alliages d'aluminium et de magnésium. Spécification technique - Partie 3 - Pièces types et pièces de série. Statut :Homologuée
- EN 23134 : Light metals & their alloys. Terms & definitions (replaces BS 3360)
- EN 23134-1 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 1 : matériaux. Statut :Homologuée
- EN 23134-2 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 2 - Formes brutes. Statut :Homologuée
- EN 23134-3 Décembre 1991 : Métaux légers et leurs alliages - Termes et définitions - Partie 3 - Produits corroyés. Statut :Homologuée
- EN 2500-2PR Février 1997 : Série aérospatiale. Instructions pour la préparation et l'utilisation des normes de matériaux métalliques. Partie 2 : exigences spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale
- EN 2731PR : MG-C-51-T6 Sand castings
- EN 2732PR : MG-C-51-T6 Chill castings
- EN 2735PR : MG-C-91-T5 Sand castings
- EN 2736PR : MG-C-91-T5 Chill castings
- EN 2738PR : MG-C-43-T5 Sand castings
- EN 2739PR : MG-C-43-T5 Chill castings
- EN 2742PR : MG-C-71-F Sand castings
- EN 4500-2PR Avril 1997 : Serie Aérospatiale - Matériaux Métalliques - Regles Pour La Redaction Et La Presentation Des Normes De Matériaux - Partie 2 : Regles Spécifiques A L'aluminium, Aux Alliages D'aluminium Et De Magnesium. Statut :Expérimentale
- EN 4500-2PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 2 : règles spécifiques à l'aluminium, aux alliages d'aluminium et aux alliages de magnésium. Statut :Expérimentale

ISO Standards

- ISO 121:1980 : Magnesium-aluminium-zinc alloy ingots & alloy castings - Chemical composition & mechanical properties of sand cast reference test bars
- ISO 791:1973 : Magnesium alloys - Determination of aluminium - 8-hydroxyquinoline gravimetric method
- ISO 791 : Magnesium alloys, analysis method for aluminium content
- ISO 792:1973 : Magnesium & magnesium alloys - Determination of iron - Orthophenanthroline photometric method
- ISO 792 : Magnesium & magnesium alloys, analysis method for iron content

- ISO 794:1976 : Magnesium & magnesium alloys - Determination of copper content - Oxalylidihydrazide photometric method
- ISO 794 : Magnesium & magnesium alloys, analysis method for copper content
- ISO 809:1973 : Magnesium & magnesium alloys - Determination of manganese - Periodate photometric method (Manganese content between 0.01 & 0.8%)
- ISO 809 : Magnesium & magnesium alloys, analysis method for manganese content
- ISO 810:1973 : Magnesium & magnesium alloys - Determination of manganese - Periodate photometric method (Manganese content less than 0, 01 %)
- ISO 1178:1976 : Magnesium alloys - Determination of soluble zirconium - Alizarin sulphonate photometric method
- ISO 1783:1973 : Magnesium alloys - Determination of zinc - Volumetric method
- ISO 1975:1973 : Magnesium & magnesium alloys - Determination of silicon - Spectrophotometric method with the reduced silicomolybdc complex
- ISO 2107:1983 : Aluminium, magnesium & their alloys - Temper designations
- ISO 2142:1981 : Wrought aluminium, magnesium & their alloys - Selection of specimens & test pieces for mechanical testing
- ISO 2353:1972 : Magnesium & its alloys - Determination of manganese in magnesium alloys containing zirconium, rare earths, thorium & silver - Periodate photometric method
- ISO 2354:1976 : Magnesium alloys - Determination of insoluble zirconium - Alizarin sulphonate photometric method
- ISO 2355:1972 : Chemical analysis of magnesium alloys - Determination of rare earths - Gravimetric method
- ISO 2377:1972 : Magnesium alloy sand castings - Reference test bar
- ISO 2437:1972 : Recommended practice for the X-ray inspection of fusion welded butt joints for aluminium & its alloys & magnesium & its alloys 5 to 50 mm thick
- ISO 3115:1981 : Castings in magnesium alloys containing zirconium - Chemical composition & mechanical properties
- ISO 3116:1981 : Wrought magnesium alloys - Chemical composition & mechanical properties
- ISO 3255:1974 : Magnesium & magnesium alloys - Determination of aluminium - Chromazurol S photometric method
- ISO 4058:1977 : Magnesium & its alloys - Determination of nickel - Photometric method using dimethylglyoxime
- ISO 4194:1981 : Magnesium alloys - Determination of zinc - Flame atomic absorption spectrometric method
- ISO 5196-1:1980 : Magnesium alloys - Determination of thorium - Part 1: Gravimetric method
- ISO 5196-2:1980 : Magnesium alloys - Determination of thorium - Part 2: Titrimetric method
- ISO 7773:1983 : Magnesium alloys - Round bars & tubes - Dimensional tolerances
- ISO 8287:1984 : Unalloyed magnesium ingots - Chemical composition
- ISO 9916:1991 : Aluminium alloy & magnesium alloy castings - Liquid penetrant inspection

SAE Standards

- SAE/AMS 4490G (Oct-88) Magnesium Alloy Castings, Die, 9.0Al 0.70Zn (AZ91A-F), As Cast
- SAE/AMS 4484J (Apr-92) Magnesium Alloy Castings, Permanent Mold 9.0Al 2.0Zn Solution and Precipitation Heat Treated
- SAE/AMS 4483C (Apr-92) Magnesium Alloy Castings, Permanent Mold 10Al Solution and Precipitation Heat Treated
- SAE/AMS 4455D (Nov-94) Magnesium Alloy, Investment Castings 10Al (AM100A-T6) Solution and Precipitation Heat Treated
- SAE/AMS 4453C (Nov-94) Magnesium Alloy, Investment Castings 9.0Al 2.0Zn (AZ92A-T6) Solution and Precipitation Heat Treated
- SAE/AMS 4452B (Nov-94) Magnesium Alloy, Investment Castings 8.7Al 0.70Zn 0.22Mn (AZ 91C-T6) Solution and Precipitation Heat Treated
- SAE/AMS 4447E (Jan-85) Magnesium Alloy Castings, Sand 3.3Th 2.1Zn 0.75Zr Precipitation Heat Treated
- SAE/AMS 4446A (Nov-96) Magnesium Alloy, Sand Castings 8.7Al 0.70Zn 0.26Mn Solution and Precipitation Heat Treated
- SAE/AMS 4445F (Jan-85) Magnesium Alloy Castings, Sand 3.3Th 0.75Zr Solution and Precipitation Heat Treated
- SAE/AMS 4444C (Jan-92) Magnesium Alloy Castings, Sand 6Zn 0.80Zr, Precipitation Heat Treated
- SAE/AMS 4443D (Jan-92) Magnesium Alloy Castings, Sand 4.5Zn 0.75Zr, Precipitation Heat Treated
- SAE/AMS 4442E (Jan-93) Magnesium Alloy Castings, Sand 3.2Ce 2.5Zn 0.70Zr Precipitation Heat Treated
- SAE/AMS 4441D (Jul-84) Magnesium Alloy Castings, Sand 3.5Ce 0.7Zr, Solution and Precipitation Heat Treated
- SAE/AMS 4440D (Apr-84) Magnesium Alloy Castings, Sand 3.5Ce 0.7Zr, Precipitation Heat Treated
- SAE/AMS 4439D (Jul-92) Magnesium Alloy Castings, Sand 4.2Zn 1.2Ce 0.70Zr Precipitation Heat Treated
- SAE/AMS 4438D (Apr-84) Magnesium Alloy Castings, Sand 5.7Zn 1.8Th, Precipitation Heat Treated
- SAE/AMS 4437D (Apr-90) Magnesium Alloy Castings, Sand, 8.7Al 0.7Zn, Solution Heat Treated and Aged
- SAE/AMS 4434K (Jul-90) Magnesium Alloy Castings, Sand, 9.0Al 2.0Zn, Solution and Precipitation Heat Treated
- SAE/AMS 4430 (Jun-50) Magnesium Alloy Castings Sand 9 Al 2 Zn As Cast*
- SAE/AMS 4428 (Jul-56) Magnesium Alloy Castings, Sand 6Ce Solution and Precipitation Treated*
- SAE MAM 4427 (Jul-92) Magnesium Alloy Sand Castings 4.0Y 2.3Nd 0.7Zr Solution and Precipitation Heat Treated
- SAE/AMS 4427 (Jul-92) Magnesium Alloy Sand Castings 4.0Y 2.3Nd 0.7Zr Solution and Precipitation Heat Treated
- SAE/AMS 4426 (Apr-90) Castings, Sand, Magnesium Alloy, 5.1Y 3.0Re 0.70Zr (WE54-T6), Solution and Precipitation Heat Treated
- SAE/AMS 4425B (Jan-92) Magnesium Alloy Castings, Sand 5.8Zn 2.5RE 0.70Zr, Solution and Precipitation Heat Treated
- SAE/AMS 4424K (Apr-87) Magnesium Alloy Castings, Sand 6.0Al 3.0Zn Solution and Precipitation Heat Treated
- SAE/AMS 4422N (Apr-87) Magnesium Alloy Castings, Sand 6.0Al 3.0Zn Solution Heat Treated
- SAE/AMS 4420M (Jan-92) Magnesium Alloy Castings, Sand 6Al 3Zn, As Cast
- SAE/AMS 4419B (Apr-87) Magnesium Alloy Castings, Sand 2.5Ag 1.1Th 1.0Di 0.70Zr (QH21-T6) Solution and Precipitation Heat Treated
- SAE/AMS 4418F (Dec-94) Magnesium Alloy, Sand Castings, 2.5Ag 2.1Di 0.70Zr Solution and Precipitation Heat Treated
- SAE/AMS 4417 (Oct-89) Castings, Sand, Magnesium Alloy, 1.5Ag 2.1Di 0.08Cu 0.70Zr, Solution and Precipitation Heat Treated
- SAE/AMS 4397A (May-68) Magnesium Wire, Welding 14Li 1.25Al*
- SAE/AMS 4396C (Oct-86) Magnesium Alloy Welding Wire 3.3Ce 2.5Zn 0.72Zr (EZ33A)
- SAE/AMS 4395D (Oct-86) Magnesium Alloy Welding Wire 9.0Al 2.0Zn (AZ92A)
- SAE/AMS 4390J (Oct-91) Sheet and Plate, Magnesium Alloy 2.0Th 0.78Mn, Solution Heat Treated, Cold Worked, and Precipitation Heat Treated
- SAE/AMS 4389F (Jan-86) Magnesium Alloy Extrusions 3.0 Th - 1.5Mn (HM31A-TS) Precipitation Heat Treated
- SAE/AMS 4388E (Oct-88) Magnesium Alloy Extrusions, 3.0Th 1.5Mn (HM31A-F), As Extruded
- SAE/AMS 4387D (Oct-89) Magnesium Alloy Extrusions, 2.3Zn 0.62Zr, As Extruded
- SAE/AMS 4386B (May-68) Magnesium Alloy Sheet and Plate, 14Li 1.25Al*
- SAE/AMS 4385H (Jan-92) Sheet and Plate, Magnesium Alloy 3.2Th 0.70Zr Cold Rolled and Partially Annealed
- SAE/AMS 4384G (Jan-92) Sheet and Plate, Magnesium Alloy 3.2Th 0.70Zr, Annealed Recrystallized
- SAE/AMS 4383D (Jan-92) Sheet and Plate, Magnesium Alloy 2.0Th 0.78Mn, Solution Heat Treated, Cold Worked, and Precipitation Heat Treated
- SAE/AMS 4382C (Oct-91) Magnesium Alloy, Plate, Extra Flat 3.0Al 1.0Zn 0.20Mn, Annealed
- SAE/AMS 4381 (Jul-47) Magnesium Alloy Sheet Aluminum Zinc (Hard)*
- SAE/AMS 4380A (Jul-48) Magnesium Alloy Sheet AZ51X Annealed*
- SAE/AMS 4377G (Oct-91) Sheet and Plate, Magnesium Alloy 3.0Al 1.0Zn 0.20Mn, Cold Rolled, Partially Annealed
- SAE/AMS 4376F (Oct-91) Plate, Magnesium Alloy 3.0Al 1.0Zn 0.20Mn, Cold Rolled and Partially Annealed
- SAE/AMS 4375J (Oct-91) Sheet and Plate, Magnesium Alloy 3.0Al 1.0Zn 0.20Mn, Annealed and Recrystallized
- SAE/AMS 4370A (Jun-62) Magnesium Alloy Sheet M1A-0 Annealed*
- SAE/AMS 4363E (Jan-92) Forgings, Magnesium Alloy 2.0Th 0.78Mn, Precipitation Heat Treated
- SAE/AMS 4362E (Jan-92) Forgings, Magnesium Alloy 5.5Zn 0.45Zr Precipitation Heat Treated
- SAE/AMS 4360E (May-68) Magnesium Alloy Forgings, 8.5Al 0.50Zn*
- SAE/AMS 4358A (Jul-81) Magnesium Alloy Forgings AZ61X*

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SAE/AMS Standards (Magnesium) - continued.

- SAE/AMS 4352G (Jan-92) Extrusions, Magnesium Alloy 5.5Zn 0.45Zr, Precipitation Heat Treated
- SAE/AMS 4350L (Jan-92) Extrusions, Magnesium Alloy 6.5Al 1.0Zn, As Extruded
- SAE/AMS 4634 (Jan-93) Aluminum Bronze Bars, Rods, and Forgings 90.5Cu 7.5Al 1.9Si Stress Relieved
- SAE/AMS 4815F (Oct-86) bearings, silver plated steel back

Note: * denotes that a standard has been cancelled or superseded as a result of technical committee action; photocopies are available from SAE.

ANSI Standards

ANSI/AWS

ANSI/AWS A5.19-92 : Magnesium Alloy Welding Electrodes and Rods.

ANSI/NFPA

- ANSI/NFPA 480-1993 : Storage, Handling, and Processing of Magnesium.
- ANSI/NFPA 651-1993 : Manufacture of Aluminum and Magnesium Powder.

ANSI/SAE J

- ANSI/SAE J465-JUN83 : Magnesium Casting Alloys.
- ANSI/SAE J466-JAN89 : Magnesium Wrought Alloys.

ANSI/SAE MAM

- ANSI/SAE MAM 2202A : Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate.
- ANSI/SAE MAM 2355B : Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloy.

TITANIUM ALLOYS

British Standards (BSI)

- BS 5383 : Specification for material identification of steel, nickel alloy & titanium alloy tubes by continuous character marking & colour-coding of steel tubes
- BS 7252-2 : Metallic materials for surgical implants. Specification for unalloyed titanium
- BS 7252-3 : Metallic materials for surgical implants. Specification for wrought Ti-6Al-4V alloy
- BS 7252-10 : Metallic materials for surgical implants. Specification for wrought T-5Al-2.5 Fe alloy
- BS 7252-11 : Metallic materials for surgical implants. Specification for wrought Ti-6Al-7Nb alloy
- BS A 101 : Specification for general requirements for titanium bolts
- BS A 254 to BS A 259 : Specification. Hexagonal head titanium alloy bolts, 1100 MPa
- BS M 58 : Specification for anodic coating of titanium & titanium alloys by the sulphuric acid process

BS TA Standards

- BS 2TA 1 : Specification for sheet & strip of commercially pure titanium, tensile strength 290-420 MPa
- BS 2TA 2 : Specification for sheet & strip of commercially pure titanium, tensile strength 390-540 MPa

- BS 2TA 3 : Specification for bar & section of commercially pure titanium, tensile strength 390-540 MPa (obsolete)
- BS 2TA 4 : Specification for forging stock of commercially pure titanium, tensile strength 390-540 MPa (obsolete)
- BS 2TA 5 : Specification for forgings of commercially pure titanium, tensile strength 390-540 MPa (obsolete)
- BS 2TA 6 : Specification for sheet & strip of commercially pure titanium, tensile strength 570-730 MPa
- BS 2TA 7 : Specification for bar & section for machining of commercially pure titanium, tensile strength 570-740 MPa
- BS 2TA 8 : Specification for forging stock of commercially pure titanium, tensile strength 540-740 MPa (obsolete)
- BS 2TA 9 : Specification for forgings of commercially pure titanium, tensile strength 540-740 MPa (obsolete)
- BS 2TA 10 : Specification for sheet of Ti-Al-V alloy, tensile strength 960-1270 MPa
- BS 2TA 11 : Specification for bar & section for machining of Ti-Al-V alloy, tensile strength 900-1160 MPa, limiting ruling section 150 mm
- BS 2TA 12 : Specification for forging stock of Ti-Al-V alloy, tensile strength 900-1160 MPa, limiting ruling section 150 mm
- BS 2TA 21 : Specification for sheet & strip of Ti-Cu alloy, tensile strength 540-700 MPa
- BS 2TA 22 : Specification for bar & section for machining of Ti-Cu alloy, tensile strength 540-770 MPa (obsolete)
- BS 2TA 23 : Specification for forging stock of Ti-Cu alloy, tensile strength 540-770 MPa (obsolete)
- BS 2TA 24 : Specification for forgings of Ti-Cu alloy, tensile strength 540-770 MPa (obsolete)
- BS 2TA 28 : Specification for forging stock & wire of Ti-Al-V alloy, tensile strength 1100-1300 MPa, limiting ruling section 20 mm – primarily intended for the manufacture of fasteners complying with BS A-series standards
- BS TA 38 : Specification for bar for machining of Ti-Al-Mo-Sn-silicon carbide alloy, tensile strength 1250-1420 MPa, limiting ruling section 25 mm
- BS TA 39 : Specification for forging stock of Ti-Al-Mo-Sn-silicon carbide alloy, tensile strength 1250-1420 MPa, limiting ruling section 25 mm
- BS TA 40 : Specification for bar for machining of Ti-Al-Mo-Sn-silicon carbide alloy, tensile strength 1205-1375 MPa, limiting ruling section over 25 up to & including 75 mm
- BS TA 41 : Specification for forging stock of Ti-Al-Mo-Sn-silicon carbide alloy, tensile strength 1205-1375 MPa, limiting ruling section over 25 up to & including 75 mm
- BS TA 42 : Specification for forgings of Ti-Al-Mo-Sn-silicon carbide alloy, tensile strength 1205-1375 MPa, limiting ruling section over 25 up to & including 75 mm
- BS TA 43 : Specification for forging stock of Ti-Al-Zr-Mo-Si alloy, tensile strength 990-1140 MPa, limiting ruling section 65 mm (obsolete)
- BS TA 44 : Specification for forging stock of Ti-Al-Zr-Mo-Si alloy, tensile strength 990-1140 MPa, limiting ruling section 65 mm (obsolete)
- BS TA 45 : Specification for bar & sections for machining of Ti-Al-Mo-Sn-Si alloy, tensile strength 1100-1280 MPa, limiting ruling section 25 mm (replaces BS TA 29)

BS TA Standards (Titanium) – Continued.

- BS TA 46 : Specification for bar & sections for machining of Ti-Al-Mo-Sn-Si alloy, tensile strength 1050-1220 MPa, limiting ruling section over 25 mm up to & including 100 mm (replaces BS TA 32)
- BS TA 47 : Specification: forging stock Ti-Al-Mo-Sn-Si alloy, tensile strength 1050-1220 MPa, limiting ruling section 100 mm (replaces BS TA30, BS TA33 & BS TA36)
- BS TA 48 : Specification for forgings of Ti-Al-Mo-Sn-Si alloy, tensile strength 1050-1220 MPa, limiting ruling section 100 mm (replaces BS TA 31, BS TA 34 & BS TA 37)
- BS TA 49 : Specification for bar & sections for machining of Ti-Al-Mo-Sn-Si alloy, tensile strength 1000-1200 MPa, limiting ruling section over 100 mm up to & including 150 mm (replaces BS TA 35)
- BS TA 50 : Specification for forging stock of Ti-Al-Mo-Sn-Si alloy, tensile strength 1000-1200 MPa, limiting ruling section over 100 mm up to & including 150 mm (replaces BS TA 36)
- BS TA 51 : Specification for forgings of Ti-Al-Mo-Sn-Si alloy, tensile strength 1000-1200 MPa, limiting ruling section over 100 mm up to & including 150 mm (replaces BS TA37)
- BS TA 52 : Specification for sheet & strip of Ti-Cu alloy, tensile strength 690-920 MPa
- BS TA 53 : Specification for bar & section for machining of Ti-Cu alloy, tensile strength 650-880 MPa, limiting ruling section 75 mm (obsolete)
- BS TA 54 : Specification for forging stock of Ti-Cu alloy, tensile strength 650-880 MPa, limiting ruling section 75mm (obsolete)
- BS TA 55 : Specification for forgings of Ti-Cu alloy, tensile strength 650-880MPa, limiting ruling section 75 mm (obsolete)
- BS TA 56 : Specification for plate of Ti-Al-V alloy, tensile strength 895-1150 MPa, max. thickness 100 mm
- BS TA 57 : Specification for plate of Ti-Al-Mo-Sn-Si alloy, tensile strength 1030-1220 MPa, max. thickness 65mm
- BS TA 58 : Specification for plate of Ti-Cu alloy, tensile strength 520-640 MPa, max. thickness 10 mm
- BS TA 59 : Specification for sheet & strip of Ti-Al-V alloy, tensile strength 920-1180 MPa
- BS 2TA 100 : Procedure for inspection & testing of wrought titanium & titanium alloys

DIN Standards

- DIN 1737-1 : Filler metals for welding titanium & titanium-palladium alloys, chemical compositions, technical delivery conditions
- DIN 17850 : Titanium, chemical composition
- DIN 17851 : Titanium alloys, chemical composition
- DIN 17860 : Titanium & titanium alloy plate, sheet & strip
- DIN 17861 : Titanium & alloy seamless circular tubes
- DIN 17863 : Titanium wire
- DIN 17865 : Titanium & titanium alloy investment castings & rammed graphite castings
- DIN 17866 : Welded circular titanium & titanium alloy tubes
- DIN 17869 : Titanium & titanium alloys, additional material property data
- DIN 65174 : Aerospace: Titanium & titanium alloy – round bars, dimensions, masses

- DIN 65179 : Aerospace (fasteners): Titanium alloy - countersunk head bolts, close tolerance, with internal offset cruciform ribbed drive & MJ thread, short thread length, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65197 : Aerospace: Titanium & titanium alloy – round bars & wire for screw stock, dimensions, masses
- DIN 65289 : Aerospace (fasteners): Titanium alloy - countersunk head screws, ribbed TORQ-SET [ACR] recess & MJ thread, short thread length, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65324 : Aerospace (fasteners): Titanium alloy - pan head bolts, close tolerance, with internal offset cruciform ribbed drive recess & MJ thread, short thread length, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65436 : Aerospace: Titanium & titanium alloy –standard quality [STQ] & disc quality [DQ], requirements & tests
- DIN 65438 : Aerospace (fasteners): Titanium alloy - bihexagonal head bolts, close tolerance, with MJ thread, short thread length, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65464 : Aerospace (fasteners): Titanium alloy – studs with MJ thread, ring-locked, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65526 : Aerospace (fasteners): Titanium alloy - hexagonal bolts, close tolerance, with MJ thread, short thread length, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65557 : Aerospace (fasteners): Titanium alloy – pan-head screws, with ribbed TORQ-SET [ACR] recess & MJ thread, fully threaded, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN 65558 : Aerospace (fasteners): Titanium alloy – countersunk-head screws, with ribbed TORQ-SET [ACR] recess & MJ thread, fully threaded, tensile strength 1100 MPa, for temperatures up to 315° C
- DIN EN 2617 (Norm-Entwurf), Publication:1996-05 : Aerospace - Plate in titanium & titanium alloys; thickness 6 mm<a>100 mm; dimensions.
- DIN V EN 2098-1 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 1: general requirements.
- DIN V EN 2098-2 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 2: inspection & testing requirements for sheets, strips & plates.
- DIN V EN 2098-3 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 3: inspection & testing requirements for bars & sections.
- DIN V EN 2098-4 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 4: inspection & testing requirements for tubes.
- DIN V EN 2098-5 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 5: inspection & testing requirements for wires.

