METHOD STATEMENT

FOR

FURSEWELD EXOTHERMIC WELDING SYSTEM

1. Equipment / Tools Required

a. Measuring tape
b. Meggar for earth testing
c. Mould
d. Cable
e. Powdered metal
f. Gloves
g. Eye protection

2. INSTALLATION SEQUENCE

GENERAL INSTRUCTIONS

CLEANING

The surfaces of all conductors etc. to be welded must be clean, dry & bright. Oil and grease may be burned out with a butane/acetylene torch or cleaned with a rapid-drying solvent such as Methylene Chloride. After cleaning use a cable brush or card cloth brush to remove any residue and brighten the surfaces.

PREPARATION OF CABLE

Corroded cable must be cleaned. It is especially important that the ends of the individual strands are clean; this can best be achieved by making a fresh cut on the end of the cable.

Bent or out-of-round cable will hold the mould open and cause leeks; therefore, the cable must be straightened before clamping the mould into place. Remove any insulation before cutting to prevent insulating material becoming trapped in the strand-ends.

PREPARATION OF BAR, TUBE, LUGS

Use a file, emery cloth or card brush to remove oxides. On tubes, clean the inside surface as well as the outside end.

PREPARATION OF STEEL, CAST IRON

Remove rust and all scale with a rasp, coarse file or grinder (not resin-bonded). Galvanised surfaces may be cleaned with emery cloth to remove oxide film; it is not necessary to remove galvanising.

For cast iron less than 12mm thick do not use larger than powder no. 65. Use only P2 powders for cast iron; do not use regular powders. Under some conditions of temperature and humidity, the surface to be welded will sweat, causing porous welds. This can be eliminated by warming the surface with a hand torch.

PREPARATION OF EARTH ROD

Ends that are threaded, 'mushroomed' from driving or drilled and tapped must be cut off. Undersized rods may be built up with copper shim.

PREPARATION OF STEEL RAIL

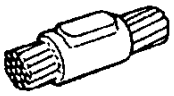
Use a grinder to remove all mill scale and rust front the rail surface, (wire-brushing is inadequate), and to remove any raised lettering on the rail web.

WELDING PROCEDURE

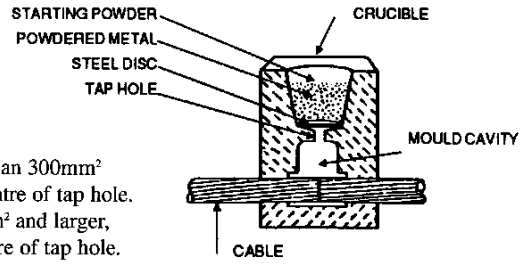
Position the cleaned conductors in the mould after ensuring the mould is dry by pre-heating or making a test joint. Lock the mould with the handle clamp; if the mould does not close properly adjust the tension by removing the split pin and turning the eye bolt accordingly. Insert the steel disc into the mould crucible, ensuring it is centred over the tap hole. Pour the welding powder into the crucible; the starting powder will be retained in the base of the cartridge and can be loosened by tapping the cartridge on the ground. Spread the starting powder evenly over the welding powder, placing a small amount on the top edge of the mould for easy ignition. Close the cover and ignite the starting powder with the flint gun; pull the gun away immediately to prevent fouling the flint. Wait a few seconds to allow the metal to solidify before opening the mould. Remove all slag and dust before making the next weld.

5.1 CABLE TO CABLE FURSEWELD INSTRUCTIONS

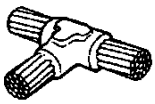
CC1



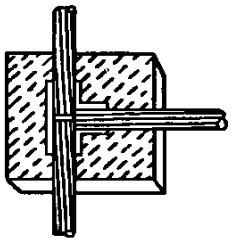
For cables smaller than 300mm² butt cables under centre of tap hole. For cables of 300mm² and larger, gap 3mm under centre of tap hole.



