

## MIG Brazing 'Manganese Boron Steel'

(in the automotive / vehicle production & repair industries)

### Why 'Manganese Boron Steel'

In the automotive industry the need to save weight, while at the same time meeting increasingly severe crash test standards, has led to the use of high strength steels that conserve good ductility and formability. The high yield strength makes this material particularly suited for anti-intrusion functions i.e. fender beams, door reinforcements, middle posts etc. This sheet steel is pre-aluminised to protect the metal from oxidation and decarburisation, during heat treatment; this also enhances the corrosion resistance after painting, avoiding the need for any subsequent corrosion protection treatment.

### MIG Brazing of pre-aluminised (galvanised) sheet

Zinc, in the galvanised coating, melts at temperatures of around 420°C and vaporises at 906°C. This causes unfavourable effects on the welding process as unalloyed SG2 MIG welding wire melts around 1450°C. The zinc starts to vaporise as soon as the arc is struck; zinc vapours and oxides can lead to pores and inadequate fusion. An alternative is to use MIG Braze process, using a copper silicon alloy wire SIFMIG 968 (CuSi3). SIFMIG 968 has a relatively low melting point approx 980°C.

The reduced heat input results in the following advantages:

- low coating burn off
- no corrosion to the joint seam
- low distortion
- dissimilar joints (any combination of material, except aluminium)
- easy after joint machining
- fast deposition saving labour costs
- minimal spatter

Since there is no fusion of the base metal, it therefore has more in common with a brazed joint than a welded one.

### The Product - SIFMIG 968

SIFMIG 968 is produced to conform to BS2901 C9 and also Din CuSi3, having a typical composition of 3% Silicon, 1% Manganese and balance Copper.

Diameters available: 0.8mm, 1.0mm and 1.2mm

Spool sizes:  
 D100 - 0.7kg (in 0.8 and 1.0mm)  
 D200 - 4.0kg (spool bore is 50mm, so fits standard MIG set spindle)  
 D300 - 12.5kg

### General Hints

Copper alloy MIG wires require 'soft' or formed wire feed drive rollers and a soft or Teflon type wire liner in the torch cable. If the welding machine has been used with steel MIG wire, ensure any steel particles are removed from the wire feed system. This is to avoid carbon contamination on the copper alloy wire.

### Procedure Tips

On thin sheet steel and galvanised sheet use 0.8mm / 1.0mm SIFMIG 968, keeping heat input to a minimum (approx 45-65 amps). Select a shielding gas, which will maintain a stable arc, such as pure Argon or Argon 2% CO2 mix. Pushing MIG torch (as conventional MIG welding) will ensure not too deep penetration, avoiding burn through on thin sheet. If galvanised coating is thick, use dip transfer with a short arc.

For best results, use a programmable synergic MIG machine. This type of system will produce a neat, clean brazed joint, requiring a minimal amount of joint dressing and preparation prior to painting. low coating burn off no corrosion to the joint seam low distortion dissimilar joints (any combination of material, except aluminium) easy after joint machining fast deposition saving labour costs minimal spatter