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DIN Standards (Titanium) – continued.

- DIN V EN 2098-6 (Vornorm), Publication:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 6: inspection & testing requirements for bars & wires for fasteners.
- LN 9297 : Aerospace: Aerospace: Titanium & titanium alloy – rolled sheet & plate, dimensions, masses

ISO Standards

- ISO 5832-2:1993 : Implants for surgery - Metallic materials - Part 2: Unalloyed titanium
- ISO 5832-3:1996 : Implants for surgery - Metallic materials - Part 3: Wrought titanium 6-aluminium 4-vanadium alloy
- ISO 5832-10:1996 : Implants for surgery - Metallic materials - Part 10: Wrought titanium 5-aluminium 2, 5-iron alloy
- ISO 5832-11:1994 : Implants for surgery - Metallic materials - Part 11: Wrought titanium 6-aluminium 7-niobium alloy
- ISO 8080:1985 : Aerospace - Anodic treatment of titanium & titanium alloys - Sulfuric acid process
- ISO/DIS 9152 : Aerospace - Bolts, with MJ threads, in titanium alloy strength class 1100 MPa - Procurement specification
- ISO/DIS 9154 : Aerospace - Bolts - Classification 1550 MPa & MJ threads - Procurement specification
- ISO/DIS 9606-5 : Approval testing of welders - Fusion welding - Part 5: Titanium & titanium alloys

AFNOR Standards

- PROJET A 04-190 Avril 1997 Fonderie controle par radiographie. Projet
- NF L 06-383 Novembre 1987 : Assemblages soudés et brasés pour constructions aérospatiales. Assemblages soudés par résistance par points ou à la molette. Qualité des assemblages soudés. Statut :Homologuée
- NF A 06-650 Septembre 1992 : Analyse chimique du titane et alliages de titane. Dosage de l'hydrogène. Statut :Homologuée
- NF A 06-651 Septembre 1992 : Analyse chimique du titane et alliages de titane. Dosage de l'oxygène. Statut :Homologuée
- NF A 06-652 Décembre 1993 : Analyse chimique des alliages de titane. Dosage de l'aluminium dans les alliages Ti-Al-V. Méthode titrimétrique par l'EDTA. Statut :Homologuée
- NF A 06-653 Décembre 1993 : Analyse chimique du titane et alliages de titane. Dosage du fer. Méthode par spectrométrie d'absorption moléculaire. Statut :Homologuée
- NF A 06-654 Décembre 1993 : Analyse chimique du titane et alliages de titane. Dosage de l'azote. Méthode titrimétrique. Statut :Homologuée
- NF A 06-655 DU 12 93 Décembre 1993 : Analyse chimique du titane et alliages de titane. Dosage du silicium. Méthode gravimétrique. Statut :Homologuée
- NF A 06-656 Décembre 1993 : Analyse chimique des alliages de titane. Dosage du vanadium dans les alliages Ti-Al-V. Méthode titrimétrique. Statut :Homologuée

- NF A 06-657 Décembre 1993 : Analyse chimique des alliages de titane. Dosage du zirconium dans les alliages Ti-Al-Zr. Méthode gravimétrique à l'acide bromomandélique. Statut :Homologuée
- NF A 08-650 Octobre 1992 : Analyse chimique du titane et alliages de titane. Dosage des éléments aluminium, vanadium et fer dans les alliages de nuance TA6V. Méthode par spectrométrie d'absorption atomique dans la flamme ou par spectrométrie d'émission de plasma. Statut :Homologuée
- NF A 08-651 Décembre 1993 : Analyse chimique du titane et alliages de titane. Dosage des éléments en faible teneur dans les alliages de nuance TA6V. Méthode par spectrométrie d'absorption atomique dans la flamme ou par spectrométrie d'émission de plasma. Statut :Homologuée
- A 08-652 Novembre 1994 : Analyse chimique du titane et des alliages de titane. Règles à suivre pour l'analyse par spectrométrie d'émission de plasma. Statut :Fascicule de doc.
- L 09-776 Octobre 1984 : Codification des références relatives aux produits semi-ouvrés en alliages d'aluminium et titane, normalisés, sélectionnés pour les constructions aéronautiques. Statut :Fascicule de doc.
- L 14-601 Septembre 1984 : Titane et alliage de titane. Barres pour forgeage en TA6V (p.q) mis en solution et recuit pour constructions aérospatiales Statut :Expérimentale
- L 14-602 Septembre 1984 : Titane et alliage de titane. Pièces forgées en TA6V (p.q) mis en solution et recuit pour constructions aérospatiales Statut :Expérimentale
- L 14-603 Septembre 1984 : Titane et alliage de titane. Barres pour forgeage en TA6V (P.Q) recuit pour constructions aérospatiales. Statut :Expérimentale
- L 14-604 Septembre 1984 : Titane et alliage de titane. Pièces forgées en TA6V (P.Q) recuit pour constructions aérospatiales. Statut :Expérimentale
- L 14-611 Septembre 1984 : Titane et alliage de titane. Barres pour forgeage en TA6Zr5D mis en solution et vieilli pour constructions aérospatiales. Statut :Expérimentale
- L 14-612 Septembre 1984 : Titane et alliage de titane. Pièces forgées en TA6Zr5D mis en solution et vieilli pour constructions aérospatiales. Statut :Expérimentale
- NF L 15-670 Juillet 1978 : Tubes circulaires en titane et alliages de titane. Statut :Homologuée
- NF L 16-003 Mai 1991 : Industrie aéronautique. Peintures et vernis. Nature et méthodes de préparation de surface des éprouvettes en alliages de titane. Statut :Homologuée
- NF L 21-270 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V - Spécification technique. Statut :Homologuée
- NF L 21-271 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête cylindrique et à bague en alliage 2024. Statut :Homologuée
- NF L 21-272 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête fraisée 100 degrés et à bague en alliage d'aluminium 2024.. Statut :Homologuée
- NF L 21-273 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête cylindrique et à bague en acier XC10, complétée par l'erratum, juin 1982. Statut :Homologuée

AFNOR NF Standards (Titanium) - continued.

- NF L 21-274 Septembre 1981 : Rivets composites "SL" à tige en alliage de titane T-A6V à tête fraisée 100 degrés et à bague en acier XC10, complétée par l'erratum, juin 1982.. Statut :Homologuée
- PROJET A 89-500 Novembre 1995 : Controle non destructif des assemblages soudés règles générales. Projet
- PROJET A 89-510 Juillet 1994 : Controle non destructif des assemblages soudés examen radiographique des assemblages soudés par fusion. Projet
- NF S 94-080-1 Janvier 1997 : Implants chirurgicaux. Alliage de titane TA6V. Partie 1 : barres et billettes. Statut :Homologuée
- NF S 94-080-2 Janvier 1997 : Implants chirurgicaux. Alliage de titane TA6V. Partie 2 : tôles, bandes et plaques. Statut :Homologuée
- NF S 94-080-3 Janvier 1997 : Implants chirurgicaux. Alliage de titane TA6V. Partie 3 : produits semi-finis obtenus par moulage. Statut :Homologuée
- NF S 94-080-4 Janvier 1997 : Implants chirurgicaux. Alliage de titane TA6V. Partie 4 : produits semi-finis obtenus par forgeage ou par usinage. Statut :Homologuée
- XP S 94-081-1 Mars 1996 : Implants chirurgicaux. Alliage à base de titane, d'aluminium 6 et de niobium 7. Partie 1 : barres et billettes. Statut :Expérimentale
- XP S 94-081-2 Mars 1996 : Implants chirurgicaux. Alliage à base de titane, d'aluminium 6 et de niobium 7. Partie 2 : produits semi-finis obtenus par forgeage ou par usinage. Statut :Expérimentale

NF EN Standards

- NF EN 2497 Juin 1989 : Série aérospatiale. Sablage sec du titane et des alliages de titane. Statut :Homologuée
- NF EN 2545-1 Septembre 1995 : Série aérospatiale. Produits pour refusion et pièces moulées en titane et alliages de titane. Spécification technique - Partie 1 : exigences générales. Statut :Homologuée
- NF EN 2545-2 Septembre 1995 : Série aérospatiale. Produits pour refusion et pièces moulées en titane et alliages de titane. Spécification technique - Partie 2 : produits pour refusion. Statut :Homologuée
- NF EN 2545-3 Septembre 1995 : Série aérospatiale. Produits pour refusion et pièces moulées en titane et alliages de titane. Spécification technique - Partie 3 : pièces type et pièces de série. Statut :Homologuée
- NF EN 2549 Août 1995 : Série aérospatiale. Vis à tête hexagonale normale, tige normale à tolérance serrée, filetage court, en alliage de titane, anodisées, lubrifiées MoS2. Classification : 1100 MPa (à température ambiante)/315 degrés Celsius. Statut :Homologuée
- NF EN 2858-1 Août 1994 : Série aérospatiale. Titane et alliages de titane - Produits destinés à la forge, pièces forgées et pièces matricées - Spécification technique. Partie 1 : exigences générales. Statut :Homologuée
- NF EN 2858-2 Août 1994 : Série aérospatiale. Titane et alliages de titane - Produits destinés à la forge, pièces forgées et pièces matricées - Spécification technique. Partie 2 : produits destinés à la forge. Statut :Homologuée
- NF EN 2858-3 Août 1994 : Série aérospatiale. Titane et alliages de titane - Produits destinés à la forge, pièces forgées et pièces matricées - Spécification technique. Partie 3 : pièces types et pièces de série. Statut :Homologuée

- NF EN 2870 Novembre 1996 : Série aérospatiale. Vis à tête bihexagonale normale, tige normale à tolérance serrée, filetage court, en alliage de titane, anodisées, lubrifiées MoS2. Classification : 1100 MPa (à température ambiante) / 315 degrés Celsius. Statut :Homologuée
- NF EN 2884 Avril 1996 : Série aérospatiale. Vis à tête cylindrique, à empreinte cruciforme déportée, tige normale à tolérance large, filetage court, en alliage de titane, anodisées, lubrifiées MoS2. Classification : 1100 MPa (à température ambiante) / 315 degrés Celsius. Statut :Homologuée
- NF EN 2955 Novembre 1993 : Série aérospatiale. Recyclage des chutes de titane et d'alliages de titane. (2e tirage corrigé) Statut :Homologuée
- EN 3456PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P64001 - Recuit - Tôles et bandes, laminées à chaud - a inférieur ou égal 6 mm). Statut :Expérimentale
- XP EN 3851PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Écrous prisonniers, droits. Statut :Expérimentale
- XP EN 3852PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords droits, soudés, filetés. Statut :Expérimentale
- XP EN 3853PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords droits, filetés. Statut :Expérimentale
- XP EN 3854PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Olives à souder. Statut :Expérimentale
- XP EN 3855PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Bouchons. Statut :Expérimentale
- XP EN 3856PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Écrous prisonniers à jonc. Statut :Expérimentale
- XP EN 3857PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords à coudes à 90 degrés, à souder. Statut :Expérimentale
- XP EN 3858PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Joncs en acier Fe-PA13. Statut :Expérimentale
- EN 3859PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Recuit - Tôles et bandes, laminées à chaud - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3860PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Recuit - Tôles et bandes, laminées à froid - a inférieur ou égal 6 mm. Statut :Expérimentale
- XP EN 3867PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Brides en alliage de titane Ti-P64001. Statut :Expérimentale
- XP EN 3868PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Raccords à souder en alliage de titane Ti-P64001. Statut :Expérimentale
- EN 3870PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Mis en solution et revenu - Tôles et bandes, laminées à chaud - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3871PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Mis en solution et revenu - Tôles et bandes, laminées à froid - a inférieur ou égal 6 mm. Statut :Expérimentale

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AFNOR NF EN Standards (Titanium) - continued.

- XP EN 3907 PR Février 1995 : Série aérospatiale. Vis à tête bihexagonale, tige normale, filetage long, en alliage de titane Ti-P63, revêtues MoS₂ - Classification : 1100 MPa (à température ambiante)/350 degrés Celsius. Statut :Expérimentale
- XP EN 4051PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane. Logement d'implantation. Statut :Expérimentale
- XP EN 4500-4PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 4 : règles spécifiques au titane et aux alliages de titane. Statut :Expérimentale
- NF ISO 5838-1 Octobre 1996 : Implants chirurgicaux. Fils et broches pour os. Partie 1 : matériaux et propriétés mécaniques. Statut :Homologuée
- FD CR 12187 Avril 1996 : Soudage. Lignes directrices pour un groupement des matériaux pour le soudage. Statut :Fascicule de doc.
- FD CR 12361 Octobre 1996 : Essais destructifs des soudures sur matériaux métalliques. Réactifs pour examen macroscopique et microscopique. Statut :Fascicule de doc.

EN Standards

- EN 2098-1PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 1: general requirements.
- EN 2098-2PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 2: inspection & testing requirements for sheets, strips & plates.
- EN 2098-3PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 3: inspection & testing requirements for bars & sections.
- EN 2098-4PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 4: inspection & testing requirements for tubes.
- EN 2098-5PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 5: inspection & testing requirements for wires.
- EN 2098-6PR:1985-12 : Aerospace series; inspection & testing requirements for titanium & heat resisting alloy wrought products; part 6: inspection & testing requirements for bars & wires for fasteners.
- EN 2497 : Specification for dry abrasive blasting of titanium & titanium alloys
- EN 2517PR : Ti-P63 alloy: annealed - sheet, strip & plate, a ≤ 100mm
- EN 2521PR : Ti P11, bars, 540 ≤ Rm ≤ 700 MPa, d ≤ 200 mm.)
- EN 2522PR : Ti P11, forgings, 540 ≤ Rm ≤ 700 MPa, d ≤ 200 mm.)
- EN 2523PR : Ti P11, bars, 650 ≤ Rm ≤ 880 MPa, d ≤ 75mm.)
- EN 2524PR : Ti P11, forgings, 650 ≤ Rm ≤ 880 MPa, d ≤ 75 mm.)
- EN 2528PR : Ti P11, sheet & strip, 540 ≤ Rm ≤ 700 MPa, a ≤ 5 mm.)

- EN 2529PR : Ti P11, sheet & strip, 690 ≤ Rm ≤ 920 MPa, a ≤ 5 mm.)
- EN 2530PR : Ti-P63 alloy: annealed - 900MPa ≤ RM ≤ 1160MPa - bars, d ≤ 100mm - provisional spec.)
- EN 2531PR : Ti-P63 alloy: annealed - 900MPa ≤ RM ≤ 1160MPa - forgings, d ≤ 100mm - provisional spec.)
- EN 2532PR : Ti P68, bar, 1100 ≥ Rm ≥ 1280 MPa, d ≤ 25 mm.)
- EN 2533PR : Ti P68, bar, 1050 ≥ Rm ≥ 1220 MPa, 25 ≤ d ≤ 100 mm.)
- EN 2534PR : Ti P68, bar, 1000 ≥ Rm ≥ 1200 MPa, 100 ≤ d ≤ 150 mm.)
- EN 2545 : Titanium & titanium alloy remelting stock & castings. Technical specification
- EN 2545-1 : General requirements
- EN 2545-2 : Remelting stock
- EN 2545-3 : Preproduction & production castings
- EN 2549 Août 1995 : Série aérospatiale. Vis à tête hexagonale normale, tige normale à tolérance serrée, filetage court, en alliage de titane, anodisées, lubrifiées MoS₂. Classification : 1100 MPa (à température ambiante)/315 degrés Celsius. Statut :Homologuée
- EN 2617 : Aerospace - Plate in titanium & titanium alloys; thickness 6 mm <a>100 mm; dimensions.
- EN 2858 : Titanium & titanium alloys. Forging stock & forgings. Technical specification
- EN 2858-1 : General requirements
- EN 2858-2 : Remelting stock
- EN 2858-3 : Preproduction & production castings
- EN 2870 Novembre 1996 : Série aérospatiale. Vis à tête bihexagonale normale, tige normale à tolérance serrée, filetage court, en alliage de titane, anodisées, lubrifiées MoS₂. Classification : 1100 MPa (à température ambiante) / 315 degrés Celsius. Statut :Homologuée
- EN 2884 Avril 1996 : Série aérospatiale. Vis à tête cylindrique, à empreinte cruciforme déportée, tige normale à tolérance large, filetage court, en alliage de titane, anodisées, lubrifiées MoS₂. Classification : 1100 MPa (à température ambiante) / 315 degrés Celsius. Statut :Homologuée
- EN 2955 : Recycling of titanium & titanium alloy scrap
- EN 2955 Novembre 1993 : Série aérospatiale. Recyclage des chutes de titane et d'alliages de titane. (2e tirage corrigé) Statut :Homologuée
- EN 3310PR : Ti-P63 alloy: not heat treated- reference heat treatment - annealed - grade 2 forging stocks, d ≤ 360mm
- EN 3311PR : Ti-P63 alloy: annealed - 900MPa ≤ RM ≤ 1160MPa - bar for machining, d ≤ 150mm
- EN 3312PR : Ti-P63 alloy: annealed - 900MPa ≤ RM ≤ 1160MPa - forgings, d ≤ 150mm
- EN 3313PR : Ti-P63 alloy: not heat treated- reference heat treatment - solution treated & aged - grade 2 forging stocks, d ≤ 360mm
- EN 3314PR : Ti-P63 alloy: solution treated & aged - RM ≥ 1070MPa - bar for machining, d ≤ 50mm
- EN 3315PR : Ti-P63 alloy: solution treated & aged - RM ≥ 1070MPa - forgings, d ≤ 50mm
- EN 3316PR : Ti P64, annealed sheet & strip, Rm ≥ 1070 MPa, a ≤ 6 mm.

EN Standards (Titanium) - continued.