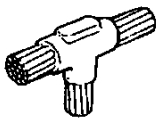
CC2



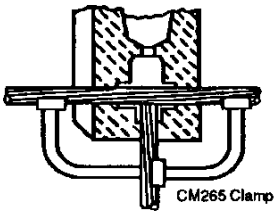
If run cable is 250 mm² or larger, and tap cable is at least halfof run cable size, then cut run cable and gap 3mm.



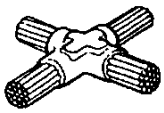
CC3



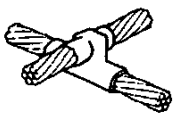
Butt tap cable against run cable. Use clamp CM 265 as illustrated.



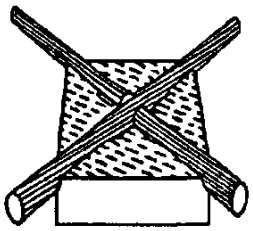
CC4



CC11

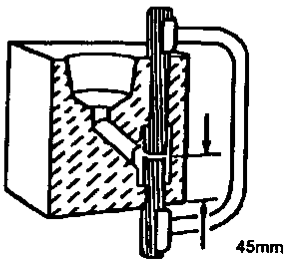


CC4 - Butt tap cable against run cable.
CC11 - Cables are uncut.
If cables are under tension use CM265 clamp.

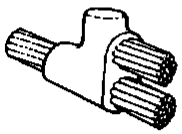


CC5

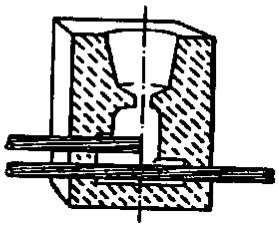
Insert lower cable 45mm into mould. For cables 35mm^2 and larger, gap upper cable 6mm. For smaller cables, butt cables together.



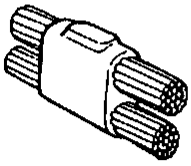
CC6



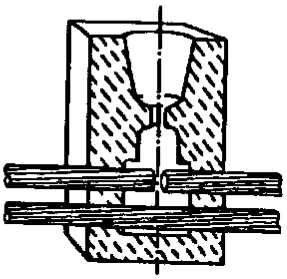
Insert tap cable under centre of tap hole. Do not cut run cable.



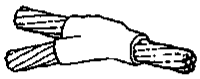
CC7



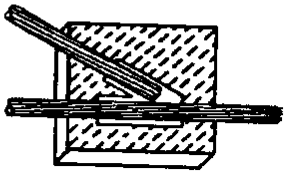
For cable 150mm^2 and larger, cut and gap top cable 6mm under centre of tap hole.



CC8/9

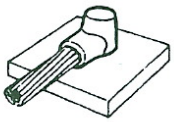


Cut tap cable end square. Butt corner of tap cable against run cable.

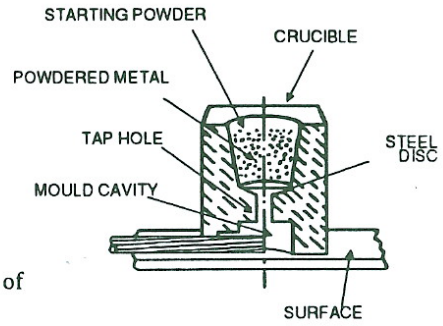


5.2 CABLE TO SURFACE FURSEWELD INSTRUCTIONS

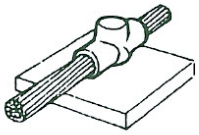
CS8



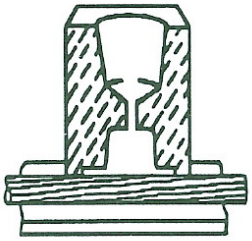
Place end of cable under centre of tap hole.



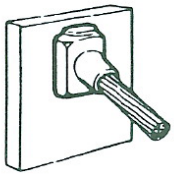
CS9



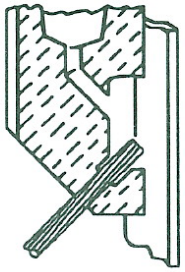
See General Note



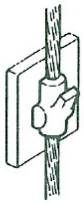
CS3



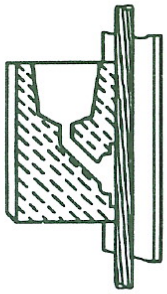
Insert cable into mould until it touches surface to be welded.



