

## *The SilBRAZE P Series Self-Fluxing Alloys for Copper Brazing*

These alloys can wet copper in air without a chemical flux. The mechanism of self-fluxing is a complex, two-stage process:

- on melting, the brazing alloy dissolves the copper oxide film on copper,
- the dissolved oxides subsequently react with the phosphorous component of the alloy to produce a fusible copper meta-phosphate slag on the surface of the molten brazing alloy.

The primary function of the slag is to protect the molten brazing alloy from excessive oxidation during the brazing cycle although it will dissolve some pre-existing copper oxide. For best results, the brazing rods should be as free of surface oxides as possible prior to commencing brazing otherwise a significant proportion of the phosphorous is used up to scavenge the oxide on the rods to the detriment of the work piece, leading to poor wetting. Also when brazing large assemblies involving prolonged heating, the brazing alloy itself can get oxidised during heating as the self fluxing action of phosphorous is effective only once molten. In such cases, use of additional flux is advised

The greyish coloured residue of the slag left on the work-piece and the brazing alloy fillet does not subsequently cause corrosion and need not be removed. When a tenacious green residue is present after brazing this is a sign of excessively long brazing cycles, which have led to flux exhaustion. All these alloys have long melting ranges and with slow heating rates can suffer liquation. Since used almost exclusively on copper, which has high thermal conductivity, the required high heating rates are best achieved with oxy-acetylene or oxy/natural gas hand-torch heating.

Joint gaps should be 0.05-0.125mm, in some cases up to 0.2mm, gaps larger than this can create problems.

When used to braze brass or bronze, conventional borate fluxes have to be used as phosphorous does not dissolve zinc or tin oxide.

### **CAUTION:**

These alloys are not for use on high nickel alloys, nickel or ferrous base materials due to the formation of brittle phosphides

These alloys are not suitable for use in sulphur atmospheres especially at elevated temperatures. Maximum continuous service temperature is limited to 200°C. At higher temperatures, selective oxidation of the phosphorous in the alloy occurs, with consequent deterioration of the joints.

Joints brazed with these alloys are not suitable for continuous sea-water exposure due to risk of selective dissolution of phosphorous-rich micro phases.