- EN 3317PR : Ti P64, annealed plate, $R_m \geq 1000$ MPa, $6 \leq a \leq 100$ mm.
- EN 3318PR : Ti P64, Grade 2 forging stock, $d \leq 360$ mm.
- EN 3319PR : Ti P64, annealed bar for machining, $R_m \geq 1000$ MPa, $d \leq 150$ mm.
- EN 3320PR : Ti P64, annealed forgings, $R_m \geq 1000$ MPa, $d \leq 150$ mm.
- EN 3321PR : Ti-P67 alloy: solution treated & aged Grade 1 forging stock, $d \leq 360$ mm
- EN 3322PR : Ti-P67 alloy: solution treated & aged forgings, $R_m \geq 990$ MPa, $d \leq 75$ mm
- EN 3351PR : Ti P68, solution treated & aged forgings, $R_m \geq 1000$ MPa, $d \leq 150$ mm.
- EN 3356PR : Ti P69, solution treated & aged forgings, $d \leq 100$ mm.
- EN 3441 : Ti P99001, Annealed, Hot rolled sheet & strip, $290 \leq R_m \leq 420$ MPa, $a \leq 6$ mm.
- EN 3454PR : Ti P11, non heat treated grade 2 forging stock, $d \leq 300$ mm.
- EN 3455PR : Ti P11, solution treated & aged grade 2 forging stock, $d \leq 300$ mm.
- EN 3456PR : Ti-P63 alloy: annealed - 920 MPa $\leq R_m \leq 1180$ MPa - sheet & strip, $a \leq 6$ mm
- EN 3457PR : Ti-P63 alloy: not heat treated- reference heat treatment - solution treated & aged - grade 2 forging stock for fasteners $d \leq 25$ mm
- EN 3458PR : Ti-P63 alloy: annealed - 900 MPa $\leq R_m \leq 1160$ MPa - bar & wire for machined fasteners, $d \leq 25$ mm
- EN 3459PR : Ti P68, solution treated & aged plate, $R_m \geq 1030$ MPa, $6 \leq a \leq 50$ mm.
- EN 3462PR : Ti P11, annealed bar for machining, $540 \leq R_m \leq 770$ MPa, $d \leq 150$ mm.
- EN 3463PR : Ti P11, solution treated & aged bar for machining, $650 \leq R_m \leq 880$ MPa, $d \leq 75$ mm.
- EN 3464PR : Ti-P63 alloy: annealed - 900 MPa $\leq R_m \leq 1160$ MPa - plate, 6 mm $\leq a \leq 100$ mm
- EN 3465PR : Ti P68, Grade 2 forging stock, $d \leq 360$ mm.
- EN 3466PR : Ti P68, solution treated & aged bar for machining, $R_m \geq 1000$ MPa, $d \leq 150$ mm.
- EN 3494PR : Ti P11, solution treated & aged forgings, $650 \leq R_m \leq 880$ MPa, $d \leq 75$ mm.
- EN 3495PR : Ti P11, annealed forgings, $540 \leq R_m \leq 770$ MPa, $d \leq 150$ mm.
- EN 3498 : Ti P99002, Annealed, Cold rolled sheet & strip, $390 \leq R_m \leq 540$ MPa, $a \leq 6$ mm.
- EN 3499 : Ti P99003, Annealed, Cold rolled sheet & strip, $570 \leq R_m \leq 730$ MPa, $a \leq 6$ mm.
- EN 3500PR : Ti P11, annealed sheet & strip, $540 \leq R_m \leq 700$ MPa, $a \leq 6$ mm.
- EN 3501PR : Ti P11, solution treated & aged sheet & strip, $690 \leq R_m \leq 920$ MPa, $a \leq 6$ mm.
- EN 3734PR : Ti P609, annealed seamless tube for pressure systems, $R_m \leq 620$ MPa, $D \leq 50$ mm.
- EN 3735PR : Ti P609, solution treated & aged bar for machining, $R_m \geq 900$ MPa, $d \leq 75$ mm.
- EN 3736PR : Ti P610, solution treated & aged forgings, $R_m \geq 900$ MPa, $d \leq 75$ mm.
- EN 3737PR : Ti P610, Grade 2 forging stock, $d \leq 360$ mm.
- EN 3851PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Écrous prisonniers, droits. Statut :Expérimentale
- EN 3852PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords droits, soudés, filetés. Statut :Expérimentale
- EN 3853PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords droits, filetés. Statut :Expérimentale
- EN 3854PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Olives à souder. Statut :Expérimentale
- EN 3855PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Bouchons. Statut :Expérimentale
- EN 3856PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Écrous prisonniers à jonc. Statut :Expérimentale
- EN 3857PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Raccords à coudes à 90 degrés, à souder. Statut :Expérimentale
- EN 3858PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane Ti-P64001. Joncs en acier Fe-PA13. Statut :Expérimentale
- EN 3859PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Recuit - Tôles et bandes, laminées à chaud - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3860PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Recuit - Tôles et bandes, laminées à froid - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3867PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Brides en alliage de titane Ti-P64001. Statut :Expérimentale
- EN 3868PR Février 1995 : Série aérospatiale. Raccords, brides amovibles et joints - Raccords à souder en alliage de titane Ti-P64001. Statut :Expérimentale
- EN 3870PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Mis en solution et revenu - Tôles et bandes, laminées à chaud - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3871PR Janvier 1994 : Série aérospatiale. Alliage de titane Ti-P19001 - Mis en solution et revenu - Tôles et bandes, laminées à froid - a inférieur ou égal 6 mm. Statut :Expérimentale
- EN 3907 PR Février 1995 : Série aérospatiale. Vis à tête bihexagonale, tige normale, filetage long, en alliage de titane Ti-P63, revêtues MoS₂ - Classification : 1100 MPa (à température ambiante)/350 degrés Celsius. Statut :Expérimentale
- EN 4051PR Mai 1995 : Série aérospatiale. Raccords sphériques, 60 degrés, en alliage de titane. Logement d'implantation. Statut :Expérimentale
- EN 4500-4PR Février 1997 : Série aérospatiale. Matériaux métalliques. Règles pour la rédaction et la présentation des normes de matériaux. Partie 4 : règles spécifiques au titane et aux alliages de titane. Statut :Expérimentale

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USA MIL-STD

- MIL-T-9046J (Jan. 1983) Titanium & titanium alloy: Sheet – strip – plate. Alloy designations: CP – commercially pure; A – alpha alloys; AB – alpha-beta alloys; B – beta alloys.
- MIL-T-9047G (Rev. Dec. 1978) Titanium & titanium alloy: Bars & reforge stock. Alloy designations: CP – commercially pure; Alpha alloys; Alpha-beta alloys; Beta alloys.
- MIL-H-81200 Heat treatment of titanium & titanium alloys.
- MIL-I-8950 Ultrasonic inspections
- MIL-STD-2154 Ultrasonic inspections.

AMS

- [See also SAE/AMS Standards]
- AMS 2631 Ultrasonic inspections

SAE Standards

SAE/MAM

- SAE MAM 4911A (Jun-94) Titanium Alloy, Sheet, Strip, and Plate, 6Al 4V, Annealed

SAE/AMS

- SAE/AMS 4897 (Jan-97) Titanium Alloy, Sheet, Strip, and Plate 77Ti 15Mo 3.0Al 2.8Cb 0.20Si, Solution Heat Treated
- SAE/AMS 4898 (Sep-96) Titanium Alloy, Sheet 6Al 2Sn 2Zr 2Mo 2Cr 0.15Si Annealed
- SAE/AMS 4899 (Apr-96) Titanium Alloy, Sheet, Strip, and Plate 4.5Al 3V 2Fe 2Mo Annealed
- SAE/AMS 4900K (Jul-91) Titanium Sheet, Strip, and Plate, Commercially Pure, Annealed, 55.0 ksi (379 MPa) Yield Strength
- SAE/AMS 4901M (Jul-91) Titanium Sheet, Strip, and Plate, Commercially Pure, Annealed, 70,000 psi (485 MPa)
- SAE/AMS 4902F (Jul-91) Titanium Sheet, Strip, and Plate, Commercially Pure Annealed, 40.0 ksi (276 MPa) Yield Strength
- SAE/AMS 4905B (Mar-94) Titanium Alloy, Damage-Tolerant Grade Plate, 6Al 4V, Beta, Annealed
- SAE/AMS 4906A (Nov-69) Titanium Alloy Sheet and Strip, 6Al 4V, Continuously Rolled, Annealed*
- SAE/AMS 4907F (May-94) Titanium Alloy Sheet, Strip, and Plate, 6.0Al 4.0V, Extra Low Interstitials, Annealed
- SAE/AMS 4908F (Apr-88) Titanium Alloy Sheet and Strip, 8Mn, Annealed, 110 ksi (760 MPa) Yield Strength
- SAE/AMS 4909E (Jan-92) Titanium Alloy Sheet, Strip, and Plate 5Al 2.5Sn, Extra Low Interstitials, Annealed
- SAE/AMS 4910K (Mar-94) Titanium Alloy, Sheet, Strip, and Plate, 5Al 2.5Sn, Annealed
- SAE/AMS 4911H (Jul-95) Titanium Alloy, Sheet, Strip, and Plate, 6Al 4V, Annealed
- SAE/AMS 4912B (Invalid D) Titanium Alloy, Sheet and Strip 4Al 3Mo 1V Solution Heat Treated*
- SAE/AMS 4913B (Invalid D) Titanium Alloy, Sheet and Strip 4Al 3Mo 1V Solution and Precipitation Treated*
- SAE/AMS 4914A (Jul-92) Titanium Alloy, Cold Rolled Sheet and Strip, 15V 3Al 3Cr 3Sn Solution Heat Treated

- SAE/AMS 4915G (Jul-90) Titanium Alloy, Sheet, Strip, and Plate, 8Al 1V 1Mo, Single Annealed
- SAE/AMS 4916F (Apr-90) Titanium Alloy, Sheet, Strip, and Plate, 8Al 1Mo 1V, Duplex Annealed
- SAE/AMS 4917E (Apr-90) Titanium Alloy, Sheet, Strip, and Plate, 13.5V 11Cr 3.0Al, Solution Heat Treated
- SAE/AMS 4918H (Jun-96) Titanium Alloy, Sheet, Strip, and Plate 6Al 6V 2Sn Annealed
- SAE/AMS 4919C (Oct-89) Titanium Alloy, Sheet, Strip, and Plate, 6Al 2Sn 4Zr 2Mo 0.08Si, Duplex Annealed
- SAE/AMS 4920B (May-96) Titanium Alloy, Forgings, 6Al 4V, Alpha-Beta or Beta Processed, Annealed
- SAE/AMS 4921G (Oct-91) Titanium Bars, Wire, Forgings, and Rings Commercially Pure 70.0 ksi (483 MPa) Yield Strength
- SAE/AMS 4922A (Mar-95) Titanium Alloy, Seamless Hydraulic Tubing, 15V 3.0Cr 3.0Al 3.0Sn Cold Worked and Precipitation Heat Treated
- SAE/AMS 4923A (Jun-74) Titanium Alloy, Bars and Forgings 2Cr 2Fe 2Mo Annealed, 120,000 psi Yield*
- SAE/AMS 4924D (Jan-85) Titanium Alloy, Bars, Forgings, and Rings 5Al 2.5Sn, Extra Low Interstitials, Annealed
- SAE/AMS 4925B (Invalid D) Titanium Alloy, Bars and Forgings 4Al 4Mn Annealed, 130,000 psi Yield*
- SAE/AMS 4926J (Aug-94) Titanium Alloy, Bars, Wire, and Rings, 5Al 2.5Sn, Annealed, 110 ksi (758 MPa) Yield Strength
- SAE/AMS 4927 (Jun-74) Titanium Alloy, 5Cr 3Al*
- SAE/AMS 4928N (Apr-93) Titanium Alloy, Bars, Wire, Forgings, and Rings, 6Al 4V, Annealed
- SAE/AMS 4929 (Dec-74) Titanium Alloy, 5.4Al 1.4Cr 1.3Fe 1.25Mo Annealed 135,000 psi Yield*
- SAE/AMS 4930D (Oct-90) Titanium Alloy, Bars, Wire, Forgings, and Rings, 6Al 4V, Extra Low Interstitials Annealed
- SAE/AMS 4931A (Apr-93) Titanium Alloy, Bars, Forgings, and Rings 6Al 4V Extra Low Interstitial (ELI) Duplex Annealed, Fracture Toughness
- SAE/AMS 4932 (Apr-90) Titanium Alloy, Sheet, 6Al 4V, Driver Sheet
- SAE/AMS 4933B (Jan-90) Titanium Alloy, Extrusions and Flash Welded Rings, 8Al 1Mo 1V, Solution Heat Treated and Stabilized
- SAE/AMS 4934C (Oct-93) Titanium Alloy, Extrusions and Flash Welded Rings, 6Al 4V, Solution Heat Treated and Aged
- SAE/AMS 4935F (Apr-90) Titanium Alloy, Extrusions and Flash Welded Rings, 6Al 4V, Annealed, Beta Processed
- SAE/AMS 4936D (Jan-90) Titanium Alloy, Extrusions and Flash Welded Rings, 6Al 6V 2Sn, Beta Extruded Plus Annealed, Heat Treatable
- SAE/AMS 4937 (Jul-92) Titanium Alloy, Extrusions and Flash Welded Rings 6Al 6V 2Sn Beta Extruded Plus Annealed, Heat Treatable
- SAE/AMS 4941C (Apr-84) Tubing, Welded, Annealed, 40,000 psi (275 MPa) Yield Strength
- SAE/AMS 4942C (Apr-84) Tubing, Seamless, Annealed, 40,000 psi (275 MPa) Yield Strength
- SAE/AMS 4943F (Jun-96) Titanium Alloy, Hydraulic, Seamless Tubing 3.0Al 2.5V Annealed

SAE/AMS Standards (Titanium) - continued.

SAE/AMS 4944E (Mar-95) Titanium Alloy, Seamless, Hydraulic Tubing 3.0Al 2.5V Cold Worked, Stress Relieved

SAE/AMS 4945A (Oct-92) Titanium Alloy, Tubing, Seamless, Hydraulic, 3Al 2.5V, Texture Controlled, 105 ksi (724 MPa) Yield Strength Cold Worked, Stress Relieved

SAE/AMS 4950 (Aug-96) Titanium Alloy, Bars, Wire, Forgings, and Rings 6.0Al 4.0V Solution Heat Treated and Aged Modified Strength

SAE/AMS 4951F (Jul-90) Titanium Welding Wire, Commercially Pure, Environment Controlled Packaging

SAE/AMS 4952A (Jan-96) Titanium Alloy, Welding Wire, 6Al 2Sn 4Zr 2Mo

SAE/AMS 4953C (Apr-90) Titanium Alloy, Welding Wire, 5Al 2.5Sn

SAE/AMS 4954F (Sep-96) Titanium Alloy, Welding Wire, 6Al 4V

SAE/AMS 4955D (Aug-96) Titanium Alloys, Welding Wire, 8Al 1Mo 1V

SAE/AMS 4956C (Apr-90) Titanium Alloy, Welding Wire, 6Al 4V, Extra Low Interstitials, Environment Controlled Packaging

SAE/AMS 4957B (May-95) Titanium Alloy, Round Bar and Wire, 3Al 8V 6Cr 4Mo 4Zr, Consumable Electrode Melted, Solution Heat Treated and Cold Drawn

SAE/AMS 4958A (Jul-89) Titanium Alloy, Bars and Rod, 3Al 8V 6Cr 4Mo 4Zr, Consumable Electrode Melted, Solution Heat Treated and Centerless Ground

SAE/AMS 4959C (Oct-93) Titanium Alloy, Wire, 13.5V 11Cr 3Al, Spring Temper

SAE/AMS 4963 (Sep-95) Titanium Alloy, Bars, Wire, Forgings, and Rings 6.0Al 4.0V Annealed, Heat Treatable, Modified Strength

SAE/AMS 4965G (May-96) Titanium alloy, bars, wire, rings and forgings, 6.0Al 4.0V Solution Heat Treated & Aged

SAE/AMS 4966K (Jun-94) Titanium Alloy, Forgings, 5Al 2.5Sn, Annealed, 110 ksi (758 MPa) Yield Strength

SAE/AMS 4967G (Oct-93) Titanium Alloy, Bars, Wire, Forgings, and Rings 6.0Al 4.0V Annealed, Heat Treatable

SAE/AMS 4968A (Dec-74) Titanium Alloy, Bars and Forgings 5Zr 5Al 5Sn Annealed*

SAE/AMS 4969 (Jun-74) Titanium Alloy, 5.4Al 1.4Cr 1.3Fe 1.25Mo Annealed 135,000 psi Yield*

SAE/AMS 4970F (Apr-90) Titanium Alloy, Bars, Wire, and Forgings 7Al 4Mo, Solution and Precipitation Heat Treated

SAE/AMS 4971E (Jun-96) Titanium Alloy, Bars, Wire, Forgings, and Rings 6Al 6V 2Sn Annealed, Heat Treatable

SAE/AMS 4972D (Jan-90) Titanium Alloy, Bars, Wire, and Rings, 8Al 1Mo 1V, Solution Heat Treated and Stabilized

SAE/AMS 4973D (Oct-90) Titanium Alloy, Forgings, 8Al 1Mo 1V, Solution Heat Treated and Stabilized

SAE/AMS 4974C (Oct-88) Titanium Alloy, Bars and Forgings, 11Sn 5.0Zr 2.3Al 1.0Mo 0.21Si, Solution and Precipitation Heat Treated

SAE/AMS 4975G (Jun-94) Titanium Alloy, Bars, Wire and Rings, 6.0Al 2.0Sn 4.0Zr 2.0Mo 0.08Si, Solution and Precipitation Heat Treated

SAE/AMS 4976E (Jul-94) Titanium Alloy, Forgings, 6.0Al 2.0Sn 4.0Zr 2.0Mo, Solution & Precipitation Heat Treated

SAE/AMS 4977C (Apr-80) Titanium Alloy, Bars 11.5Mo 6.0Zr 4.5Sn, 1275 - 1350°F (690 - 730°C) Solution Heat Treated*

SAE/AMS 4978C (Oct-89) Titanium Alloy, Bars, Wire, Forgings and Rings, 6Al 6V 2Sn, Annealed

SAE/AMS 4979C (Jan-92) Titanium Alloy, Bars, Forgings, and Rings 6Al 6V 2Sn Solution and Precipitation Heat Treated

SAE/AMS 4980C (Apr-80) Titanium Alloy, Bars 11.5Mo 6.0Zr 4.5Sn, 1375°F (745°C) Solution Heat Treated*

SAE/AMS 4981C (Jan-90) Titanium Alloy, Bars, Wire, and Forgings, 6.0Al 2.0Sn 4.0Zr 6.0Mo, Solution and Precipitation Heat Treated

SAE/AMS 4982B (Oct-93) Titanium Alloy, Wire 44.5Cb

SAE/AMS 4983B (Feb-95) Titanium Alloy, Forgings 10V-2Fe-3Al Consumable Electrode Melted, Single-Step Solution Heat Treated and Aged, 180 ksi (124 MPa) Tensile Strength

SAE/AMS 4984A (May-95) Titanium Alloy, Forgings 10V 2Fe 3Al, Consumable Electrode Melted, Solution Heat Treated and Aged, 173 ksi (1193 MPa) Tensile Strength

SAE/AMS 4985B (Jan-97) Titanium Alloy, Investment Castings 6Al 4V, 130 UTS, 120 YS, 6% EL Hot isostatically pressed anneal optional or when specified

SAE/AMS 4986A (Nov-96) Titanium Alloy, Forging 10V 2Fe 3Al Consumable Electrode Melted, Single Solution Heat Treated and Overaged, 160 ksi (1103 MPa) Tensile Strength

SAE/AMS 4987A (Dec-95) Titanium Alloy, Forgings 10V 2Fe 3Al, Consumable Electrode Melted, Single Solution Heat Treated and Overaged, 140 ksi (965 MPa) Tensile Strength

SAE/AMS 4991A (Oct-87) Titanium Alloy, Castings, Investment, 6Al 4V, Annealed

SAE/AMS 4993B (Feb-94) Titanium Alloy, Blended Powder Compacts, Sintered, 6Al 4V

SAE/AMS 4994 (Jul-92) Titanium Alloy, Powdered Metal Products 6Al 4V Hot Isostatically Pressed, Annealed

SAE/AMS 4995A (Sep-77) Billets and Preforms, 5Al 2Sn 2Zr 4Cr 4Mo 0.10O₂, Premium Quality, Powder-Metallurgy Product

SAE/AMS 4996A (Mar-77) Billets and Preforms, 6Al 4V, Premium Quality, Powder-Metallurgy Product

SAE/AMS 4997A (Sep-77) Titanium Alloy, Powder 5Al 2Sn 2Zr 4Cr 4Mo 0.10O₂, Premium Quality

SAE/AMS 4998B (Jan-93) Titanium Alloy, Powder, 6Al 4V

SAE/AMS 7460D : Titanium Alloy, 6Al - 4V, Heat Treated, Roll Threaded (AMS 4967).

SAE/AMS 7461C : Titanium Alloy, 6Al - 4V, Upset Headed, Heat Treated, Roll Threaded (AMS 4967).

SAE/AMS 7488D (R1988) : Flash Welded - Aluminum and Aluminum Alloys.

SAE/AMS 7498J : Rings, Flash Welded, Titanium and Titanium Alloys.

Note: * denotes that a standard has been cancelled or superseded as a result of technical committee action; photocopies are available from SAE.

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ANSI Standards

ANSI/SAE AMS

[See also: SAE AMS]

ANSI/SAE AMS 7460D : Titanium Alloy, 6Al - 4V, Heat Treated, Roll Threaded (AMS 4967).

ANSI/SAE AMS 7461C : Titanium Alloy, 6Al - 4V, Upset Headed, Heat Treated, Roll Threaded (AMS 4967).

ANSI/SAE AMS 7498J : Rings, Flash Welded, Titanium and Titanium Alloys.

ANSI/AWS

ANSI/AWS A5.16-90 : Specification for Titanium and Titanium Alloy Welding Electrodes and Rods.

ANSI/AWS D10.6-91 : Gas Tungsten Arc Welding of Titanium Piping and Tubing, Recommended Practice.

ANSI/NFPA

ANSI/NFPA 481-1995 : Production, Processing, Handling, and Storage of Titanium.

ANSI/SAE ARP

ANSI/SAE ARP 1333 : Nondestructive Testing of Electron Beam Welded Joints in Titanium-Base Alloys.

ANSI/SAE ARP 1843A : Surface Preparation for Structural Adhesive Bonding, Titanium Alloy Parts.

ANSI/SAE ARP 1932 : Anodize Treatment of Titanium and Titanium Alloys, pH 12.4 Maximum.

ANSI/SAE ARP 4146 : Coiled Tubing - Titanium Alloy, Hydraulic Applications.

ANSI/SAE ARP 982B : Titanium Alloy Products, Wrought, Minimizing Stress Corrosion Cracking.

ANSI/SAE AS

ANSI/SAE AS 1576B : Fittings, Welded, Hydraulic, Titanium and Corrosion Resistant Steel, 3000 psi.

ANSI/SAE AS 1580 : Ring, Tube Weld, 3000 psi, Hydraulic, Titanium.

ANSI/SAE AS 1814B : Terminology for Titanium Microstructures.

ANSI/SAE AS 4076 : Contractile Strain Ratio Testing of Titanium Hydraulic Tubing.

ANSI/SAE AS 7460 : Bolts and Screws, Titanium Alloy 6Al - 4V Procurement, Specification for.

ANSI/SAE AS 7461 : Bolts and Screws, Titanium Alloy 6Al - 4V Fatigue-Rated, Procurement, Specification.

ANSI/SAE MA

ANSI/SAE MA 2060 : Fittings, Welded, Hydraulic, Titanium and Corrosion Resistant Steel, 20,000 kPa.

ANSI/SAE MA 2060A : Fittings, Welded, Hydraulic, Titanium and Corrosion Resistant Steel, 21000 kPa.

ANSI/SAE MAM

ANSI/SAE MAM 2242A : Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium,.

ANSI/SAE MAM 2245A : Tolerances, Metric, Titanium and Titanium Alloy Extruded Bars, Rods, and Shap.

ANSI/SAE MAM 4911 : Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed.

