

# Copper & Brass

## 'A Guild To Successful Welding'



Technical advice in the original SifTips style which started in 1932

### Copper

Pure copper has characteristics of high thermal and electrical conductivity and, because the metal requires about six times more heat (melting point is 1,083°C) for fusion welding than steel, particular care must be taken during welding and brazing.

Tough pitch copper, which includes most varieties of high conductivity copper, contains up to 0.5% oxygen (cuprous oxide) and is not suitable for fusion welding since it has a tendency to embrittlement and cracking, though it can be brazed.

Deoxidised copper, where the oxygen has been removed during manufacture by the use of deoxidising agents, can be fusion welded.

For MIG and TIG welding, It will be necessary to preheat workpiece if it is over 6mm thick. The usual shielding gas is argon, but with thicker material an argon/helium mixture can beneficially increase the arc temperature.

Consumables to be used are SIFMIG 985 and Sifsilcopper No 985, although Sifsilcopper No 7 can be used for TIG welding sheet up to 3mm thick.

Gas welding of copper, such as whiskey stills, tanks etc, requires the parts to be preheated to 600 C and slowly cooled on completion of the joint. Sifsilcopper No 7 together with Sifsilcopper flux will produce a joint with excellent colour match.

Copper is not generally joined using arc welding electrodes. But in circumstances where there is no other welding equipment other than a transformer, Hilco Bronsil proves ideal.

### Brass

Brass is a generic term covering a wide range of copper alloys containing additions of zinc. All brasses, which includes Gilding Metal, can be silver soldered, MIG and TIG welded successfully.

However, the addition of lead for free cutting brass and in gunmetal (LG1 & LG2) causes porosity and fume problems with gas shielded arc welding. Phosphor Bronze, copper/tin alloys such as PB2, can be readily brazed or welded.

Gas welding of brass is not recommended as the zinc will tend to vaporise causing fumes (zinc oxide) and porosity. However, PB2 phosphor bronze can be joined with oxy-acetylene and Sifphosphor Bronze No 8, as sometimes used by sculptors.

For MIG and TIG welding a shielding gas of argon or argon/carbon dioxide mixture is used.

If it is felt necessary to use preheat, this must be limited to less than 80 C, otherwise the structure of the brass may become altered.

The choice of filler wire or rod will depend on the composition of the alloy being joined.

As a general comment, SIFMIG 8 or Sifphosphor Bronze No8 is recommended as first consideration.

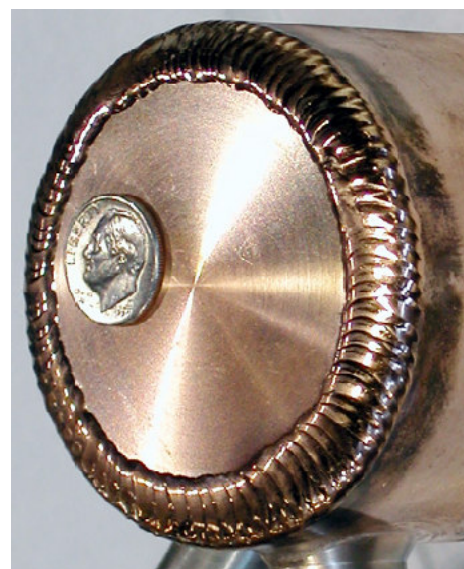
However, SIFMIG 328 and 968 or Sifalbronze No 32 and Sifsilcopper No 968 may also be suitable.

If colour match with brass is important, Sifphosphor Bronze No 82 is recommended

Sifbronzing is an almost universally recognised way of describing the low temperature bronze welding of sheet steel, cast iron and other metals. The reason behind this fact summarises why Sifbronze, the company which first developed and promoted the technique, is generally considered to be a supplier of top-quality welding rods, wires, fluxes and equipment.

'Will The Welder' was a Siftips magazine that was produced in the early 1930's. The aim was to provide users with ideas and tips as to how to get the most out of their welding equipment.

In 2007, Weldability-Sif acquired Sifbronze, the welding consumables division of the Suffolk Iron Foundry, known internationally as Sif. Sif is renowned for its manufacturing heritage and for its complete range of quality welding consumables for MIG/GMAW, TIG/GTAW, Arc/SMAW, Oxy/Fuel Welding and Brazing, which have been used globally for almost a century.



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