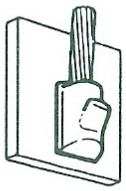
CS26



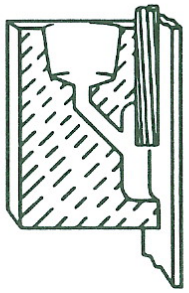
See General Note



CS7

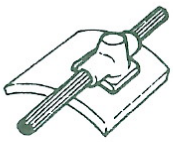


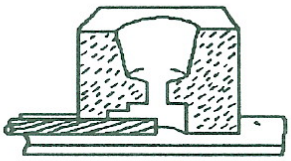
Align end of cable with centre of tap hole.



CS32/33

CS34/35





CS32 & CS34 - Steel; CS33 & CS35 - Cast Iron

If pvc covered cable is used, dress back sufficient insulation to ensure that the cable allows the mould to sit flush on the surface to be welded.

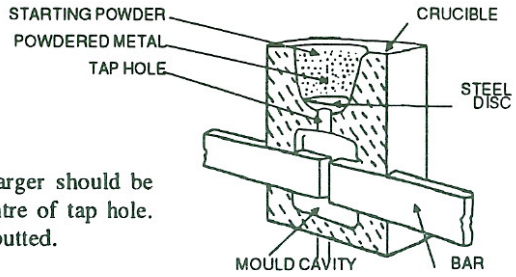
GENERAL NOTE

For all cable to surface applications it may be advisable to secure the mould to the surface by means of a 'G' clamp

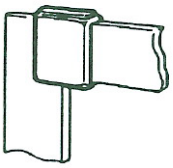
5.3 BAR TO BAR FURSEWELD INSTRUCTIONS

BB1

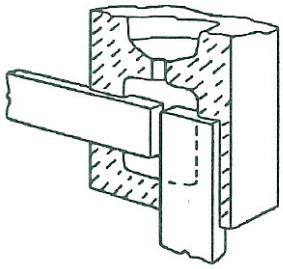
Bars 4.5mm thick or larger should be gapped 6mm under centre of tap hole. Smaller bars should be butted.



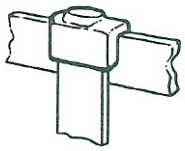
BB2



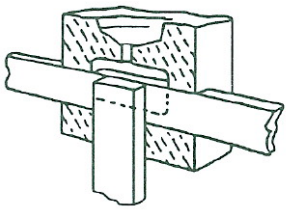
Bars 4.5mm or larger should be gapped 6mm under centre of tap hole. Smaller bars should be butted. Ensure top face of vertical bar is fully located in mould to prevent leakage.



BB3

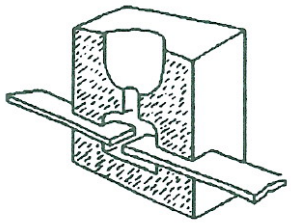


End of bus bar should be inserted into the mould flush with upper edge of the continuous bar.

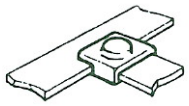


BB7

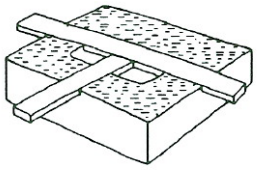
Bars 4.5mm thick or larger should be gapped 6mm under centre of tap hole. Smaller bars should be butted.



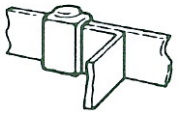
BB14



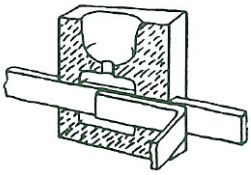
Bars 4.5mm or larger should be gapped 6mm under centre of tap hole. Smaller bars should be butted.