ASTM

A845-85 : Titanium Scrap for Use in Deoxidation & Alloying of Steel

B265-95a : Titanium & Titanium Alloy Strip, Sheet, & Plate

B299 : Titanium sponge

B337 : Titanium & Titanium Alloy pipe

B338-95 : Seamless & Welded Titanium & Titanium Alloy Tubes for Condensers & Heat Exchangers

B348-95a : Titanium & Titanium Alloy Bars & Billets

B363-95 : Seamless & Welded Unalloyed Titanium & Titanium Alloy Welding Fittings

B367-93 : Titanium & Titanium Alloy Castings

B381-95a : Titanium & Titanium Alloy Forgings

B481-68(1990) : Preparation of Titanium & Titanium Alloys for Electroplating

B600-91 : Descaling & Cleaning Titanium & Titanium Alloy Surfaces

B817-93 : Powder Metallurgy (P/M) Titanium Alloy Structural Components

D2651-90 : Preparation of Metal Surfaces for Adhesive Bonding

E120-96 : Chemical Analysis of Titanium & Titanium Alloys

E428-92 : Fabrication & Control of Steel Reference Blocks Used in Ultrasonic Inspection

E539-90(1996)E1 : X-Ray Emission Spectrometric Analysis of 6Al-4V Titanium Alloy

E1409-96 : Determination of Oxygen in Titanium & Titanium Alloys by the Inert Gas Fusion Technique

E1447-92 : Determination of Hydrogen in Titanium & Titanium Alloys by the Inert Gas Fusion Thermal Conductivity Method

F67-95 : Unalloyed Titanium for Surgical Implant Applications

F136-96e1 : Wrought Titanium-6 Aluminum-4 Vanadium ELI (Extra Low Interstitial) Alloy (R56401) for Surgical Implant Applications

F467-93 : Nonferrous Nuts for General Use

F467M-93 : Nonferrous Nuts for General Use [Metric]

F468-93 : Nonferrous Bolts, Hex Cap Screws, & Studs for General Use

F468M-93 : Nonferrous Bolts, Hex Cap Screws, & Studs for General Use [Metric]

F620-96 : Titanium 6 Aluminum-4 Vanadium ELI Alloy Forgings for Surgical Implants [UNS R56401]

F945-85 : Stress-Corrosion of Titanium Alloys by Aircraft Engine Cleaning Materials

F1077-95a : Selection of Committee F-16 Fastener Specifications

F1108-97 : Ti6Al4V Alloy Castings for Surgical Implants (UNS R56406)

F1295-97 : Wrought Titanium-6 Aluminum-7 Niobium Alloy for Surgical Implant Applications (UNS R56700)

F1341-92 : Unalloyed Titanium Wire for Surgical Implant Applications

F1472-93 : Wrought Ti-6Al-4V Alloy for Surgical Implant Applications

F1580-95 : Titanium & Titanium-6% Aluminum-4% Vanadium Alloy Powders for Coatings of Surgical Implants

BERYLLIUM

USA-MIL

MIL-B-8964 : Sheet & plate

MIL-B-21531 : Bar, rod & shape.

ASTM Standards

C1233-93 : Determining Equivalent Boron Contents of Nuclear Materials

D3645-93 : Beryllium in Water

E439-88(1993)e1 : Chemical Analysis of Beryllium

E798-96 : Conducting Irradiations at Accelerator-Based Neutron Sources

ANSI Standards

ANSI/SAE AMS

ANSI/SAE AMS 7900 : Virgin Beryllium Bars, Rods, and Shapes.

ANSI/SAE AMS 7901 : Beryllium Bars, Rods, and Shapes.

ANSI/SAE AMS 7902A : Beryllium Sheet and Plate.

ANSI/SAE AMS 7903 : Beryllium Bars, Rods, Tubing, and Shapes - 4.25BeO - 94Be, High Micro-yield St.

ANSI/SAE AMS 7904A : Beryllium Bars, Rods, Tubing, and Shapes - High Ductility Grade.

ANSI/SAE AMS 7905 : Beryllium Bars, Rods, Tubing, and Shapes - Optical Grade.

ANSI/SAE AMS 7906 : Beryllium Bars, Rods, Tubing, and Shapes - Standard Grade.

ANSI/SAE AMS 7907 : Beryllium Bars, Rods, Tubing, and Shapes - Instrument Grade.

ANSI/SAE AMS 7908 : Beryllium Hipped Near-Net Preforms, Standard Grade.

ANSI/SAE AMS 7910 : Beryllium Near-Performs, Standard Grade, Cold Isostatic Pressed, Sintered.

Appendix B : Primary Aluminium Production

This appendix summarises primary aluminium smelters by country, giving their location and an indication of their capacity (in tonnes).

Argentina

Aluar Aluminio Argentino SAIC
Puerto Madryn (175 000)

Australia

Alcan Australia Ltd.
Kurri Kurri

Alcoa of Australia Ltd.
Point Henry, Geelong (185 000)

Victoria State GMT
(No details)

First National Resource Trust
(No details)

Citic Marubeni Aluminium Australia Pty. Ltd.
Portland (320 000)

Boyne Smelters Ltd.
Boyne Island (230 000)

Comalco Ltd.
Bell Bay (120 000)

Tomago Aluminium Company Pty. Ltd.
Newcastle (380 000)

Azerbaijan

Sumgait Aluminium Smelter
Sumgait (58 000)

Bahrain

Aluminium Bahrain B.S.C.
Bahrain (460 000)

Bosnia-Herzegovena

Aluminjski Kombinat Mostar
Mostar (closed)

Brazil

Alcan Aluminio Do Brasil S.A.
Aratu, BA (58 000)
Saramenha, MG (51 000)

Alcoa Aluminio S.A.
Pocos de Caldas, MG (90 000)

Alumar
Sao Luis, MA (330 000)

Companhia Brasileira De Aluminio
Mairinique, S.P. (215 000)

Albras - Aluminio Brasileiro S/A
Barcarena, PA (320 000)

Valesul Aluminio S.A.
Santa Cruz, R.J. (90 000)

Cameroon

Alucam
Edéa (80 000)

Canada

Alcan Smelters & Chemicals Ltd:
Jonquière, Quebec (232 000)
Beauharnois, Quebec (48 000)
Grande Baie, Quebec (180 000)
Isle Maligne, Quebec (73 000)
Kitimat, British Columbia. (272 000)
Laterriere, Quebec (204 000)
Shawinigan, Quebec (84 000)

Alumax Inc. / Aluminerie Lauralco Inc:
Deschambault, Quebec (215 000)

Aluminerie Alouette Inc.
Sept-Iles, Quebec (215 000)

Aluminerie de Bécancour Inc.
Bécancour, Quebec (360 000)

Canadian Reynolds Metals Co. Ltd.
Baie Comeau, Quebec (400 000)

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China (PRC)

China National NonFerrous Metals Industry Corp:
Baillianhe Aluminium Plant (5 000)
Baiyin Aluminium Plant (50 000)
Baoding Aluminium Factory (2 500)
Baotou Aluminium Smelter (70 000)
Changsha Aluminium Factory (14 000)
Chongqing Aluminium Factory (11 000)
Fushun Aluminium Plant (100 000)
Gansu Provincial Aluminium Co. (25 000)
Guangxi Desheng Aluminium Plant (7 000)
Guizhou Aluminium Plant (160 000)
Hanzhong Aluminium Plant (5 000)
Hebei Matuo Aluminium Plant (12 000)
Hefei Aluminium Smelter (10 000)
Hejin Longmen Electrolytic (12 000)
Hubei Aluminium Plant (15 000)
Hunjiang Aluminium Plant (15 000)
Jiaozuo Aluminium Plant (15 000)
Jiamusi Aluminium Factory (5 000)
Kunming Aluminium Plant (30 000)
Lanzhou Aluminium Plant (25 000)
Liancheng Aluminium Plant (85 000)
Longxi Aluminium Plant (10 000)
Nanping Aluminium Works (24 000)
Panshi Aluminium Factory (15 000)
Pingguo Aluminium Industry Co. (100 000)
Pingyang Aluminium Plant (15 000)
Qinghai Aluminium Smelter (100 000)
Qingtongxia Aluminium Plant (82 000)
Quzhou Chemical Corp. (13 000)
Sanmanxia Aluminium Plant (30 000)
Shandong Aluminium Industry Co. (35 000)
Shijiazhuang Aluminium Plant (15 000)
Taiyuan Aluminium Plant (15 000)
Tongchuan Aluminium Plant (15 000)
Tongren Aluminium Factory (5 000)
Tongshun Aluminium Plant (10 000)
Wulumiqi Aluminium Smelter (22 000)
Xiangxiang Aluminium Plant (14 000)
Xiezhou Aluminium Plant (15 000)
Xuzhou Aluminium Works (13 000)
Yongcheng Aluminium Plant (3 000)
Zhejiang Aluminium Co. (25 000)
Zhengzhou Aluminium Plant (32 000)
Zibo Aluminium Plant (9 000)
Zunyi Aluminium Plant (14 000)

Croatia

TLM Sibenik
Sibenik (closed)

Egypt

The Aluminium Company of Egypt
Nag Hammadi (180 000)

France

Pechiney
Auzat (44 000)
Dunkerque (215 000)
St. Jean de Maurienne (120 000)
Lannemezan (44 000)
Venhon (31 000)

Germany

Hamburger Aluminium - Werk GMBH
Hamburg (115 000)
Hoogovens Aluminium Hüttenwerk Voerde GMBH
Voerde (80 000)
Aluminium Essen GMBH
Essen (135 000)
VAW Aluminium AG
Norf (210 000)
Stade (68 000)
Töging (85 000)

Ghana

Volta Aluminium Co. Ltd.
Tema (200 000)

Greece

Aluminium de Grece
Distomon (150 000)

Hungary

Hungalu-Hungarian Aluminium Corp.
Inota (35 000)

Iceland

Icelandic Aluminium Co. Ltd.
Straumsvik

India

Bahrat Aluminium Co. Ltd.
Korba (100 000)

Hindalco Industries Ltd.
Renukoot (150 000)

Indian Aluminium Co. Ltd.
Alupuram (20 000)
Hirakud (24 000)
Belgaum (73 000)

National Aluminium Co. Ltd.
Angul (218 000)

Indonesia

P.T. Indonesia Asahan Aluminium
Kuala Tanjung (225 000)

Iran

IRALCO - Iranian Aluminium Company
Arak (120 000)

Italy

Alumix Spa
Fusina (13 000)
Porto Vesme (130 000)

Japan

Nippon Light Metal Co. Ltd.
Kambara (20 000)

Mexico

Aluminio y Derivados de Veracruz S.A. de C.V.
Veracruz (66 000)

Netherlands

Aluminium Delfzijl
Delfzijl (97 000)

Pechiney Nederland N.V.
Vlissingen (170 000)

New Zealand

New Zealand Aluminium Smelters Ltd.
Bluff (259 000)

Nigeria

Aluminium Smelter Co. of Nigeria
Ikot Abasi (90 000)

Norway

Hydro Aluminium A.S.
Ardal (265 000)
Sunndalsora (140 000)
Hoyanger (65 000)
Karmoy (220 000)

Elkem Aluminium ANS
Lista (80 000)
Mosjoen (115 000)

SOR - Norge Aluminium A/S
Husnes (78 000)

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Poland

Konin Aluminium Works
Maliniec Smelter (55 000)

Romania

Slatina Aluminium Working Enterprise
Slatina (265 000)

Russian Federation

AO Bogoslovsk Aluminium Smelter - BAZ
Bogoslovsk (158 000)

AO Bratsk Aluminium Plant - BrAZ
Bratsk (809 000)

AO Irkutsk Aluminium Plant - IrkAZ
Irkutsk (255 000)

AO Uralsk Aluminium Smelter - UAZ
Ural (67 000)

AO Kandalaksha Aluminium Smelter
Kandalaksha (63 000)

AO Krasnoyarsk Aluminium Plant - KrZA
Krasnoyarsk (749 000)

AO Nadvoytsy Aluminium Smelter
Nadvoytsy (73 000)

AO Novokuznetsk Aluminium Smelter - NkAZ
Novokuznetsk (284 000)

AO Volgograd Aluminium Smelter- VgAZ
Volgograd (141 000)

AO Volkhov Aluminium Smelter - VAZ
Volkhov (20 000)

AO Sayansk Aluminium Smelter - SaAZ
Sayansk (274 000)

Serbia & Montenegro

DP Kombinat Aluminijuma
Podgorica (120 000)

Slovak Republic

ZSNP Ziar Nad Hronom
Ziar nad Hronom (65 000)

Slovenia

Unial Tovarna Glinice in Aluminija
Kidrecevo (75 000)

South Africa

Alusaf Ltd.:
Richards Bay (172 000)
Hillside (began 1995)

Spain

Aluminio Español S.A.
San Ciprian (190 000)

Industria Española Del Aluminio S.A.
Avilés (40 000)
La Coruña (78 000)

Surinam

Suriname Aluminium Company
Paranam (30 000)

Sweden

GA Metall AB
Sundsvall (100 000)

Switzerland

Alusuisse Aluminium Ltd.
Steg (24 000)

Tadjikistan

Tadjik Aluminium Smelter - TAZ
Regar (517 000)

Turkey

Etibank Alüminyum Co. Ltd.
Müessesesi Müdürlüğü Seydisehir (60 000)

Ukraine

Dnieper Aluminium Smelter - DAZ
Zaporozhye (108 000)

United Arab Emirates

Dubai Aluminium Co. Ltd.
Jebel Ali (240 000)

United Kingdom

Anglesey Aluminium Ltd.
Holyhead (124 000)

British Alcan Aluminium Plc.
Kinlochleven (11 000)
Lochaber (38 000)
Lynemouth (135 000)

United States of America

Alcan Aluminum Corporation
Sebree, Kentucky (163 000)

Alumax Inc.:
Bellingham, Washington (270 000)
Frederick, Maryland (175 000)
Mount Holly, South Carolina (181 000)

ALCOA - Aluminum Company of America
Alcoa, Tennessee (200 000)
Badin, North Carolina (115 000)
Evansville, Indiana (270 000)
Massena, New York (127 000)
Rockdale, Texas (315 000)
Wentchee, Washington (265 000)

Columbia Aluminum Corporation
Goldendale, Washington (168 000)

Columbia Falls Aluminum Company
Columbia Falls, Montana (168 000)

Kaiser Aluminum & Chemical Corp.
Mead, Washington (200 000)
Tacoma, Washington (73 000)

NSA (Division of Southwire)
Hawesville, Kentucky (186 000)

Noranda Aluminum Inc.
New Madrid, Missouri (204 000)

Northwest Aluminum Company
The Dalles, Oregon (82 000)

Ormet Corporation
Hannibal, Ohio (245 000)

Ravenswood Aluminum Corp.
Ravenswood, West Virginia (166 000)

Reynolds Metals Company
Longview, Washington (204 000)
Massena, New York (123 000)
Troutdale, Oregon (121 000)

Vanalco Inc.
Vancouver, Washington (110 000)

Venezuela

Aluminio Del Caroni S.A.
Puerto Ordaz (220 000)

Industria Venezolana De Aluminio C.A.
Puerto Ordaz (441 000)

Appendix C : Glossary

This appendix is a compilation of terms commonly used in the light metal industry. They are a mixture of those used to describe the materials themselves (metallurgical) and their processing, production and characteristics.

A

Age Hardening - A special dispersion-strengthening heat treatment. By solution treatment, quenching, and ageing, a coherent precipitate can be formed that provides a substantial strengthening effect. Also known as precipitation hardening.

Alloy - Combination of metals and other elements giving improved properties over the pure metal.

Annealing - A heat treatment used to eliminate part or all of the effects of cold working. Used to soften alloys that have been hardened by cold work or by heat-treatment; often used to enable a metal to be cold worked. To avoid excessive grain growth the metal should be heated to the annealing temperature as rapidly as possible, and held at temperature only as long as necessary. Excessive grain growth reduces the mechanical properties of the metal and may give a rough 'orange-peel' effect on the surface when the material is subsequently worked. Annealing temperatures depend on the particular alloy type, i.e. those which age-harden at room temperature may require a more complicated annealing schedule. Local annealing can be done by, for example, a blow-torch on work-hardened, non-heatreatable alloys. For heat-treated alloys, it imparts the heat-treated properties.

Artificial Ageing - Reheating a solution-treated and quenched alloy to a temperature below the solvus in order to provide the thermal energy required for a precipitate to form. For heat-treatable alloys that slowly harden at normal temperatures, the rate can be increased by heating the solution heat-treated alloy in the range 100-200°C for a shorter period. The time at the specified temperature depends on the alloy, but may be typically 2 to 30 hours. Maximum strength is generally attained by prolonged ageing at low temperature rather than by rapid ageing at high temperature.

B

Bar - A round, rectangular or polygonal solid section supplied in straight lengths. The term is generally applied to materials of not less than 6mm diameter (or minor dimensions).

Bend Test - Application of a force to the central region of a test bar that is supported on each end to determine the resistance of the material to a static or slowly applied load. Typically used for brittle materials. May be 3- or 4-point bend. In 4-point bending a pair of rollers is used to apply force to the central section - with the advantage that the resulting stress in the test sample is uniform between them.

Bolt Stock - Round bar or wire suitable for manufacturing bolts by cold heading.

C

Castability - The ease with which a metal flows into a mould to make a casting without producing defects or requiring unusual or expensive techniques to prevent casting problems.

Cavity Shrinkage - A large void within a casting caused by the volume contraction that occurs during solidification.

Chill Zone - A region of small, randomly oriented grains that forms rapidly at the surface of a casting as a result of heterogeneous nucleation.

Circumscribing Circle - In extrusion - that circle which defines the largest possible cross-section for the extruded product (maximum die dimensions).

Coefficient of Thermal Expansion (linear) - Describes the amount by which a unit length of a material changes when its temperature changes by one degree Celsius (may vary with temperature range).

Coherent Precipitate - A precipitate whose crystal structure and atomic arrangement are continuous with the matrix from which the precipitate formed. In effect a small region of enrichment by alloying elements, producing local strain (distortion) of the crystal lattice. This hinders the movement of dislocations and provides excellent strengthening.

Cold Rolled Plate - A cold rolled product of rectangular section over 6mm thick, supplied flat in a variety of conditions, with better surface finish, and normally to closer tolerances, than hot rolled plate.

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Cold Working - Deformation of a metal below the recrystallisation temperature. During cold working, dislocations increase in number and become entangled (pinned), strengthening the metal. *Solution Heat-Treated Alloys*: that age naturally at room temperature should be worked within 2 hours of quenching (30 mins for severe forming operations), i.e. before age-hardening reaches any significant level. Alloys can be re-solution heat-treated in order to complete the forming operation. **But**: repeated solution treating can reduce the mechanical properties attained by natural or artificial ageing.

Columnar Zone - A region of elongated grains having a preferred orientation. These form as a result of competitive growth during the solidification of a casting, generally growing in at right-angles to the surface of the casting.

Composites - A group of materials formed from mixtures of metals, ceramics, or polymers, combined in such a manner that unusual combinations of properties are obtained. These properties can be deliberately highly directional, i.e. anisotropic.

Coring - Microsegregation within a grain.

Creep Rate - The rate at which a material deforms when a constant stress is applied at a high temperature.

Creep Test - Measures the resistance of a material to deformation and failure when subjected to a static load below the yield strength at an elevated temperature.

Crystal Structure - The lattice arrangement of the atoms in a material.

D

Dendrite - The structure formed by a solid growing along crystallographic directions when an undercooled liquid nucleates.

Density - Mass per unit volume of a material, often expressed in units of kg.m^3 or g.cm^3 .

Dispersion Strengthening - Increasing the strength of a material by incorporating finely divided particles (often oxides or carbides). By proper control of the size, shape, amount, and individual properties of the phases, excellent combinations of properties can be obtained.

Drawing - A deformation processing technique by which a material is reduced in cross-section by being pulled through an opening in a die.

Drawn Tube - A hollow product of uniform wall thickness produced by cold drawing from tube bloom.

Ductility - The ability of a material to be permanently deformed without fracture when a force is applied.

E

Elastic Deformation - Deformation of the material that is recovered when the applied load is removed.

Elongation (percentage) - The total percentage increase in the length of a specimen during a tensile test.

Epitaxial growth - Growth of a liquid onto an existing solid material without the need for nucleation.

Eutectic - A three-phase reaction in which one liquid phase solidifies to produce two solid phases.

Eutectic microconstituent - A characteristic mixture of two phases formed as a result of the eutectic reaction.

Eutectoid - A three-phase reaction in which one solid phase transforms to two different solid phases.

Extruded Round Tube - A circular hollow extrusion of uniform wall thickness.

Extrusion - A deformation processing technique by which a material is pushed through an opening in a die.

F

Fatigue Life - The number of stress cycles before a material fails by fatigue.

Fatigue Limit (Endurance limit) - The stress below which a material will not fail in a fatigue test.

Fatigue strength - The stress required to cause failure by fatigue in a given number of cycles; normally several hundred million cycles.

Fatigue Test - Measures the resistance of a material to failure when a cyclic stress below the yield strength is applied.

Fibre Metal Laminate (FML) - A proprietary sheet material consisting of thin metal sheets bonded with an adhesive layer which contains a continuous fibre reinforcement.

Fibre Texture - A preferred orientation of grains obtained during the drawing process. Grains are elongated along the drawing direction, causing anisotropic behaviour.

Flexural Modulus - The modulus of elasticity resulting from a bend test, the slope of the stress-strain curve.

Flexural Strength - The stress required to fracture a specimen in a bend test. Also called the modulus of rupture (MOR).

Fluidity - The ability of liquid metal to fill a mould cavity without premature solidification.

Foil - A cold rolled product of rectangular section and thickness not greater than 0.2 mm.

Forging Stock - Cast, extruded or rolled starting material for the production of forgings.

Fracture Mechanics - The study of a material's ability to withstand stress in the presence of a defect.

Fracture Toughness - The resistance of a material to failure in the presence of a defect.

Freezing Range - The temperature difference between the liquidus and solidus temperatures.

Fusion Welding - Joining processes in which a portion of the materials must melt in order to achieve good bonding.

Fusion Zone - The portion of a weld heated to produce all liquid during the welding process. Solidification of the fusion zone provides joining.

G

Gas Porosity - Gas bubbles trapped within a casting during solidification. Occurs because of the lower solubility of gas in the solid compared with that in the liquid.

Grain Refinement - The multiplication and equalisation of grains in a cast microstructure.

H

Hall-Heroult Process - An electrolytic process used for extraction of aluminium from the ore.

