Metals in general are insoluble in ordinary solvents (like water, alcohol, ether, benzene, etc.) However, a metal can dissolve in another metal in molten state forming a homogeneous liquid mixture, which on cooling solidifies to a solid mixture, called an alloy.

→ Alloys are formed not only by metals amongst themselves, but also by metal and non-metal. Thus, an alloy is a metallic, intimately mixed solid mixture of two or more different elements, one of which atleast is essentially a metal. Alloys containing mercury as the constituent element are called amalgams e.g. sodium-amalgam is an alloy of sodium and mercury.

→ Alloys are homogeneous in molten state, but they may or may not be homogeneous upon solidification. Hence an alloy in solid state may ~~or may not~~ be either homogeneous or heterogeneous.

Purpose of Making Alloys:

Pure metals, in general, possess a few useful physical properties (like high malleability, ductility, lustre, good electrical conductivity etc.) However, they are very soft and highly chemically reactive. The properties of a given metal can be improved by alloying it with some other metal/non-metal. Main purposes of making alloys are

(i) Hardness: Pure metals, which are generally soft can be made harder by alloying them with other metal/non-metal. For example, hardness of lead can be improved by alloying it with arsenic (0-5%), that it can be used for making bullets.

Uses of Muntz Brass: Used for making valve stems, marine fittings, condenser tubes, spring, chains, screw

(II) Special Brasses: contain metal(s) other than Cu and zinc.

(i) High tensile brass

Cu = 60%, Zn = 40%.

With small additions of Fe, Al, Sn, Mn and Ni

Characteristics: Very strong, hard and tough.

Uses: For making switch, gears, automobiles, marine propellers, shafts and high strength of fittings of all types.

(ii) German Silver

Cu = 50%, Zn = 20%, Ni = 30%.

Characteristics: It possess good strength and corrosion [illegible]. It is extremely ductile,

metallic, some covalent character is ...

Main forms of Brass

(i) Commercial brass / Guilding metal/ French Gold.

Composition : Cu = 90%, Zn = 10%.

Characteristics : Stronger and harder than pure metal Cu, Golden in colour.

Uses : For making Rivets, hardwares, screws, costums, jewellery etc.

(ii) Dutch metal / low brass:

Cu = 80%, Zn = 20%.

Characteristics : It has golden colour, good ductility

Uses : For making cheap jewellery, musical instruments

(d) Corrosion resistance: Pure metals have poor corrosion resistance. For example, pure iron is corroded even in moist air. But an alloy of iron with Cr, Ni and Mo is even acid proof. It is popularly known as stainless steel. The protection against corrosion is due to the formation of dense, tough film of chromium oxide at the surface of iron, especially when the content of Cr ≥ 16%. ~~It is brittle~~

Similarly, an alloy of Cu with tin (Bronze) ~~is~~ corrosion resistant