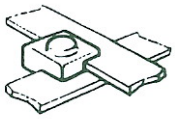
BB5



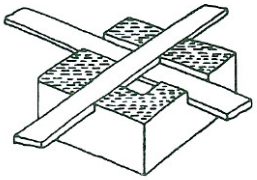
Tap bar should be formed before welding to give a minimum of 75 mm straight bar. Tap bar should be inserted under the centre of the tap hole.



BB41

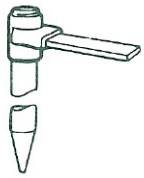


Locate bars firmly into mould to prevent leakage.

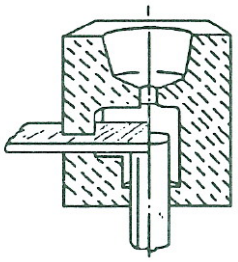


5.4 BAR TO ROD FURSEWELD INSTRUCTIONS

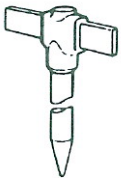
BR1



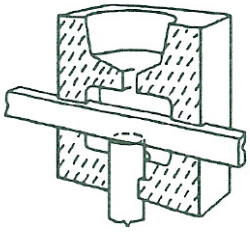
Place end of bar under centre of tap hole. Bar must sit on top of rod. Use locking pliers or a clamp on the rod below the mould to prevent the mould slipping when fired.



BR2

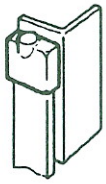


Do not cut bar. Butt top of rod against bottom of bar. Use locking pliers or a clamp below the mould to prevent the mould slipping when fired.

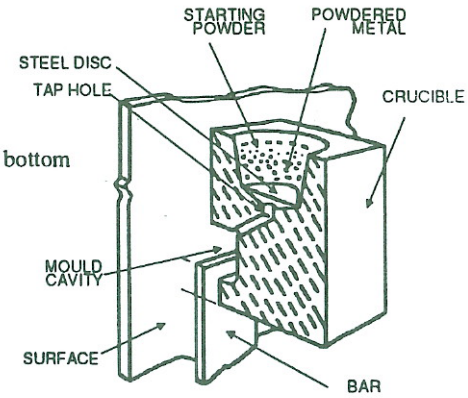


5.5 BAR TO SURFACE FURSEWELD INSTRUCTIONS

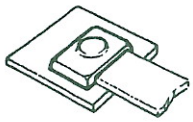
BS1



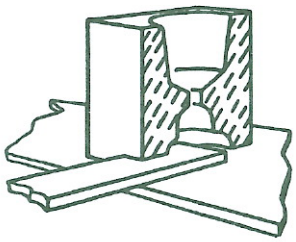
Insert end of bar 45mm up from bottom of mould



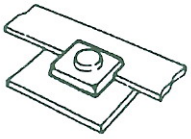
BS2



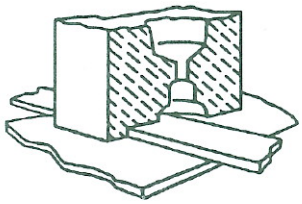
Insert end of bus bar under centre of tap hole.Press down on mould cover to prevent mould from tipping.



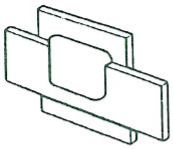
BS3



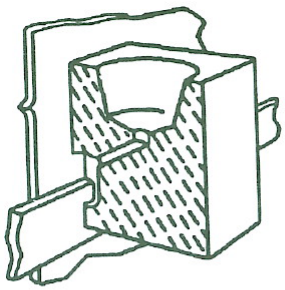
Edge and flat face of bus bar must be in contact with mould to prevent leakage. Press down on mould cover to prevent mould from tipping.



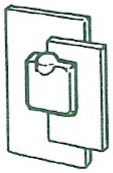
BS4



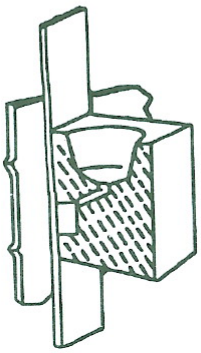
Edge and flat face of bus bar must be in contact with mould to prevent leakage. Fasten mould to surface with C clamp if possible.