Hardness Test - Measures the resistance of a material to penetration by an object. Common hardness tests for light-alloys are Brinell (HB), Rockwell (R + scale letter) and Vickers (VPN).

Heat Treatment – A light alloy is generally said to be in a heat-treated condition when it has been subjected to one or both of the following: (a) Heating for a prescribed period at a prescribed temperature, then cooling rapidly from this temperature, usually by quenching (solution heat-treatment); (b) Ageing, either spontaneously at ordinary temperatures (natural ageing) or by heating for a prescribed period at a prescribed low temperature (artificial ageing). The application of both solution heat-treatment and artificial ageing is often termed 'fully heat treated'. This situation may be more complex for some multi-phase titanium alloy compositions.

Heat-affected Zone (HAZ) - The area adjacent to a weld that is heated above some critical temperature during the welding process. This results in changes in the structure, such as grain growth or recrystallisation, and alteration in properties.

Hollow Section - An extruded shape other than round, the cross-section of which completely encloses a void or voids.

Homogenisation - A heat treatment used to reduce the microsegregation caused during non equilibrium solidification.

Hooke's Law - The relationship between stress and strain in the elastic portion of the stress-strain curve.

Hot Rolled Plate - A hot rolled product of rectangular section, > 6mm thick, supplied flat in a variety of conditions but generally with less control of surface finish and tolerance than applies to sheet.

Hot Shortness - Melting of a lower melting point non equilibrium phase that forms by segregation, even though the temperature is below the equilibrium solidus temperature.

Hot Working - Deformation of a metal above the recrystallisation temperature. During hot working, only the shape of the metal changes; the strength remains relatively unchanged because no strain hardening occurs.

Hypereutectic Alloys - Alloys above the eutectic composition but containing at least some eutectic microconstituent.

Hypoeutectic Alloys - Alloys below the eutectic composition but containing at least some eutectic microconstituent.

I

Impact Energy - The energy required to fracture a standard specimen when the load is applied rapidly.

Impact Test - Measures the ability of a material to absorb a rapidly applied load. Common tests are Charpy and Izod.

Ingot Structure - The macrostructure, including the chill zone, columnar zone, and equiaxed zone.

Inoculation - The addition of heterogeneous nuclei in a controlled manner to increase the number of grains in a casting.

Intermetallic Compound - A chemical compound formed by two or more metals, having a particular composition and structure. *Nonstoichiometric*: A variable ratio of the components present in the compound. *Stoichiometric*: A fixed ratio of the components present in the compound. Also called an intermediate solid solution.

L

Limited Solubility - When there is a limit to the amount of a solute material which can be dissolved in the solvent material.

Liquidus - The temperature at which the first solid begins to form within a cooling liquid.

M

Macrosegregation – Variations in composition of a material over large distances caused by nonequilibrium solidification.

Macrostructure – Obvious features of a material's structure (visible without the aid of a microscope).

Matrix – The continuous solid phase in a complex microstructure. *Alloys*: precipitates can form within the matrix. *Composites*: the phase in which the reinforcement is embedded.

Mechanical Properties – Measurable characteristics of a material that describe the resistance to applied forces, e.g. tensile, compressive, impact, fatigue, etc.

Metal matrix Composite – A material which consists of a reinforcement phase embedded in a metal alloy. The reinforcements can be particles or fibres.

Microsegregation - Compositional differences in a material over short distances caused by non equilibrium solidification.

Modification - Addition of alloying elements which change the microstructure of the eutectic microconstituent, e.g. Na or Sr in Al-Si alloys.

Modulus of Elasticity (Young's modulus) - The slope of the stress-strain curve in the elastic region.

Modulus of Resilience - The maximum elastic energy absorbed by a material when a load is applied.

N

Natural ageing – Strengthening mechanism where a coherent precipitate forms from a solution-treated and quenched, age-hardenable alloy when held at room temperature.

Non Ferrous alloy - An alloy based on some metal other than iron.

Notch sensitivity - Measures the deleterious effect of a notch, scratch, or other imperfection on a material's properties, such as toughness or fatigue resistance.

P

Phase - A material having the same composition, structure, and properties everywhere under equilibrium conditions. A distinctive part of a microstructure.

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Phase Diagram - Diagrams of temperature and composition showing the phases and their boundaries. *Unary*: one component. *Binary*: with two components; *Ternary*: 3D plot of three components; *Isomorphous*: displays unlimited solid solubility. *Isothermal plot*: horizontal section through a ternary phase diagram.

Physical Properties - Describe characteristics such as colour, elasticity, electrical or thermal conductivity, magnetism, and optical behaviour which are generally not influenced by forces acting on a material.

Pipe Shrinkage - A large conical-shaped void at the surface of a casting caused by the volume contraction that occurs during solidification.

Plastic Deformation - The permanent deformation of a material when a load is applied and then removed.

Poisson's Ratio - The ratio between the lateral and longitudinal strains during elastic deformation.

Pouring Temperature - The temperature of the metal when it is poured into a mould during casting.

Precipitate - A solid phase that forms from the original matrix phase when the solubility limit is exceeded. Control of the formation of precipitates produces optimum dispersion strengthening.

Proof Strength - The yield strength (obtained graphically) which is the stress corresponding to a small specified amount of plastic deformation. Proof stresses are commonly quoted as 0.2%PS, or occasionally 0.1%PS.

Q

Quenching - Means of reducing the temperature after heat-treatment and retaining the required material structure. The quench media may be water (hot or cold), water-jet/spray, oil, forced-air, polymer solutions. *Wrought*: Care is required that shaped components (long and thin) and sheet materials do not distort unacceptably. *Castings & Forgings*: Care may be necessary owing to stresses occurring from different rates of cooling in sections of different thickness. Normally hot-water quenched. *Note*: oil quench cannot be used where the alloy has been heated in a salt-bath. There is fire risk when hot nitrate comes into contact with oil.

R

Rapid Solidification Processing (RSP) - Methods used to produce unique material compositions and structures by using unusually high cooling rates during solidification. Powders produced by RSP (of which there are several techniques) can have alloying element levels higher than that possible by conventional metallurgy (segregation effects in ingot). They may also contain dispersed phases of very fine ceramic particles (oxide dispersion strengthened 'ODS' alloys), or combined with particulate reinforcements for metal matrix composites.

Recovery - A low-temperature annealing heat treatment designed to eliminate residual stresses introduced during deformation without reducing the strength of the cold-worked material.

Recrystallisation - A medium-temperature annealing heat treatment designed to eliminate all of the effects of the strain hardening produced during cold working. The grain structure is altered as the temperature is sufficient for new grains to nucleate and grow..

Reduction in Area (RoA) - Total decrease in the cross-sectional area of a specimen during the tensile test, expressed as a percentage.

Refrigeration - Used to delay the onset of age-hardening of solution heat-treated material; usually between -6 to -10°C. A work piece may be refrigerated for production control purposes. Avoids the start of natural age hardening.

Re-Heat Treatment - Alloys which have been incorrectly heat-treated can be re-solution treated and precipitation treated to restore properties. If solution treatment has been carried out at too high a temperature, the condition cannot be remedied by reheat treatment. *Note*: Clad material should not be re-heat-treated.

Residual Stresses - Stresses in a material produced during processing which, rather than causing deformation of the material, remain stored in the structure. Internal stresses can arise from quenching or in castings by solidification in the mould. Castings have stresses set up by different cooling rates, consequently different shrinkage rates. They are more significant in large castings and those with adjacent thick and thin sections. When a metal has solidified, these stresses are in a state of equilibrium, so that the dimensions of a casting will not alter under normal conditions. Machining or use at high temperature can disturb the equilibrium state and cause distortion; particularly undesirable for close tolerance items.

Rivet Stock - Round bar or wire suitable for the manufacture of rivets.

Rupture Time - The time required for a specimen to fail by creep at a particular temperature and stress.

S

Screw Stock - Round bar or wire suitable for the manufacture of screws by cold heading.

Segregation - Composition differences in a material, often caused by insufficient time for diffusion during solidification.

Shape-memory Effect - The ability of certain materials to develop microstructures that, after being deformed, can return the material to its initial shape when heated.

Shate - Rolled material, normally between 4-6mm thickness. Intermediate between sheet and plate.

Sheet - A cold rolled product of rectangular section, over 0.2 mm, but not exceeding 6 mm thick; supplied flat in all available conditions. It may be produced as strip and then flattened and cut to length.

Sheet Texture - Preferred orientation of grains obtained during the rolling process.

Shot Peening - Introducing compressive residual stresses into the surface of a part by bombarding the surface with balls to produce localised plastic deformation. Residual compressive stresses may improve the fatigue resistance.

Solid Solution - A solid phase of uniform composition containing a more than one element.

Solidus - The temperature below which all liquid has completely solidified.

Solubility - The amount of one material that will completely dissolve in a second without becoming a second phase.

Solution Heat-treatment – The first step in the age-hardening heat treatment. The alloy is heated above the solvus temperature to dissolve any second phases and to produce a homogeneous single-phase structure. (1) initially increases the ductility of alloys and enables a certain amount of cold work to be applied before natural ageing starts to harden the metal. (2) increases strength but not to the level achieved by subsequent artificial ageing. *Temperature:* Maximum property improvement is attained when the solution heat-treatment is within the specified temperature range: too low, mechanical properties will be below requirements; too high there is a risk of cracking due to overheating. *Time:* Varies with loading and spacing of the workload. Care is needed with Clad materials because the alloying constituents tend to diffuse from the core into the cladding, so affecting corrosion resistance. In general, cast aluminium alloys need to be solution heat-treated for longer periods than wrought aluminium alloys.

Specific Strength - The ratio of strength to density. Also called strength-to-weight ratio.

Stabilising - The relief of residual internal stresses by heating to a predetermined temperature, then cooling slowly. Stabilising is more widely applied to castings than wrought products. *Temperature:* depends on the history of the metal and its intended service use. [See also: Residual stresses].

Stiffness - A qualitative measure of the elastic deformation produced in a material, e.g. a stiff material has a high modulus of elasticity.

Strain Hardening - Strengthening of a material by increasing the number of dislocations with deformation, or cold working. Also known as work hardening.

Strain Rate - The rate at which a material is deformed. A material may behave much differently if it is slowly pressed into a shape rather than formed rapidly into a shape by an impact, [See also: Superplasticity].

Strain-hardening Coefficient - The effect that strain has on the resulting strength of the material. A material with a high strain-hardening coefficient obtains high strength with only small amounts of deformation or strain.

Strength-to-weight Ratio - The strength of a material divided by its density; materials with a high strength-to-weight ratio are strong but lightweight.

Stress Relief Anneal - The recovery stage of the annealing heat treatment, during which residual stresses are relieved without reducing the mechanical properties of the material.

Strip - A cold rolled product of rectangular section supplied in coil, over 0.2 mm thick, but not exceeding 3 mm thick.

Superplasticity - The ability of a material to deform uniformly by an exceptionally large amount without fracture (often several hundred percent). Careful control of temperature, grain size, and strain rate are required for a material to behave in a superplastic manner. Some light-alloys are specifically denoted as superplastic forming (SPF) grades.

T

Temper – describes the condition of a material, i.e. its history of thermal or cold working. The temper has a strong influence on the alloy characteristics.

Temper Designation - A shorthand notation using letters and numbers to describe the processing of an alloy. H tempers refer to cold-worked alloys; T tempers refer to age-hardening treatments. The numbers following the letter denote the precise steps in achieving the temper.

Tensile Strength - Stress that corresponds to the maximum load in a tensile test.

Tensile Test - Measures the response of a material to a slowly applied uniaxial tensile force. Provides values for yield strength (YS); proof stress (PS) for a given permanent plastic deformation offset, e.g. 0.2 or 0.1%; tensile strength (UTS); modulus of elasticity (E); ductility (EI%).

Thermal Conductivity - Measures the rate at which heat is transferred through a material.

Thermal Shock - Failure of a material caused by stresses introduced by rapid changes in temperature.

Thermal Stresses - Stresses introduced into a material by differences in the amount of expansion or contraction that occur because of the temperature change.

Thixocasting (Rheocasting) - A process by which a material is stirred during solidification. Produces a semi-solid (partly liquid, partly solid) structure that behaves as a solid when no external force is applied but flows as a liquid under pressure. Used to produce billet materials for subsequent processing, e.g. die-casting.

Total Solidification Time - The time required for a casting to solidify completely after it has been poured.

Toughness - A qualitative measure of the impact resistance of a material; high resistance = tough.

U

Undercooling - The temperature to which the liquid metal must cool below the equilibrium freezing temperature before nucleation occurs.

W

Widmanstätten Structure - Precipitation of a second phase from the matrix when there is a fixed crystallographic relationship between the precipitate and matrix crystal structures. Often needlelike or platelike structures. A microstructural feature of some titanium alloys.

Wire - A round, square or regular polygonal solid section of not more than 10 mm diameter or width across flats produced by drawing; usually supplied in coil.

Work Hardening - Strain hardening or cold working.

Wrought Alloys - Alloys that are shaped by a deformation process, e.g. extrusion, rolling, drawing, etc.

Y

Yield Strength - The stress applied to a material that just causes permanent plastic deformation.

Appendix D :

Multilingual Vocabulary

English	French	German	Italian	Spanish
Adhesion	Adhérence	Haftvermögen	Aderenza	Adherencia
Age hardening	Durcissement structural	Aushärtung	Incrudimento per deformazione a freddo	Endurecimiento estructural
Air quenching	Trempe à l'air	Luftabschrecken	Tempra all'aria	Temple al aire
All-over marking	Marquage continu	Rollstempelung	Marchiatura in continuo	Marcado continuo
Alloy	Alliage	Legierung	Lega	Aleacion
Alloying element	Élément d'addition	Legierungselement	Effetto di pressa	Elemento de adición
Aluminium	Aluminium	Aluminium	Alluminio	Aluminio
Aluminium alloy	Alliage d'aluminium	Aluminiumlegierung	Lega di alluminio	Aleacion de aluminio
Aluminium refined	Aluminium raffiné	Reinstaluminium	Alluminio raffinato	Aluminio refinado
Anisotropy	Anisotropie	Anisotropie	Anisotropia	Anisotropia
Annealing	Recuit	Glühung	Ricotto	Recocido
Anodising	Anodisation	Anodisation	Anodizzazione	Anodización
Artificial ageing	Revenu	Warmauslagerung	Rinvenimento	Revenido
Artificially aged	Etat revenu	Warmausgehärtet	Stato rinvenuto	Estado revenido
As-quenched condition	Brut de trempe	Abgeschreckt	Grezzo di tempra	Bruto de temple
As-quenched condition	Trempe fraîche	Frische Abschreckhärtung	Tempra fresca	Temple al agua
As-quenched temper	Etat trempé	Abgeschreckter Zustand	Stato temprato	Estado templado
Bar, Rod	Barre	Stab, Stange	Barra	Barra
Bend radius	Rayon de pliage	Biegeradius	Raggio di piegatura	Radio de plegado
Bend test	Essai de pliage	Biegeversuch	Prova di piegatura	Ensayo de plegado
Bending	Cintrage	Biegen	Curvatura	Doblado
Bevel welding bead	Chanfrein (de soudure)	Abschrägung	Smusso (di saldatura)	Chafian de soldadura
Blackening	Noircissement	Schwärzung, Trübung	Annerimento	Ennegrecimiento
Blank	Flan	Zuschnitt	Flangia	Pieza en bruto
Blankholder	Serre flan	Niederhalter	Premilamiera	Pisador
Blanking	Découpage sous presse	Stanzen	Taglio	Corte a la prensa
Blister	Soufflure	Blase	Soffiatura	Burbuja
Bonding	Collage	Kleben	Incollatura	Pegado
Bow	Flèche longitudinaie	Längsdurchbiegung	Freccia longitudinale	Flecha longitudinal
Brazing	Brasage fort	Hartlöten	Brasatura	Soldadura fuerte
Brazing sheet	Tôle pour brasure	Lötblech	Lastro per brasatura	Chapa para soldar
Brittleness	Fragilité	Sprödigke	Fragilità	Fragilidad
Broken edge	Bord irregulier	Kantenrisse	Bordo irregolare	Canto irregular
Brushing	Brossage	Bürsten	Spazzolatura	Cepillado
Buckling	Flambement	Knicken	Ingobbamento	Flameado
Buffing	Polissage au disque	Schwabbeln	Pulitura con disco	Pulido al disco
Burr	Bavure	Grat	Bava	Rebabas
Can stock	Tôle pour boitage	Dosenblech	Lastra per lattine	Chapa para latas de bebida
Cast	Coulée	Abguß	Lavorato	Colada
Cast number	Numéro de coulée	Gußnummer	Numero di colata	Numero de colada
Casting	Moulage	Guß	Colata in stampo	Fundición
Casting alloy	Alliage de moulage	Gußlegierung	Lega per colata	Aleacion para moldeo
Chemical brightening	Brillantage chimique	Chemisches Glänzen	Brillantatura chimica	Abrillantado químico
Chemical conversion	Conversion chimique	Chemische Konversion	Conversione chimica	Conversion química
Chemical polishing	Polissage chimique	Chemisches Polieren	Pulitura chimica	Pulido químico
Circle	Disque	Ronde	Dilatazione	Disco

English	French	German	Italian	Spanish
Clad alloy	Alliage plaqué	Plattierte Legierung	Prodotto placcata	Producto plaqueado
Clad sheet	Tôle plaquée	Plattiertes Blech	Lastra placcata	Chapa placada
Cladding	Placage	Plattierung	Placcatura	Plaqueado
Cladding blister	Soufflure de placage	Plattierblase	Soffiatura di placcatura	Burbuja de plaqueado
Clinching	Clinchage	Clinchen	Aggroffatura	Clisado
Clipping	Ebarbage	Entgratung	Durezza	Desbarbado
Coating	Revêtement	Beschichten	Rivestimento	Revestimiento
Coil	Bande	Band	Nastro	Banda
Coil coating	Revêtement en bande	Bandbeschichtung	Rivestimento con nastro	Revestimiento en banda
Coil crown effect	Bombé d'une bande	Bandwölbung	Tegolatura	Abombado de un lado
Cold compression	Compression à froid	Koltstauchen	Compressione a freddo	Compresion en frio
Cold working	Déformation a froid	Kaltumformung	De ormazione a caldo	Deformacion en frio
Cold working, Strain hardening	Ecrouissage	Kaltverfestigung	Campione	Endurecimiento por conformacion
Cold-drawn rod/bar	Barre étirée à froid	Kaltgezogene Stange	Barra trafilata	Barra estrada en frio
Continuous casting	Coulée continue	Strangguß	Colata	Colada continua
Controlled atmosphere	Atmosphère contrôlée	Kontrollierte Atmosphäre	Atmosfera controllata	Atmosfera controlada
Controlled stretching	Traction contrôlée	Kontrolliertes Recken	Trozione controllata	Traccion controlado
Convexity	Convexité	Konvexität	Convessità	Convexidad
Cooling	Refroidissement	Abkühlung	Raffreddamento	Enfriamiento
Corrosion	Corrosion	Korrosion	Corrosione	Corrosion
Crack	Fissure	Riß	Cricca	Fisura
Creep	Fluage	Plastisches Fließen	Scorrimento	Flujo
Crevice corrosion	Corrosion cavemeuse	Spaltkorrosion	Corrosione interstiziale	Corrosion cavemosa
Crevice corrosion	Corrosion sous dépôt	Belagkorrosion	Corrosione da sollecitazione	Corrosion por almacenamiento
Critical quenching rate	Vitesse critique de trempe	Kritische Abschreckgeschwindigkeit	Velocità critica di tempra	Velocidad critica de temple
Critical strain	Ecrouissage critique	Kritischer Verformungsgrad	Incrudimento	Endurecimiento critico
Cropping	Eboutage	Schopfen	Sbavatura	Despuntado
Crown	Bombé	Bombierung	Bombato	Abombado
Cutting	Découpage	Schneiden	Tornitura	Cortado
Defect	Défaut	Qualitätsmangel	Tranciatura	Defecto
Degreasing	Dégraissage	Entfettung	Deformazione permanente	Desengrasado
Dent	Bosse, creux	Einbeulung	Ammaccatura	Relieve, hueco
Desensitisation	Désensibilisation	Desensibilisierungsglühung	Semilavorato	Desensibilizacion
Destructive test	Essai destructif	Zerstörungsprüfung	Prova distruttiva	Ensayo destructivo
Diameter	Diamètre	Durchmesser	Detensionamento	Diametro
Die	Matrice	Matrize	Stampo	Matriz
Die forging	Matrissage	Gesenkschmieden	Stampaggio	Matrizado
Die scores	Rayure de filière	Preßriefen	Striatura di filiera	Rayado de hilera
Diffusion	Diffusion	Diffusion	Diametro	Difusion
Dilatation	Dilatation	Wärmedehnung	Diffusione	Dilatacion
Direct extrusion	Filage direct	Direktes Strangpressen	Estrusione diretta	Extrusion directa
Dissolution potential	Potentiel de dissolution	Auflösungspotential	Potenziale di dissoluzione	Potencial de disolucion
Draw bench	Banc d'etirage	Ziehbank	Banco di trafila	Banco de estrirado
Drawing	Emboutissage	Tiefziehen	Imballaggio Imbutitura	Embuticion
Drawing	Étirage	Ziehen	Trafilatura	Estirado
Drawn tube	Tube étiré	Kaltgezogenes Rohr	Tubo trafilato	Tubo estrirado
Drawn wire	Fil tréfilé	Gezogener Draht	Filo trafilato	Hilo trefilado
Ductility	Ductilité	Duktilität	Raddrizzatura	Ductilidad
Duplex ageing	Double revenu	Stufenaushärtung	Disco	Doble revenido
Dye penetrant test	Essai de ressuage	Riß Eindringprüfung	Prova di trasudamento	Ensayo de resudacion
Dye penetrant test	Ressuage	Penetrationstest	Prova liquidi penetranti	Resudacion
Earing	Comes d'emboutissage	Zipfel	Anisotropia	Orejas de embuticion
Eccentricity	Excentricité	Exzentrizität	Eccentricità	Excentricidad
Eddy current test	Essai par courants de Foucault	Wirbelstromprüfverfahren	Prova a correnti parassite	Ensayo corriente de Foucault
Edge trimming	Ebavrage	Abgraten Entgraten	Sbozzato carta	Desbardado
Edge wave	Bord long	Randwelligkeit	Bordo lungo	Borde longitudinal
Electrical conductivity	Conductivité électrique	Elektrische Leitfähigkeit	Conduktività elettrica	Conductividad electrica
Electrical resistivity	Résistivité électrique	Spezifischer elektrischer Widerstand	Resistivita elettrica	Resistidad electrica
Electrochemical brightening	Brillantage électrochimique	Elektrochemisches Glänzen	Brillantatura elettrochimica	Abrillantado electroquimico
Elongation	Allongement	Dehnung	Allungamento	Alargamiento
Etching	Attaque chimique	Ätzen	Attacco chimico	Ataque quimico
Etching	Gravure (chimique)	Chemische Gravierung	Incisione (chimica)	Grovado quimico
Exfoliation corrosion	Corrosion exfoliante, Corrosion feuilletante	Schichtkorrosion	Corrosione a strati	Corrosion exfoliante/escamosa
Expansion test	Essai d'évasement	Aufweitversuch (Rohr)	Prova di svasatura	Ensayo de abocardoniento
Extrudability	Filabilité	Verpreßbarkeit	Indoneità all'estrusione	Extrusionabilidad
Extruded rod/bar	Barre filée	Stranggepreßte Stange	Barra estrusa	Barra extruida
Extruded section	Profilé filé	Vollprofil	Profilo estruso	Perfil
Extruded tube	Tube filé	Stranggepreßtes Rohr	Tubo estruso	Tubo extruida
Extrusion	Filage	Strangpressen	Estrusione	Extrusion
Extrusion billet	Billette de filage	Preßbolzen	Billetta estrusa	Lingote de extrusion

