

When a machine or a tool is made, the most suitable material must be chosen by considering its properties, which can be classified as mechanical, thermal, electrical and chemical. Some common non-ferrous alloys are brass (formed by mixing copper and zinc); bronze (formed by mixing copper and tin) and other aluminium alloy which are used in the aircraft industry. The main types of materials used in chemical engineering are metals, polymer materials, ceramics and composite materials. The most commonly used materials are metals, which can be divided into ferrous and non-ferrous. They can be used in their pure form or mixed with other elements. PVC or polyvinyl chloride is a type of plastic and is used to insulate wires and cables. Composite materials are made up of two or more materials combined to improve their mechanical properties. Because iron is soft and pasty it is not suitable to be used as a structural material, so a small amount of carbon is added to it to make steel alloy. Ceramic materials are good insulators: hard resistant and strong but brittle. In this second case we have an alloy which is used to improve some properties of the metals. The most commonly ferrous metals are iron and alloy which use iron. The most common non-ferrous metals used in machines are copper, zinc, tin and aluminium. Other examples of materials used in mechanical engineering are plastic and rubber. Rubber is a polymer and its best property is elasticity, as it returns to its original size and shape after deformation. Non ferrous metals contain little or no iron. Concrete is reinforced with steel and is used in building engineering.