BS5

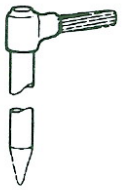


Edge and flat face of bus bar must be in contact with mould to prevent leakage. Fasten mould to surface with C clamp if possible.

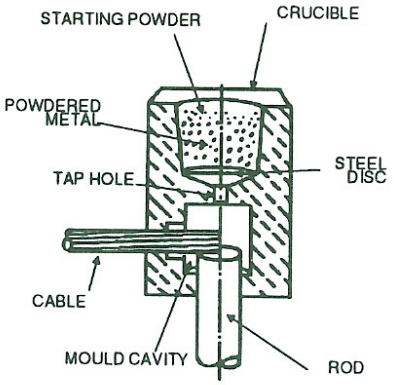


5.6 CABLE TO ROD FURSEWELD INSTRUCTIONS

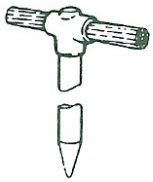
CR1



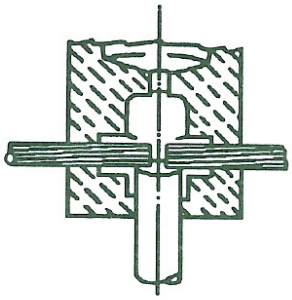
Place end of cable under centre of tap hole. Cable must sit on top of rod. Use locking pliers or a clamp on rod below mould to prevent slipping when the mould is fired.



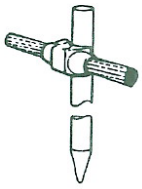
CR2



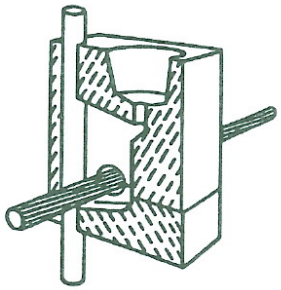
Cable must sit on top of the rod. Use locking pliers or a clamp on rod below mould to prevent slipping when the mould is fired.



CR3



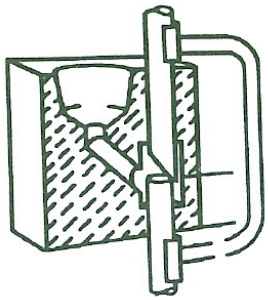
Secure mould to earthrod with backing plate attachment. Support mould to keep it from sliding down rod when welding. Use locking pliers or clamp rod on rod below mould.



5.7 ROD TO ROD FURSEWELD INSTRUCTIONS

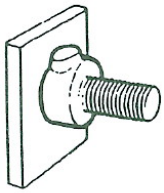
RR1

Insert lower rod 45mm up from bottom of mould. For 3/4" rod and smaller, pointed rod is butted. Blunt rod is gapped 9mm. For 1" rod cut upper rod at 45° and butt as shown. Use the A-330 cable clamp to position the mould and support and alighn the upper rod as shown.

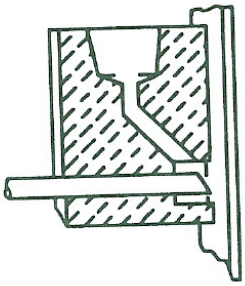


5.8 ROD TO SURFACE FURSEWELD INSTRUCTIONS

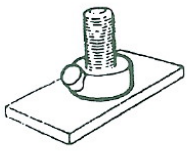
RS1



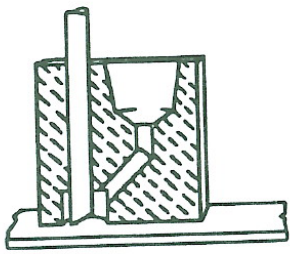
Place stud in mould so end to be welded is 3mm from steel surface. If this is not possible due to using short stud, cut end of stud to a 25° angle, and position as shown.



RS2

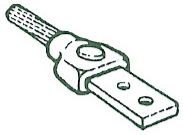


Place stud in mould so end to be welded is 3mm from steel surface. If this is not possible due to using short stud, cut end of stud to a 25° angle, and position as shown.