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English	French	German	Italian	Spanish
Extrusion die	Filière	Preßmatrize	Fillera	Hilera
Extrusion effect	Effet de presse	Preßeffekt	Incrudimento critico	Efecto de prensa
Extrusion press	Presse à filer	Strangpresse	Pressa per estrusione	Prensa extrusion
Fatigue	Fatigue	Ermüdung	Fatica	Fatiga
Fatigue limit	Limite de fatigue	Dauerfestigkeit	Limite di fatica	Limite de fatiga
Fatigue strength	Résistance a la fatigue	Dauerfestigkeit, Ermüdungsfestigkeit	Resistenza alla fatica	Resistencia a la fatiga
Film coating	Pelliculage	Folienbeschichtung	Applicazione pellicola	Película
Fin stock	Bande pour échangeurs	Band für Warne austauscher	Nastro per scambiatori	Banda para intercambiadores
Finish	Finition de surface	Oberflächenfinish	Finitura di superficie	Acabado superficial
Finishing	Parachèvement	Zurichtung	Finitura	Acabada
Fitup	Accostage	Anlegen	Accostata	Acercamiento
Flash annealing	Recuit flash	Stoßglühung	Ricotto flash	Recocido flash
Flatness	Planéité	Ebenheit	Planarità	Planidad
Flattening	Planage	Richten	Spianatura	Aplanado
Flow turning	Fluotournage	Drückwolzen	Tomitura ad emulsione	Fluortorneado
Foil	Feuille mince	Folie	Foglio sottile	Banda fina
Foil stock	Ebauche feuille mince	Folienvorwalzband	Sbozzatura al laminatoio	Desbaste hoja fina
Fold	Pli	Knick	Piega	Plegue
Folding	Pliage	Falten	Piegatura	Plegado
Forming, Shaping	Mise en forme	Formen	Messa in forma	Conformado
Fracture toughness, Toughness	Tenacité	Bruchzähigkeit, Zähigkeit	Tenacità	Resistencia a la fissura
Free machining	Décolletage	Abdrehen	Rottami	Decoletage
Free machining alloy	Alliage de décolletage	Automatenlegierung	Lega per tomitura	Aleacion decolletage
Fretting marks	Fretting corrosion	Transportscheuerstellen	Corrosione per frizione	Marcos de fricción
Frost finish	Fini glacé	Glanzfinish	Finito liscio	Vidriado
Fumace	Four	Ofen	Forno	Horno
Galvanic corrosion	Corrosion galvanique	Galvanische Korrosion	Corrosione sfogliante	Corrosion galvanica
Gauge	Calibre	Kaliber Blechdicke	Calibro	Calibre
Gouging	Gougeage	Fugenhobeln	Sgorbiatura	Acanalado
Grade	Classe	Güte	Classe	Clase
Grain	Grain	Korn	Grano	Grano
Grain flow	Fibrage	Faserverlauf	Sfibratura	Conduccion de la fibra
Grain growth	Grossissement du grain	Kornwachstum	Ingrossamento del grano	Crecimiento grano
Grain size	Taille de grain	Korngröße	Dimensione del grano	Tamaño del grano
Grinding	Meulage	Schleifen	Rettifica	Esmerilado
Half hard temper	Etat demi-dur	Halbhart-Zustand	Stato semicrudo	Estado semi duro
Hand forging	Forgeage	Schmieden	Forgiatura	Forjado
Hard anodising	Anodisation dure	Hartanodisation	Anodizzazione dura	Anodizacion dura
Hard temper	Etat quatre quarts-dur	Hart-Zustand	Stato quattro quarti duro	Estado duro
Hardness	Dureté	Härte	Incrudimento strutturale	Dureza
Hardness test	Essai de dureté	Härteprüfung	Prova di durezza	Ensayo de dureza
Heat treatment	Traitement thermique	Wärmebehandlung	Trattamento termico	Tratamiento termico
Heat-affected zone	Zone affectée thermiquement	Wärmeeinflußzone	Zona influenzata termicamente	Zona afectada termicamente
Heat-treatable alloy	Alliage a traitement thermique	Aushärtbare Legierung	Lega per trattamento termico	Aleacion tratable térmicamente
Heat-treatable alloy	Alliage trempant	Aushärtbare Legierung	Lega autotrepante	Aleacion para lempar
Hexagonal bar	Barre hexagonale	Sechskantstange	Barra esagonale	Barra exagonal
Hollow shape	Profilé creux	Hohlprofil	Profilo forato	Perfil hueco
Hollow-ware manufacture	Chaudronnage	Blechverarbeitung	Caldaieria	Caldereria
Homogenisation	Homogénéisation	Homogenisierung	Omogeneizzazione	Homogeneizacion
Hot rolled sheet	Tôle laminée à chaud	Warmwalzblech	Lastra laminata a caldo	Chapa laminada en caliente
Hot rolled temper (F)	Etat brut de laminage à chaud	Warmwalzzustand	Stato grezzo di laminazione a caldo	Estado bruto de laminado en caliente
Hot shortness	Fragilité à chaud	Warmbrüchigkeit	Fragilità a caldo	Fragilidad en caliente
Hot tearing	Arrachements	Querrisse	Graffiature	Arrancamientos
Hot working	Déformation à chaud	Warmumformung	Deformazione	Deformacion por calor
Impact extrusion	Filage par choc	Fließpressen	Estrusione per choc	Extrusion por golpe
Impact resistance, Shock resistance	Résistance au choc	Schlagfestigkeit	Resistenza all'urto	Resistencia al choque
Impurities	Impuretés	Verunreinigungen	Impurità	Impurezas
Inclusion	Inclusion	Einschluß	Inclusion	Inclusion
Indirect extrusion	Filage inverse	Indirektpressen	Estrusione inversa	Extrusion inversa
Ingot	Lingot	Barren	Lingotto	Lingote
Inspection	Contrôle	Kontrolle	Controllo	Control
Inter-crystalline corrosion	Corrosion intercrystalline	Interkristalline Korrosion	Corrosione galvanica	Corrosion intercrystalina
Intergranular corrosion	Corrosion intergranulaire	Korngrenzenkorrosion	Corrosione intercrystallina	Corrosion intergranular
Interleaving	Intercalaire	Zwischenlage	Intercalare	Intercalarío
Internal stress	Contrainte interne	Eigenspannung	Sollecitazione interna	Tension interna
Lacquering	Vernissage	Transparentlackieren	Laccatura	Bamizado
Lateral bow, Lateral curvature	Fleche latérale	Abweichung von der Geradheit	Freccia laterale	Flecha lateral
Length	Longueur	Länge	Lunghezza	Largo
Long transverse direction	Sens travers long	Längs-Querrichtung	Senso trasversale lungo	Direccion transversal larga
Longitudinal bow	Cambure	Längswölbung	Curvatura	Curvatura

English	French	German	Italian	Spanish
Longitudinal crown	Bombé longitudinal	Breitenballigkeit	Sciabolatura longitudinale	Abombado longitudinal
Longitudinal direction	Sens long	Längsrichtung	Senso longitudinale	Dirección longitudinal
Lüders lines	Lignes de Lüders	Lüderslinien	Linee di Lüders	Lineas de Lüders
Machining	Usinage	Spanabhebende Bearbeitung	Lavorazione	Mecanizado
Macro-etching test	Macrographie	Makroätzen	Macrografia	Macrografia
Mandrel	Aiguille	Dom	Ago	Aguja
Marking	Marquage	Kennzeichnung	Marchiatura	Marcado
Matt finish	Fini mat	Mattfinish	Finito opaco	Mate
Mechanical polishing	Polissage mécanique	Mechanisches Polieren	Pulitura meccanica	Pulido mecanico
Mechanical properties	Caractéristiques mécaniques	Mechanische Eigenschaften	Caratteristiche meccaniche	Características mecánicas
Metal	Métal	Metall	Metallo	Metal
Metallization	Métallisation	Metallisierung	Metallizzazione	Metallizacion
Microstructure	Microstructure	Mikrogefüge	Microstruttura	Microestructura
Milling	Fraisage	Fräsen	Fresatura	Fresado
Mirror finish	Fini miroir	Hochglanzfinish	Finito a specchio	Brillante espejo
Modulus of elasticity	Module d'élasticité	Elastizitätsmodul	Modulo elastico	Modulo elastico
Natural ageing	Maturation	Kaltauslagerung	Invecchiamento naturale	Maduración
Natural oxide film	Film d'oxyde naturel	Natürliche Oxidhaut	Strato d'ossido naturale	Capa oxido natural
Natural oxide film	Oxyde naturel	Natürliche Oxidschicht	Ossido naturale	Oxido natural
Non destructive testing	Essai non destructif	Zerstörende Prüfung	Prova non distruttiva	Ensayo no destructivo
Non heat treatable alloy	Alliage non trempant	Nichtaushärtbare Legierung	Lega non temperabile	Aleación no templable
Oil staining	Tache de cracking	Ölflecken, Ölrückstände	Macchia da olio bruciato	Mancha de aceite
Orange peel effect	Peau d'orange	Orangerhauteffekt	Buccia d'arancia	Piel de naranja
Ovality	Ovalisation	Ovalität	Ovalizzazione	Ovalizacion
Over-ageing	Sur-revenu	Überalterung	Sovrarinvenimento	Sobre revenido
Overheating	Brûlure	Überhitzen	Brucciatura	Quemado
Overheating	Surchauffe	Überhitzung	Sovrarisaldamento	Sobrecalentamiento
Packaging	Emballage	Verpackung	Elemento di addizione	Embalage
Painted sheet	Tôle laquée	Lackiertes Blech	Lastra laccata	Chapa lacada
Painting	Peinture	Decklackieren	Verniciatura	Pintura
Partial annealing	Restauration	Anlassen auf Zustand, Erholung	Trattamento termico	Restauración
Partially annealed	Etat restauré	Rückgeglühter Zustand	Stato bonificato	Estado restaurado
Percentage elongation	Allongement pour cent	Dehnung in Prozent	Allungamento percentuale	Porcentaje de alargamiento
Permanent set	Déformation permanente	Bleibende Verformung	Deformazione a freddo	Deformación permanente
Physical properties	Propriétés physiques	Physikalische Eigenschaften	Proprietà fisiche	Propiedades físicas
Pickling	Décapage	Beizen	Colata continua	Decapado
Pinholes	Percillage	Loch	Puntinatura	Perforaciones
Pitting	Piqure (de corrosion)	Lochfraßstelle	Corrosione puntiforme	Corrosion superficial
Pitting corrosion	Corrosion par piqures	Lochfraßkorrosion	Corrosione durante lo stoccaggio	Corrosion por picadas
Plate	Tôle épaisse	Dickes Blech, Platte	Piastro	Chapa alto espesor
Polishing	Polissage	Polierung	Pulitura	Pulido
Porosity	Porosité	Porosität	Porosità	Porosidad
Porthole die	Filière à point	Kammerwerkzeug	Filiera a ponte	Hilera al puente
Pre-ageing	Pré-revenu	Vorauslagerungsbehandlung	Pre-rinvenuto	Pre-revenido
Preheating	Préchauffage	Vorwärmen	Preriscaldamento	Precalentamiento
Press	Presse	Presse	Pressa	Prensa
Press brake	Presse à plier	Biegepresse	Pressa per piegatura	Plegadora
Press quenching	Trémie sur presse	Abschrecken aus der Preßhitze	Tempra alla pressa	Temple sobre prensa
Primer	Primaire	Primer	Primario	Primario
Proof strength	Limite conventionnelle d'élasticité	Dehngrenze bei nicht-proportionaler Verlängerung	Limite convenzionale di elasticità	Limite elastico convencional
Protective anodising	Anodisation de protection	Schutzanodisation	Anodizzazione di protezione	Anodización de protección
Quarter hard temper	Etat quart-dur	Viertelhart-Zustand	Stato un quarto duro	Estado un cuarto duro
Quenching	Trémie	Abschrecken	Tempra	Temple
Recovery annealing	Recuit de restauration	Erholungsglühen	Ricottura di bonifica	Recocido de restauración
Recrystallisation	Recristallisation	Rekristallisation	Ricristallizzazione	Recristalización
Recrystallisation annealing	Recuit de recristallisation	Rekristallisationsglühung	Ricottura di ricristallizzazione	Recocido de recristalización
Recycling	Recyclage	Recycling	Riciclaggio	Reciclado
Reflectivity	Pouvoir réflecteur	Reflexionsvermögen	Potere riflettente	Reflectividad
Reheating	Réchauffage	Aufwärmen	Riscaldamento	Recalentado
Residual stress	Contrainte résiduelle	Restspannung	Tensione residua	Tension residual
Ripple mark	Ondulations	Querschläge	Ondulazioni	Ondulaciones
Ripple mark	Zébrures	Querschläge	Striature	Vetas
Rivet	Rivet	Niete	Rivetto	Remache
Rivet stock	Fil à rivet	Nietdraht	Filo per rivetti	Hilo de remaches
Rod	Barre ronde	Rundstange	Barra tonda	Barra redonda
Roller levelling	Planage à rouleaux	Rollrichten	Spianatura a rulli	Aplanado con rodillos
Rolling	Laminage	Walzen	Laminazione	Laminado
Rolling ingot	Plaque de laminage	Walzbarren	Placca di laminazione	Placa de laminación
Roughing on rolling mill	Ebauchage au laminoir	Vorwalzen	Scriccatura	Debastado en el laminador
Sample	Echantillon	Muster	Spuntatura	Muestra

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English	French	German	Italian	Spanish
Sand blasting	Sablage	Sandstrahlen	Sabbatura	Arenado
Satin finish	Fini satiné	Satiniert	Finito satinato	Satinado
Sawing	Sciage	Sägen	Taglio allo sego	Serrado
Scalping	Scalpage	Abdrehen (runde Flächen), Fräsen (ebene Flächen)	Scalpatura	Escalpado
Scoring	Rayure	Riefen	Rigatura	Rayado
Scrap	Déchets	Schrott	Decapaggio	Chatarras
Scratch-brushed finish	Fini brossé	Gebürstet	Finito di spazzolatura	Cepillado
Sealing	Colmatage	Verdichten	Fissaggio	Colmataje
Seamless tube	Tube sans soudure	Nabtloses Rohr	Tubo senza saldatura	Tubo sin soldadura
Segregation	Ségrégation	Seigerung	Segregazione	Segregación
Semi-finished product	Demi-produit	Halbzeug	Sgrassaggio	Semi-producto
Shape	Forme	Form	Forma	Forma
Shaving	Arasage	Schälen	Sbaratura-Scavatura	Escalpado
Shear strength	Résistance au cisaillement	Kritische Scherspannung	Resistenza al taglio	Resistencia al cizallado
Shearing	Cisaillement	Abscherung	Cisoatura	Cizallado
Sheet	Tôle	Blech	Lastro	Chapa
Short transverse direction	Sens travers court	Kurz-Querrichtung	Senso trasversale corto	Dirección transversal corta
Shot blasting, Blast cleaning	Grenaillage	Strahlen	Granigliatura	Granallado
Slitting	Refendage	Längsteilen, Spalten	Cesoatura	Cortado longitudinal
Slug	Pion	Butze	Pastiglia	Disco de extrusion
Soft annealing	Recuit d'adoucissement	Weichglühung	Ricottura leggera	Recocido para alisado
Soft temper (O)	Etat recuit	Geglüht-Zustand	Stato ricotto	Estado recocido
Soldering	Brasage tendre	Weichlöten	Brasatura leggera	Soldadura floja
Solid shape	Profilé plein	Strangpreßprofil	Profilo pieno	Perfil macizo
Solution treated & aged	Etat trempé mûri	Abgeschreckt und ausgelagert	Stato temprato invecchiato	Templado y madurad
Solution treatment	Mise en solution	Lösungsglühen	Messa in soluzione	Disolución
Special qualities	Qualités spéciales	Spezialqualitäten	Qualità speciali	Caidades Especiales
Specification	Spécification	Spezifikation	Specifica	Especificación
Spinning	Repoussage	Flachprägen, Metalldrücken	Imbutitura al tornio	Repulsado
Spot welding	Soudage par point	Punktschweißen	Saldatura a punti	Soldadura por puntos
Square bar, Square rod	Barre carrée	Vierkantstab Vierkantstange	Barra quadra	Barra cuadrada
Squareness	Equerrage	Rechtwinkligkeit	Squadratura	Escuadrado
Stabilised temper	Etat stabilisé	Stabilisierter Zustand	Stato stabilizzato	Estado estabilizado
Standard	Norme	Norm	Norma	Norma
Sticking between laps	Adhérence entre spires	Lagenhaftung	Aderenza tra le spire	Adherencia entre espiras
Sticking between laps	Collage des spires	Kleben (Folie)	Incollaggio delle spire	Pegado de espiras
Storage	Stockage	Lagerung	Stoccaggio	Almacenamiento
Straightening	Dressage	Richten	Doppio rinvenimento	Enderezado
Straightness	Rectitude	Geradheit	Rettilinearità	Rectitud
Strain	Déformation	Verformung	Difetto	Deformación en caliente
Strain hardened temper	Etat écroui	Kaltverfestigter Zustand	Stato crudo	Endurecido en frío
Strain hardening	Durcissement par écrouissage	Verfestigung	Duttilità	Endurecimiento por conformación en frío
Strain-hardening alloy	Alliage a durcissement par écrouissage	Kaltverfestigende Legierung	Lega incrudita per deformazione a freddo	Aleación endurecida por conformación en frío
Streak	Strie	Streifen, Zeile	Striatura	Estria
Stress	Contrainte	Spannung	Sollecitazione	Tension
Stress corrosion	Corrosion sous contrainte	Spannungsrißkorrosion	Corrosione per punti	Corrosion bajo tension
Stress relieving	Détensionnement	Spannungsarm recken	Desensibilizzazione	Desensionado
Stretching	Traction	Recken, Reckrichten	Trazione	Traccion
Surface condition	Etat de surface	Oberflächenbeschaffenheit	Aspetto superficiale	Estado superficial
Surface milling	Surfaçage	Fräsung	Rettifica	Mecanizado superficial
Surface roughness	Rugosité superficielle	Oberflächenrauheit	Rugosità superficiale	Rugosidad superficial
Surface treatment	Traitement de surface	Oberflächenbehandlung	Trattamento di superficie	Tratamiento superficial
Swarf	Copeau	Span	Truciolo	Virutas
Temper	Etat (métallurgique)	Werkstoffzustand	Stato (metallurgico)	Estado (metalurgico)
Tensile strength	Résistance a la traction	Zugfestigkeit	Resistenza a trazione	Resistencia a la tracción
Tensile test	Essai de traction	Zugversuch	Prova di trazione	Ensayo de tracción
Tension levelling	Planage sous tension	Bandrecken, Reckbiegerichten	Spianatura sotto tensione	Aplanado bajo tension
Test	Essai	Prüfung	Prova	Ensayo
Test piece	Eprouvette	Probe	Provetta	Probeta
Texture	Texture	Textur	Struttura metallurgica	Textura
Thermal conductivity	Conductivité thermique	Wärmeleitfähigkeit	Conduktività termica	Conductividad termica
Thickness	Epaisseur	Wanddicke	Spessore	Espesor
Three quarter hard temper	Etat trois quarts-dur	Dreiviertelhart-Zustand	Stato tre quarti duro	Estado tres cuarto duro
Tolerance	Tolérance	Toleranz, Grenzmaß	Tolleranza	Tolerancia
Tool	Outilage	Werkzeug	Attrezzatura	Utillaje
Tooling plate	Tôle pour usinage	Werkzeugplatte	Lastra per lavorazione	Chapa para mecanizar
Torsion	Torsion	Torsion	Torsione	Torsion
Transverse direction	Sens travers	Querrichtung	Senso trasversale	Dirección transversal
Tread plate	Tôle relief	Warzenblech, Trittbloch	Lastra mandorlata	Chapa relieve
Tube	Tube	Rohr	Tubo	Tubo
Twist	Vrillage	Verwindung	Eccesso di torsione	Torsion

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English	French	German	Italian	Spanish
Ultimate tensile strength	Charge de rupture	Zugfestigkeit	Carico di rottura	Carga de rotura
Ultrasonic test	Contrôle ultra-sons	Ultraschallprüfung	Controllo ultra-suoni	Control ultra sonido
Under-ageing	Sous revenu	Unteralterung	Sottorinvenimento	Subvenido
Water stain	Corrosion lors du stockage	Wasserflecken	Corrosione intergranulare	Corrosion durante el stock
Water staining	Temissement	Trübung	Annerimento	Deslucimiento
Weathering	Corrosion atmosphérique	Atmosphärische Korrosion	Corrosione atmosferica	Corrosion atmosférica
Weldability	Soudabilité	Schweißbarkeit	Saldabilità	Soldabilidad
Welded tube	Tube soudé	Längsnahtgeschweißtes Rohr	Tube saldato	Tubo soldado
Welding	Soudage	Schweißen	Saldatura	Soldadura
Welding wire, Filler wire	Fil d'apport	Schweißdraht	Filo d'apporto	Hilo de aportacion
Wettability	Mouillabilité	Benetzbarkeit	Bagnabilità	Humedabilidad
Wide coil	Bande large	Breitband	Nastro argo	Banda ancha
Width	Largeur	Breite	Larghezza	Ancho
Wire	Fil	Draht	Filo	Hilo para remaches
Work hardening	Corroyage	Verschmiedungsgrad	Corrosione durante lo stoccaggio	Fresado
Workability	Aptitude à la transformation	Verarbeitbarkeit	Lavorabilità	Aptitud a lo transformacion
Working	Transformation	Umformung	Trasformazione	Transformacion
Wrought alloy	Alliage de corroyage	Knetlegierung	Lega da trasformazione plastica	Aieacion die fresado
Wrought product	Produit corroyé	Kneterzeugnis	Prodotto lavorato	Producto modelado
Yield strength	Limite opparente d'élasticité	Streckgrenze	Limite di elasticità apparente	Limite elastico aparente

Appendix E : Conversion Factors & Units

INTRODUCTION

The conversion factors listed here have been used throughout the book. Data originally supplied in a variety of metric and imperial units has been presented in a standardised set of units based on the *Système Internationale d'Unités* (S.I.), taking into account the differences between UK and US quantities. Multiple units and prefixes are also given.

