



RAYAN MOBADEL PISHRO

رایان مبدل پیشرو

Introduction to HVAC

Heating and Air-Conditioning systems are one of the main parts of mechanical facilities. The biggest application of refrigeration, which is in the cooling process, is used for air conditioning. In addition, refrigeration includes industrial refrigeration, which is widely used in chemical and petrochemical industries.

Air conditioning according to the standard defined by "American Society of Heating, Refrigerating and Air-Conditioning Engineers - ASHRAE" for comfort is: "The process of improving the air for the simultaneous control of temperature, humidity, cleanliness and its proper distribution in order to respond to the needs of the residents of the place that has been controlled". Therefore, air conditioning includes all heating operations as well as controlling temperature, moisture in the air (humidity), air movement speed, and air quality including removing foreign particles, vapors, and gases in it, and providing air from outside for ventilation.

Modern air conditioning is critical to almost every facet of advancing human activity. Although there have been great advances in HVAC, there are several areas where active research and debate continue:

- **Indoor Air Quality (IAQ)** is one that directly affects us. In many countries of the world there is a rapid rise in asthmatics and increasing dissatisfaction with indoor-air-quality in buildings and planes. The causes and effects are extremely complex. A significant scientific and engineering field has developed to investigate and address these issues.
- **Greenhouse Gas Emissions (GGE)** are concerns that are stimulating research. New legislation and guidelines are evolving that encourage: recycling; the use of new forms of energy; less energy usage; and low polluting materials, particularly refrigerants. All these issues have a significant impact on building design, including HVAC systems and the design codes.
- **Energy Conservation** is an ongoing challenge to find novel ways to reduce consumption in new and existing buildings without compromising comfort and indoor air quality. Energy conservation requires significant cooperation between disciplines.