REFERENCE

D. R. Lide (Editor-in-Chief)

Handbook of Chemistry and Physics - A Ready-reference Book of Chemical & Physical Data

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CONVERSION FACTORS

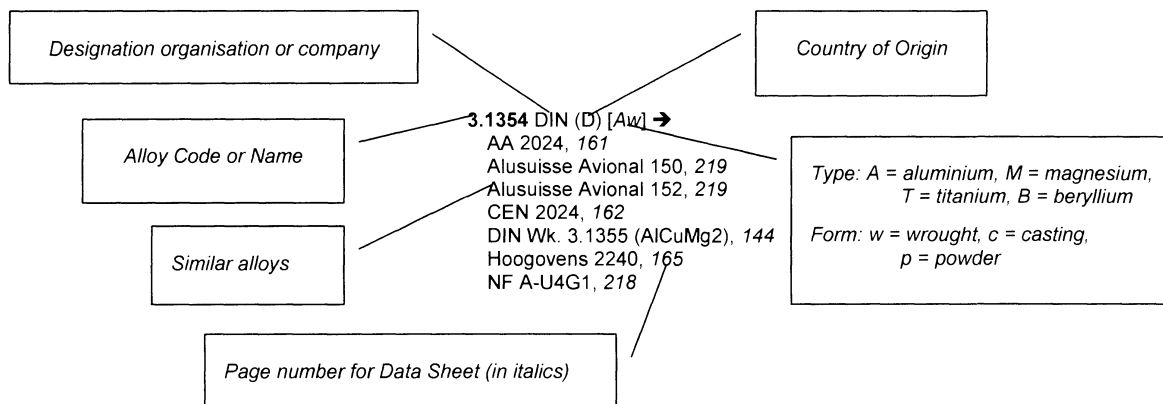
B ⇨ A	A	B	A ⇨ B
Multiply by:			Multiply by:
1.019716 x 10 ⁻⁵	Atmosphere (At.)	Pascal (Pa, N.m ⁻²)	98066.5
0.980665	Bar	Atmosphere (At.)	1.019716
1 x 10 ⁻⁵	Bar	Pascal (Pa, N.m ⁻²)	1 x 10 ⁵
0.577790874	BTU/(hr.ft ² .°F)/ft	Watt/metre.°C (W.m ⁻¹ .°C ⁻¹)	1.73073
6.9334664	BTU/(hr.ft ² .°F)/in	Watt/metre.°C (W.m ⁻¹ .°C ⁻¹)	0.144228
0.0023884	Cal/sec.cm.°C	Watt/metre.°C (W.m ⁻¹ .°C ⁻¹)	418.68
1000	Centipoise (cp)	Pascal second (Pa·s)	0.001
0.03531467	Cubic foot (cu.ft)	Litre (l)	28.316847
0.06102374	Cubic inch (cu.in)	Cubic centimetre (cc, cm ³ , ml, millilitre)	16.387064
[B - 273.16]	Degrees Centigrade (°C)	Degrees Kelvin (K)	[A + 273.16]
[((B x 9) / 5) + 32]	Degrees Fahrenheit (°F)	Degrees centigrade (°C)	[((A - 32) x 5) / 9]
3.2808399	Foot (ft,')	Meter (m)	0.3048
0.737561033	Foot pound (ft.lb)	Joule (J)	1.35582
29.037836	Foot pound per inch (ft.lb/in)	Newton metre/metre (N.m.m ⁻¹)	0.034437828
0.3937008	Inch (in,")	Centimetre (cm)	2.54
10.19716213	Kilogram centimetre (kg.cm)	Newton metre (N.m)	0.0980665
10.19716213	Kilogram per square centimetre (kg/cm ²)	Megapascal (MPa)	0.0980665
39.37008	Mil (thou, 0.001 inch)	Millimetre	0.0254
1	Newton meter (Nm)	Joule (J)	1
1	Newton per square millimetre (N.mm ⁻²)	Megapascal (MPa)	1
0.035273962	Ounce (oz)	Gram (g)	28.349523
0.8326742	Pint {UK}	Pint {USA Liq.}	1.200950
1.759754	Pint {UK}	Litre (l)	0.56826125
2.113376	Pint {USA Liq.}	Litre (l)	0.4731765
2.2046226	Pound (lb)	Kilogram (kg)	0.45359237
0.224809	Pound force (lb)	Newton (N)	4.44822
1.45038 x 10 ⁻⁴	Pound force/square inch (psi)	Pascal (Pa, N.m ⁻²)	6894.76
0.06242796	Pounds per cubic foot (lb/cu.ft)	Kilograms per cubic meter (kg.m ⁻³)	16.01846
0.204816044	Pounds force per square foot (lb.ft ⁻²)	Kilogram per square metre (kg.m ⁻²)	4.88243
0.005710141	Pound force/linear inch (PLI, lb.in ⁻¹)	Newton/metre (N.m ⁻¹)	175.127
0.005710141	Pound force/linear inch (PLI, lb.in ⁻¹)	Newton/millimetre (N.mm ⁻¹)	0.175127
10.76391	Square foot (sq.ft)	Square meter (m ²)	0.09290304
1.550003	Square inch (sq.in)	Square centimetre (sq.cm, cm ²)	6.4516
0.145038	Thousand pound force/square inch (ksi)	Megapascal (MPa)	6.89476
0.06474881	Tons force per square inch (tsi)	Megapascal (MPa)	15.4443
1.093613298	Yard (yd)	Meter (m)	0.9144

MULTIPLE UNITS

Multiple	Prefix	Symbol	Multiple	Prefix	Symbol
10 ⁻¹	deci	d	10	deca	da
10 ⁻²	centi	c	10 ²	hecto	h
10 ⁻³	milli	m	10 ³	kilo	k
10 ⁻⁶	micro	μ	10 ⁶	mega	M
10 ⁻⁹	nano	n	10 ⁹	giga	G
10 ⁻¹²	pico	p	10 ¹²	tera	T
10 ⁻¹⁵	femto	f	10 ¹⁵	peta	P
10 ⁻¹⁸	atto	a	10 ¹⁸	exa	E

ALLOY CROSS-REFERENCE LISTING

This listing shows similar and equivalent alloys for approximately 7000 light alloy designations. It contains all of the metals and alloys listed under the **Similar/Equivalent Alloys** heading in the alloy data section. Each entry gives references and page numbers (*Italic*) for a number of other related alloys which have specific data entries in this book. Some of the alloys have duplicate entries under variants of their designations for ease of reference (e.g. BS TA1 appears both as stated and as TA1). This is **not** a guaranteed alloy equivalence listing and should be treated with caution. It has been compiled from a number of standard sources, together with information from commercial alloy suppliers.



- 1A (UK) [Aw] →**
AA 1080A, 153
Alusuisse Pure Aluminium 99.8, 227
CEN 1080A, 153
DIN Al 99.8, 210
DIN Wk. 3.0285 (Al99.8), 143
- 1B (UK) [Aw] →**
AA 1050, 151
AA 1050A, 152
Alusingen 134, 149
Alusuisse Pure Aluminium 99.5, 227
CEN 1050A, 152
DIN Al 99.5, 210
DIN Wk. 3.0255 (Al99.5), 143
Hoogovens 1000, 151
NF A-5, 210
NF A-5L, 210
VAW 99/52, 149
- 1C (UK) [Aw] →**
AA 1200, 156
AA 8079, 209
Alusuisse Pure Aluminium 99.0, 226
CEN 1200, 156
DIN Al 99, 210
Hoogovens 1010, 151
Lawson Mardon (LM) Star 1201, 156
VAW 99/00, 149
VAW 99/01, 149
- 1E (UK) [Aw] →**
AA 1350, 157
Alusuisse Pure Aluminium 99.5 E, 227
CEN 1350, 157
DIN E-Al, 220
Hoogovens 1001, 151
- 2L55 (UK) [Aw] →**
AA 5052, 177
Alusuisse Peraluman 253, 224
CEN 5052, 177
DIN Wk. 3.3523 (AlMg2.5), 146
Hoogovens 5520, 185
VAW 63/52, 148
- 2L56 (UK) [Aw] →**
AA 5052, 177
Alusuisse Peraluman 253, 224
CEN 5052, 177
DIN Wk. 3.3523 (AlMg2.5), 146
Hoogovens 5520, 185
VAW 63/52, 148
- 2L58 (UK) [Aw] →**
AA 5056, 177
- 2L77 (UK) [Aw] →**
AA 2014, 159
AA 2014A, 160
Alusuisse Avional-660/662, 219
CEN 2014, 160
Hoogovens 2140, 164
- 2L84 (UK) [Aw] →**
AA 6066, 193
- 2L87 (UK) [Aw] →**
AA 2014, 159
AA 2014A, 160
Alusuisse Avional-660/662, 219
CEN 2014, 160
Hoogovens 2140, 164
- 2L91 (UK) [Ac] →**
VAW Veral Cu4Ti, 291
- 2L92 (UK) [Ac] →**
VAW Veral Cu4Ti, 291
- 2L93 (UK) [Aw] →**
AA 2014, 159
AA 2014A, 160
Alusuisse Avional-660/662, 219
CEN 2014, 160
Hoogovens 2140, 164
- 2L95 (UK) [Aw] →**
AA 7075, 203
Alusuisse Perunal 215, 226
CEN 7075, 204
DIN Wk. 3.4365 (AlZnMgCu1.5), 147
Hoogovens 7750, 207
- 2L97 (UK) [Aw] →**
AA 2024, 161
Alusuisse Avional 150, 219
Alusuisse Avional 152, 219
CEN 2024, 162
DIN Wk. 3.1355 (AlCuMg2), 144
Hoogovens 2240, 165
NF A-U4G1, 218
- 2L98 (UK) [Aw] →**
AA 2024, 161
Alusuisse Avional 150, 219
Alusuisse Avional 152, 219
CEN 2024, 162
DIN Wk. 3.1355 (AlCuMg2), 144
Hoogovens 2240, 165
NF A-U4G1, 218
- 2L99 (UK) [Ac] →**
AA 356.0, 239
- 2L121 (UK) [Mw] →**
ASTM AZ80A, 302
BS 2L121, 297
CEN MG-P-61, 311
DIN 3.5812, 297
Magnesium Elektron AZ80, 302
NF G-A7Z1, 306
NF G-A8Z, 306
- 2L122 (UK) [Mw] →**
ASTM AZ80A, 302
BS 2L121, 297
CEN MG-P-61, 311
DIN 3.5812, 297
Magnesium Elektron AZ80, 302
NF G-A7Z1, 306
NF G-A8Z, 306
- 2L126 (UK) [Mc] →**
AECMA MG-C-91, 311
ASTM EZ33A, 306
BS MAG6, 310
DIN Wk. 3.5103, 297
Magnesium Elektron EZ33, 304
- 2L127 (UK) [Mc] →**
ASTM ZK51A, 314
BS MAG4, 310
- 2L128 (UK) [Mc] →**
AECMA MG-C-43, 311
ASTM ZE41A, 314
BS MAG5, 310
DIN Wk. 3.5101, 297
Magnesium Elektron ZE41, 305
NF G-Z4TR, 306
- 2L503 (UK) [Mw] →**
AECMA MG-P-63, 311
ASTM AZ61A, 301
BS MAG-E-121M, 308
BS MAG-x-121, 308
DIN 3.5612, 297
Magnesium Elektron AZ61, 301
NF G-A6Z1, 306
- 2L504 (UK) [Mw] →**
BS MAG-x-151, 309
- 2L505 (UK) [Mw] →**
AECMA MG-P-43, 311
BS MAG-x-151, 309
Magnesium Elektron ZW3, 315

428 Alloy Cross-Reference Listing

- 2L508 (UK) [Mw] →**
BS MAG-x-141, 309
- 2L509 (UK) [Mw] →**
BS MAG-x-141, 309
- 2L512 (UK) [Mw] →**
BS MAG-x-121, 308
- 2L513 (UK) [Mw] →**
BS MAG-x-121, 308
- 2L514 (UK) [Mw] →**
BS MAG-x-151, 309
- 2L515 (UK) [Mw] →**
BS MAG-x-141, 309
- 2TA1 (UK) [Tw] →**
BS 2TA1, 317
CEN Ti P99001, 341
Timetal 35A, 322
- 2TA2 (UK) [Tc] →**
NF T 40, 336
Timetal 50A, 323
- 2TA2 (UK) [Tw] →**
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- 2TA3 (UK) [Tc] →**
NF T 40, 336
Timetal 50A, 323
- 2TA3 (UK) [Tw] →**
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- 2TA4 (UK) [Tc] →**
NF T 40, 336
Timetal 50A, 323
- 2TA4 (UK) [Tw] →**
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- 2TA5 (UK) [Tc] →**
NF T 40, 336
Timetal 50A, 323
- 2TA5 (UK) [Tw] →**
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- 2TA6 (UK) [Tw] →**
ASTM Grade 4, 332
CEN Ti P99003, 341
Deutsche Titan Tikrutan RT 20, 343
DIN Wk. 3.7065, 318
Timetal 75A, 323
- 2TA7 (UK) [Tcw] →**
ASTM Grade 4, 333
Timetal 100A, 323
- 2TA8 (UK) [Tcw] →**
ASTM Grade 4, 333
Timetal 100A, 323
- 2TA9 (UK) [Tcw] →**
ASTM Grade 4, 333
Timetal 100A, 323
- 2TA10 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF TA6V, 336
NF Ti P64001, 340
Timetal 6-4, 321
- 2TA11 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF TA6V, 336
NF Ti P64001, 340
Timetal 6-4, 321
- 2TA12 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF TA6V, 336
NF Ti P64001, 340
Timetal 6-4, 321
- 2TA13 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF TA6V, 336
NF Ti P64001, 340
Timetal 6-4, 321
- 2TA21 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA22 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA23 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA24 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA28 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF TA6V, 336
NF Ti P64001, 340
Timetal 6-4, 321
- 2TA52 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA53 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA54 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA55 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 2TA58 (UK) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- 3-2.5 (Prop.) [Tw] →**
Ti-3Al-2.5V, 337
- 3.0205 DIN (D) [Aw] →**
AA 1200, 156
Aluisse Pure Aluminium 99.0, 226
CEN 1200, 156
DIN Al 99, 210
Hoogovens 1010, 151
Lawson Mardon (LM) Star 1201, 156
VAW 99/00, 149
VAW 99/01, 149
Hoogovens 1000, 151
VAW 99/52, 149
- 3.0255 (Al99.5) DIN (D) [Aw] →**
AA 1050, 151
AA 1050A, 152
AA 1350, 157
Alusingen 134, 149
Aluisse Pure Aluminium 99.5 E, 227
Aluisse Pure Aluminium 99.5, 227
CEN 1050A, 152
CEN 1350, 157
DIN Al 99.5, 210
DIN Wk. 3.0255 (Al99.5), 143
Hoogovens 1001, 151
NF A-5, 210
NF A-5L, 210

- 3.0257 DIN (D) [Aw] →**
AA 1350A, 157
DIN E-Al, 220
DIN Wk. 3.0257 (E-Al), 143
- 3.0275 DIN (D) [Aw] →**
AA 1070, 152
AA 1070A, 153
AA 1080A, 153
AA 1175, 155
Alunord 1370-70, 158
Alusingen 111, 149
Alusuisse Pure Aluminium 99.8, 227
CEN 1070A, 153
CEN 1080A, 153
DIN Al 99.7, 210
DIN Al 99.8, 210
DIN Wk. 3.0285 (Al99.8), 143
Hoogovens 1070, 153
- 3.0285 DIN (D) [Aw] →**
AA 1080A, 153
AA 1175, 155
Alusingen 111, 149
Alusuisse Pure Aluminium 99.8, 227
CEN 1080A, 153
DIN Al 99.8, 210
DIN Wk. 3.0285 (Al99.8), 143
- 3.0305 (Al99.9) DIN (D) [Aw] →**
AA 1090, 154
Alusingen 119, 149
Alusuisse Pure Aluminium 99.9, 227
CEN 1090, 154
DIN Al 99.9, 211
DIN Wk. 3.0305 (Al99.9), 143
- 3.0505 DIN (D) [Aw] →**
AA 3105, 170
CEN 3105, 170
VAW 61/10, 148
- 3.0515 DIN (D) [Aw] →**
AA 3003, 166
AA 3103, 169
Alusuisse Aluman 100, 213
CEN 3003, 167
CEN 3103, 169
DIN Al Mn1, 213
Hoogovens 3000, 166
Hoogovens 3530, 170
Lawson Mardon (LM) Star 3103, 169
NF 3003, 167
Reynolds Tread-Brite, 228
VAW 41/20, 148
- 3.0517 DIN (D) [Aw] →**
AA 3003, 166
Alusuisse Aluman 100, 213
CEN 3003, 167
DIN Al Mn Cu, 213
Hoogovens 3530, 170
Lawson Mardon (LM) Star 3103, 169
NF 3003, 167
Reynolds Tread-Brite, 228
VAW 41/20, 148
- 3.0525 DIN (D) [Aw] →**
AA 3005 Alclad, 168
Hoogovens 3560 Clad, 171
- 3.0526 DIN (D) [Aw] →**
AA 3004, 167
CEN 3004, 167
Hoogovens 3540, 171
Hoogovens 3541, 171
VAW 61/03, 148
- 3.0615 DIN (D) [Aw] →**
AA 6012, 189
AA 6018, 190
Alusuisse Anticorodal Pb-107, 217
Alusuisse Anticorodal Pb-109, 217
CEN 6012, 189
- 3.0915 (AlFeSi) DIN (D) [Aw] →**
AA 8011A, 207
CEN 8011A, 208
DIN Wk. 3.0915 (AlFeSi), 144
- 3.1254 DIN (D) [Aw] →**
AA 2014, 159
Alusuisse Avional-660/662, 219
CEN 2014, 160
DIN Wk. 3.1255 (AlCuSiMn), 144
Hoogovens 2140, 164
- 3.1255 DIN (D) [Aw] →**
AA 2014, 159
AA 2014A, 160
Alusuisse Avional-660/662, 219
CEN 2014, 160
Hoogovens 2140, 164
- 3.1305 DIN (D) [Aw] →**
AA 2117, 164
DIN Wk. 3.1305 (AlCu2.5Mg0.5), 144
- 3.1324 DIN (D) [Aw] →**
AA 2017, 160
Hoogovens 2170, 164
- 3.1325 DIN (D) [Aw] →**
AA 2017A, 161
Alusuisse Avional 100, 218
Alusuisse Avional-102, 218
CEN 2017A, 161
DIN Wk. 3.1325 (AlCuMg1), 144
NF A-U4G, 218
- 3.1354 DIN (D) [Aw] →**
AA 2024, 161
Alusuisse Avional 150, 219
Alusuisse Avional 152, 219
CEN 2024, 162
DIN Wk. 3.1355 (AlCuMg2), 144
Hoogovens 2240, 165
NF A-U4G1, 218
- 3.1355 DIN (D) [Aw] →**
AA 2024, 161
Alusuisse Avional 150, 219
Alusuisse Avional 152, 219
CEN 2024, 162
DIN Wk. 3.1355 (AlCuMg2), 144
Hoogovens 2240, 165
NF A-U4G1, 218
- 3.1371 DIN (D) [Ac] →**
AA 204.2, 234
AA 295.0, 235
VAW Veral Cu4TiMg, 291
- 3.1372 DIN (D) [Ac] →**
AA 204.2, 234
DIN GB-AlCu4TiMg, 282
VAW Veral Cu4TiMg, 291
- 3.1645 DIN (D) [Aw] →**
AA 2007, 158
AA 2030, 162
Alusuisse Avional Pb-118, 219
CEN 2030, 162
NF A-U4PB, 218
- 3.1655 DIN (D) [Aw] →**
AA 2011, 159
Alusuisse Decoltal 500, 220
CEN 2011, 159
DIN Wk. 3.1855 (AlCuBiPb), 145
- 3.1841 DIN (D) [Ac] →**
VAW Veral Cu4Ti, 291
- 3.1842 DIN (D) [Ac] →**
DIN GB-AlCu4Ti, 282
VAW Veral Cu4Ti, 291
- 3.1924 DIN (D) [Aw] →**
AA 2618, 165
AA 2618A, 166
CEN 2618A, 166
NF A-U2GN, 218
- 3.2151 DIN (D) [Ac] →**
AA 319.0, 237
AA A319.1, 262
VAW Veral 225, 290
- 3.2155 DIN (D) [Ac] →**
AA A319.1, 262
DIN GB-AISI6Cu4, 283
VAW Veral 225, 290
- 3.2161 DIN (D) [Ac] →**
AA 333.0, 237
AA 380.0, 240
- 3.2163 DIN (D) [Ac] →**
AA 333.1, 238
AA B380.1, 276
VAW Veral 226(D), 290
VAW Veral 226A, 290
- 3.2165 DIN (D) [Ac] →**
AA 333.1, 238
DIN GB-AISI9Cu3, 283
- 3.2166 DIN (D) [Ac] →**
AA B380.1, 276
DIN GBD-AISI9Cu3, 284
VAW Veral 226(D), 290
VAW Veral 226A, 290
- 3.2211 DIN (D) [Ac] →**
AA 369.1, 240
AA A413.2, 263
BS LM6, 285
VAW Silumin, 288
VAW Silumin-Kappa, 289
- 3.2212 DIN (D) [Ac] →**
AA 369.1, 240
AA A413.2, 263
BS LM6, 285
DIN GB-AISI11, 283
VAW Silumin, 288
VAW Silumin-Kappa, 289
- 3.2245 DIN (D) [Aw] →**
AA 4043, 172
- 3.2305 (AlMgSi) DIN (D) [Aw] →**
AA 6101A, 196
DIN Wk. 3.2305 (AlMgSi), 145
- 3.2307 DIN (D) [Aw] →**
AA 6101, 196
AA 6463, 198
CEN 6101, 196
DIN Al 99.85 Mg Si, 211
DIN Al 99.85 Mg Si0.4, 211
- 3.2315 DIN (D) [Aw] →**
AA 6082, 194
Alusuisse Anticorodal 110/112, 217
Alusuisse Anticorodal 112/114, 217
Alusuisse Anticorodal-100/105, 216
BOAL UK AM68, 215
CEN 6082, 195
DIN Al Mg Si1, 213
DIN Wk. 3.2315 (AlMgSi1), 145
Hoogovens 6010, 189
NF A-SGM0.7, 218
- 3.2316 DIN (D) [Aw] →**
AA 6005, 188
Alunord 6081-11, 194
- 3.2331 DIN (D) [Ac] →**
DIN GB-AISI10Mg, 283
VAW Veral Si10MgA, 293
- 3.2332 DIN (D) [Ac] →**
AA 361.1, 239
DIN GB-AISI10Mg(Cu), 283
VAW Veral 233, 290
- 3.2333 DIN (D) [Ac] →**
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- 13 Old AA (USA) [Ac] →**
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- 43 (0.15 Cu max.) Old AA (USA) [Ac] →**
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- 296.0** AA (USA) [Ac] →
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- 322.1** AA (USA) [Ac] →
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- 333** Old AA (USA) [Ac] →
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- 333.0** AA (USA) [Ac] →
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- 333.1** AA (USA) [Ac] →
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AA 354.1, 238
- 354.0** AA (USA) [Ac] →
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- 354.1** AA (USA) [Ac] →
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- 355** Old AA (USA) [Ac] →
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- 356.0 A** AA (USA) [Ac] →
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- 356.2 A** AA (USA) [Ac] →
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- 357** Old AA (USA) [Ac] →
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- 357.0** AA (USA) [Ac] →
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- 357.0 A** AA (USA) [Ac] →
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- 359** Old AA (USA) [Ac] →
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- BS 2TA28 (UK) [Tcw] →**
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- BS 2TA52 (UK) [Tw] →**
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DIN LW 3.7124, 319
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- BS 2TA53 (UK) [Tw] →**
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DIN LW 3.7124, 319
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- BS 2TA55 (UK) [Tw] →**
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DIN LW 3.7124, 319
NF T-U2, 344
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- BS 2TA58 (UK) [Tw] →**
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- BS 3L63 (UK) [Aw] →**
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- BS 3L86 (UK) [Aw] →**
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- BS 3L124 (UK) [Mc] →**
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- BS 3L125 (UK) [Mc] →**
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- BS 4L34 (UK) [Aw] →**
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- BS 5L36 (UK) [Aw] →**
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Alusuisse Pure Aluminium 99.5, 227
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DIN Wk. 3.0255 (Al99.5), 143
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- BS 5L37 (UK) [Aw] →**
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- BS 6L17 (UK) [Aw] →**
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- BS 3370 MAG-S-1310/M (UK) [Mw] →**
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- BS 3371 MAG-E-101M (UK) [Mw] →**
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- BS 3371 MAG-T-121M (UK) [Mw] →**
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- BS 3372 MAG-E-151M (UK) [Mw] →**
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- BS 3372 MAG-F-121 (UK) [Mw] →**
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- BS 3372 MAG-F-151M (UK) [Mw] →**
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- BS 3372 MAG-S-151 (UK) [Mw] →**
Magnesium Elektron ZW3, 315
- BS 3373 MAG-151M (UK) [Mw] →**
Magnesium Elektron ZW3, 315
- BS 3373 MAG-E-111M (UK) [Mw] →**
Comeca AZ31B, 301
Magnesium Elektron AZ31, 300
- BS 3373 MAG-E-121M (UK) [Mw] →**
AECMA MG-P-63, 311
ASTM AZ61A, 301
BS MAG-E-121M, 308
DIN 3.5612, 297
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NF G-A6Z1, 306
- BS 3373 MAG-E-131M (UK) [Mw] →**
Magnesium Elektron ZM21, 305
- BS 3373 MAG-E-151M (UK) [Mw] →**
Magnesium Elektron ZW3, 315
- BS 3373 MAG-F-131M (UK) [Mw] →**
Magnesium Elektron ZM21, 305
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Magnesium Elektron ZW3, 315
- BS 3373 MAG-S-151 (UK) [Mw] →**
Magnesium Elektron ZW3, 315
- BS 3373 MAG-T-101M (UK) [Mw] →**
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- BS FC1 (UK) [Aw] →**
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DIN Wk. 3.1855 (AlCuBiPb), 145
- BS G1B (UK) [Aw] →**
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- BS G1E (UK) [Aw] →**
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- BS H20 (UK) [Aw] →**
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- BS L117 (UK) [Aw] →**
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- BS L512 (UK) [Mw] →**
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- BS L513 (UK) [Mw] →**
AECMA MG-P-63, 311
ASTM AZ61A, 301
BS MAG-E-121M, 308
DIN 3.5612, 297
Magnesium Elektron AZ61, 301
Magnesium Elektron AZM, 304
NF G-A6Z1, 306
- BS L514 (UK) [Mw] →**
AECMA MG-P-43, 311
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- BS TA5 (UK) [Tw]** →
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- BS TA20 (UK) [Tw]** →
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DIN Wk. 3.7155, 319
IMI 685, 325
NF T-A6Zr5D, 337
Timetal 685, 325
- BS TA45 (UK) [Tw]** →
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Titanium Industries Ti-4-4-2.5 (550), 338
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Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
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Titanium Industries Ti-4-4-2.5 (550), 338
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NF TA 4DE, 336
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Titanium Industries Ti-4-4-2.5 (550), 338
- BS TA49 (UK) [Tw]** →
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Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
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NF TA 4DE, 336
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- BS TA50 (UK) [Tw]** →
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Deutsche Titan Tikrutan LT 34, 342
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NF TA 4DE, 336
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Titanium Industries Ti-4-4-2.5 (550), 338
- BS TA51 (UK) [Tw]** →
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Deutsche Titan Tikrutan LT 34, 342
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Timetal 550, 324
Titanium Industries Ti-4-4-2.5 (550), 338
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BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
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NF TA6V, 336
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Timetal 6-4, 321
Titanium Industries GR-5, 331
- BS TA57 (UK) [Tw]** →
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NF G-A6Z1, 306
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- Mag. Elek W15 (welding rod)** (Prop.) [Mw] →
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- Mag. Elek ZC63** (Prop.) [Mc] →
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- MgAl6Zn** DIN (D) [Mw] →
AECMA MG-P-63, 311
ASTM AZ61A, 301
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ASTM AM60, 299
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ASTM AZ80A, 302
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- MgAl8Zn1** DIN (D) [Mc] →
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Timetal 679, 325
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- TA 25 (UK) [Tw] →**
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BS TA18, 337
BS TA20, 337
IMI 679, 325
Timetal 679, 325
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Timetal 685, 325
- TA 44 (UK) [Tw] →**
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DIN Wk. 3.7155, 319
IMI 685, 325
NF T-A6Zr5D, 337
Timetal 685, 325
- TA 45 (UK) [Tw] →**
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Titanium Industries Ti-4-4-2.5 (550), 338
- TA 48 (UK) [Tw] →**
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- TA 50 (UK) [Tw] →**
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Deutsche Titan Tikrutan LT 34, 342
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- TA 56 (UK) [Tcw] →**
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- TA 57 (UK) [Tw] →**
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Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
NF TA 4DE, 336
Timetal 550, 324
Titanium Industries Ti-4-4-2.5 (550), 338
- TA 59 (UK) [Tcw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
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- Ti 1 Pd DIN (D) [Tw] →**
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DIN Wk. 3.7225, 320
- Ti 2 DIN (D) [Tw] →**
Deutsche Titan Tikrutan RT 15, 343
DIN Wk. 3.7035, 318
- Ti 2 Pd DIN (D) [Tw] →**
Deutsche Titan Tikrutan RT 15 Pd, 343
DIN Wk. 3.7235, 321
- Ti 3 DIN (D) [Tw] →**
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NF TA6V, 336
Timetal 6-4, 321
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ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- Ti 550 (Prop.) [Tw] →**
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Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
NF TA 4DE, 336
Timetal 550, 324
- Ti-6242 [Tw] →**
Timetal 6-2-4-2, 321
- TiAl4Mo4Sn2Si DIN (D) [Tw] →**
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DIN Wk. 3.7185, 320
- TiAl5Fe2.5 DIN (D) [Tw] →**
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DIN Wk. 3.7145, 319
- TiAl6V4 DIN (D) [Tcw] →**
NF TA6V, 336
Timetal 6-4, 321
- TiAl6V4 DIN (D) [Tw] →**
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BS 2TA10, 317
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DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- TiAl6V6Sn2 DIN (D) [Tw] →**
Deutsche Titan Tikrutan LT 33, 342
DIN Wk. 3.7175, 320
- TiAl6Zr5Mo0.5Si DIN (D) [Tw] →**
Deutsche Titan Tikrutan LT 26, 341
DIN Wk. 3.7155, 319
- Ti-C63 AECMA (EUR) [Tcw] →**
NF TA6V, 336
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- Ti-C63 AECMA (EUR) [Tw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- TiCu2 DIN (D) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
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- Tikrutan LT 24 (Prop.) [Tw] →**
DIN Wk. 3.7145, 319
- Tikrutan LT 25 (Prop.) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- Tikrutan LT 26 (Prop.) [Tw] →**
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- Tikrutan LT 31 (Prop.) [Tw] →**
DIN Wk. 3.7165, 320
- Tikrutan LT 33 (Prop.) [Tw] →**
DIN Wk. 3.7175, 320
- Tikrutan LT 34 (Prop.) [Tw] →**
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
- Tikrutan LT 35 (Prop.) [Tw] →**
DIN Wk. 3.7110, 318
- Tikrutan RT 12 (Prop.) [Tw] →**
DIN Wk. 3.7025, 318
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DIN Wk. 3.7225, 320
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DIN Wk. 3.7255, 321
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DIN Wk. 3.7065, 318
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NF TA6V, 336
Timetal 6-4, 321
- Timetal 6-4** (Prop.) [Tw] →
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- Timetal 6-6-2** (Prop.) [Tw] →
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Deutsche Titan Tikrutan LT 33, 342
DIN LW 3.7174, 320
DIN Wk. 3.7175, 320
Timetal 6-6-2, 321
- Timetal 8-1-1** (Prop.) [Tw] →
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MIL R-81588, 334
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- Timetal 10-2-3** (Prop.) [Tw] →
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- Timetal 15-3** (Prop.) [Tw] →
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Timetal 15-3, 322
- Timetal 21S** (Prop.) [Tw] →
Timetal 21S, 322
- Timetal 35A** (Prop.) [Tw] →
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CEN Ti P99001, 341
Timetal 35A, 322
- Timetal 50A** (Prop.) [Tcw] →
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CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- Timetal 50A** (Prop.) [Tw] →
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NF T 40, 336
- Timetal 65A** (Prop.) [Tcw] →
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- Timetal 65A** (Prop.) [Tw] →
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Deutsche Titan Tikrutan RT 18, 343
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- Timetal 75A** (Prop.) [Tw] →
ASTM Grade 4, 332
CEN Ti P99003, 341
Deutsche Titan Tikrutan RT 20, 343
DIN Wk. 3.7065, 318
Timetal 75A, 323
- Timetal 100A** (Prop.) [Tcw] →
ASTM Grade 4, 333
Timetal 100A, 323
- Timetal 230** (Prop.) [Tw] →
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
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- Timetal 367** (Prop.) [Tw] →
IMI 367, 324
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Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
NF TA 4DE, 336
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- Timetal 551** (Prop.) [Tw] →
IMI 551, 324
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Timetal 679, 325
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DIN Wk. 3.7155, 319
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- TiNiMo083** DIN (D) [Tcw] →
Deutsche Titan Tikrutan LT 27, 342
DIN Wk. 3.7105, 318
- Ti P01** AECMA (EUR) [Tw] →
BS 2TA1, 317
CEN Ti P99001, 341
Deutsche Titan Tikrutan RT 12, 342
DIN Wk. 3.7025, 318
Timetal 35A, 322
- Ti P01** CEN (EUR) [Tw] →
DIN Wk. 3.7025, 318
- Ti P01** (UK) [Tw] →
BS 2TA1, 317
CEN Ti P99001, 341
Timetal 35A, 322
- Ti P02** AECMA (EUR) [Tc] →
NF T 40, 336
- Ti P02** AECMA (EUR) [Tcw] →
Timetal 50A, 323
- Ti P02** AECMA (EUR) [Tw] →
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
DIN Wk. 3.7035, 318
- Ti P02** CEN (EUR) [Tw] →
DIN Wk. 3.7035, 318
- Ti P04** AECMA (EUR) [Tw] →
ASTM Grade 4, 332
CEN Ti P99003, 341
Deutsche Titan Tikrutan RT 20, 343
DIN Wk. 3.7065, 318
Timetal 75A, 323
- Ti P11** AECMA (EUR) [Tw] →
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
NF T-U2, 344
Timetal 230, 324
- Ti P11** CEN (EUR) [Tw] →
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- Ti P62** AECMA (EUR) [Tw] →
AECMA Ti P62, 340
ASTM I7, 321
ASTM F7, 331
Crucible Steel Co. C130AM, 330
DTD 5053, 328
IMI 314A, 324
NF TA 5M, 336
- Ti-P63** AECMA (EUR) [Tcw] →
NF TA6V, 336
Timetal 6-4, 321
- Ti-P63** AECMA (EUR) [Tw] →
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- Ti P63** CEN (EUR) [Tcw] →
NF TA6V, 336
Timetal 6-4, 321
- Ti P63** CEN (EUR) [Tw] →
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW. 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340

- Ti P64 AECMA (EUR) [Tw] →**
AMS 4918, 327
Deutsche Titan Tikrutan LT 33, 342
DIN LW 3.7174, 320
DIN Wk. 3.7175, 320
Timetal 6-6-2, 321
- Ti P64 CEN (EUR) [Tw] →**
AMS 4918, 327
Deutsche Titan Tikrutan LT 33, 342
DIN LW 3.7174, 320
DIN Wk. 3.7175, 320
Timetal 6-6-2, 321
- Ti P65 AECMA (EUR) [Tcw] →**
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- Ti P65 AECMA (EUR) [Tw] →**
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ASTM Grade 6, 333
DIN Wk. 3.7115, 318
DTD 5083, 328
NF TA 5E, 336
- Ti P66 AECMA (EUR) [Tw] →**
AMS 4915, 327
MIL R-81588, 334
Timetal 8-1-1, 322
- Ti P67 AECMA (EUR) [Tw] →**
Deutsche Titan Tikrutan LT 26, 341
DIN Wk. 3.7155, 319
IMI 685, 325
NF T-A6Zr5D, 337
Timetal 685, 325
- Ti P67 CEN (EUR) [Tw] →**
Deutsche Titan Tikrutan LT 26, 341
DIN Wk. 3.7155, 319
IMI 685, 325
NF T-A6Zr5D, 337
Timetal 685, 325
- Ti P68 AECMA (EUR) [Tw] →**
BS TA45, 337
Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
NF TA 4DE, 336
Timetal 550, 324
- Ti P68 CEN (EUR) [Tw] →**
BS TA45, 337
Deutsche Titan Tikrutan LT 34, 342
DIN LW 3.7184, 320
DIN Wk. 3.7185, 320
- Ti P68 CEN (EUR) [Tw] →**
NF TA 4DE, 336
Timetal 550, 324
- Ti P69 AECMA (EUR) [Tw] →**
ASTM 3Al-2.5V, 321
ASTM Grade 9, 333
Timetal 3-2.5, 318
- Ti P69 CEN (EUR) [Tw] →**
ASTM 3Al-2.5V, 321
ASTM Grade 9, 333
Timetal 3-2.5, 318
- Ti P609 AECMA (EUR) [Tw] →**
ASTM 3Al-2.5V, 321
ASTM Grade 9, 333
Timetal 3-2.5, 318
- Ti P610 AECMA (EUR) [Tw] →**
Timetal 6-2-4-2, 321
Timetal 6-2-4-2, 321
- Ti P9001 AECMA (EUR) [Tw] →**
AECMA Ti P9001, 340
BS 2TA21, 317
Deutsche Titan Tikrutan LT 25, 341
DIN LW 3.7124, 319
NF T-U2, 344
Timetal 230, 324
- Ti P64001 AECMA (EUR) [Tcw] →**
NF TA6V, 336
Timetal 6-4, 321
- Ti P64001 AECMA (EUR) [Tw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- Ti P64001 NF (F) [Tcw] →**
NF TA6V, 336
Timetal 6-4, 321
- Ti P64001 NF (F) [Tw] →**
AMS 4905, 326
ASTM Grade 5, 333
BS 2TA10, 317
CEN Ti P63, 340
Deutsche Titan Tikrutan LT 31, 342
DIN LW 3.7164, 319
DIN Ti Al6 V4, 339
DIN Wk. 3.7165, 320
DTD 5163, 328
NF Ti P64001, 340
- Ti P99001 (UK) [Tw] →**
BS 2TA1, 317
CEN Ti P99001, 341
Timetal 35A, 322
- Ti P99001 AECMA (EUR) [Tw] →**
BS 2TA1, 317
CEN Ti P99001, 341
DIN Wk. 3.7025, 318
Timetal 35A, 322
- Ti P99001 CEN (EUR) [Tw] →**
BS 2TA1, 317
CEN Ti P99001, 341
Timetal 35A, 322
- Ti P99002 AECMA (EUR) [Tc] →**
NF T 40, 336
- Ti P99002 AECMA (EUR) [Tcw] →**
Timetal 50A, 323
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- Ti P99002 CEN (EUR) [Tc] →**
NF T 40, 336
- Ti P99002 CEN (EUR) [Tcw] →**
Timetal 50A, 323
- Ti P99002 CEN (EUR) [Tw] →**
ASTM Grade 2, 332
CEN Ti P99002, 341
Deutsche Titan Tikrutan RT 15, 343
- Ti P99003 AECMA (EUR) [Tw] →**
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COMMENTS & CONTRIBUTIONS FOR THE NEXT EDITION OF THE LIGHT ALLOYS DIRECTORY & DATA BOOK

Comments

We are very interested to know your comments and suggestions on the content and structure of this first edition of the book. Readership feed-back is an essential part of the revision process. Please use the form provided (next page) to contact the authors of this book – Thank you.

Contributions

To ensure that this publication remains up-to-date, we shall be revising its contents periodically. We welcome information from new companies, data on new products, changes to existing products or revised company information (address, telephone, fax, etc). **Inclusion is free.** It does not cost anything for your company's information to be included and it will not be sold on or used for marketing purposes. Please complete this form (print clearly) and send it with the new information.

We have contributed information for this edition of the book. We wish to notify you of:

- Change of name or address or telephone numbers.
- New products available.
- Products no longer available or replaced by new products.
- Products listed now have changed properties.
- Error in data (please specify precisely the nature of the error).

Please send **BY POST** full **TECHNICAL DATA SHEETS** on the properties and characteristics of light alloys.

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- Product name/code
- Composition
- Product forms: casting (ingot, cast method), wrought (state processing method, e.g. extruded, drawn, forged, etc).
- Similar/Equivalent alloys (within American, European and national systems, including aerospace or other industry-specific designation systems)
- Comments relating to the type, use and any particular features of the material.
- Typical mechanical properties (for product form and tempers available): Yield, proof, tensile strengths, modulus, hardness including any appropriate test method notes.

Send **BY POST** full **TECHNICAL DATA SHEETS** on the properties and characteristics of each product

- We are suppliers/distributors for (please state your company details and manufacturers' names, and send a letter-heading or business card)**
- COMPANY INFORMATION:** A list of updated contact addresses (with a contact name if possible), telephone, fax, telex, E-mail numbers for all subsidiaries/offices across the world. Also state Internet site addresses.
- PERMISSION** Please indicate your agreement to reproduce any data provided in the directory & data book.
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Please send this completed page with your contributions **by post** (not by fax) to:

**RJ Technical Consultants
Bois Moreau
F-17770 JUICQ
Charente Maritime
FRANCE**

All queries should be addressed to either Bob Hussey or Jo Wilson (Tel/Fax: +33 5 46 95 35 10). Sorry, we cannot accept information sent by fax as numerical data can often be difficult to read with any confidence.

Thank you for your cooperation and contributions

FAX

To: Bob Hussey/Jo Wilson RJ Technical Consultants Bois Moreau F-17770 Juicq France	From: Country:
Tel: +33 5 46 95 35 10 Fax: +33 5 46 95 35 10	Tel No: Fax No: E-mail:

Date:

Reader Feed-back on the 'Light Alloys Directory & Databook' published by Chapman & Hall

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