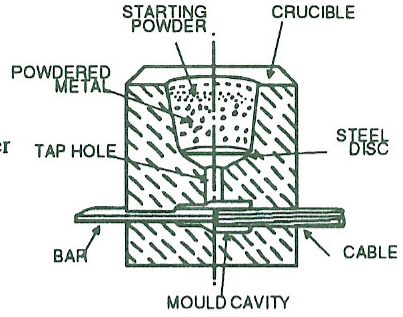


5.9 CABLE TO BAR FURSEWELD INSTRUCTIONS

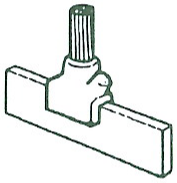
CB1



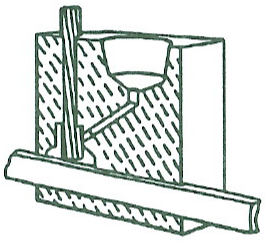
Butt the ends of the cable and bar under the centre of the tap hole.



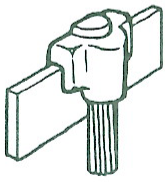
CB2



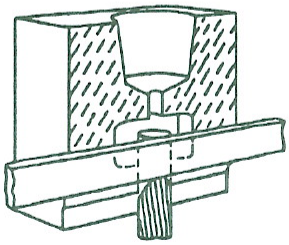
The continuous bar is inserted to seat in mould. Tap cable is gapped 6mm from upper edge of the continuous bar.



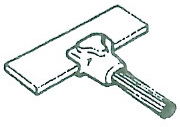
CB3



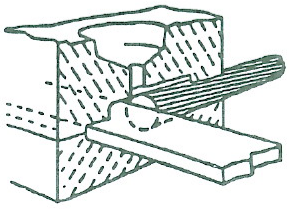
Insert end of tap cable flush with upper edge of the continuous bar. Pack cable opening with Duxseal where the continuous bar is of 75mm or greater in width.



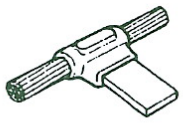
CB4



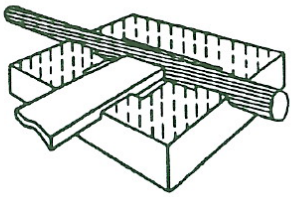
Butt cable against edge of the continuous bar.



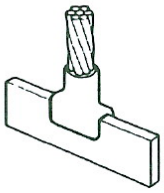
CB5



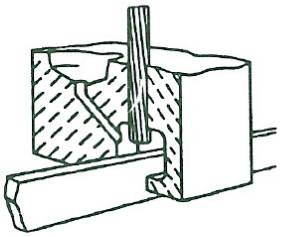
Butt tap bar against the side of the continuous cable.



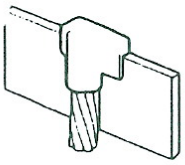
CB6



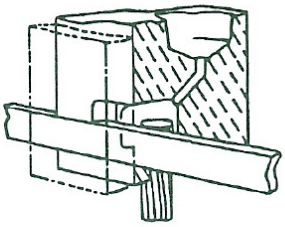
The continuous bar is inserted to seat in the mould. Tap cable is gapped 6mm from tupper edge of the continuous bar.



CB7



Insert end of tap cable flush with upper edge of the continuous bar. Pack cable opening with Duxseal where the continuous bar is of 75mm or greater in width.

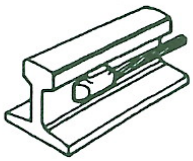


GAP INSTRUCTIONS

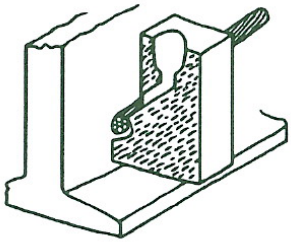
The gap is obtained by initially butting the tap to the run, and marking the tap where it enters the mould with say, adhesive tape. The tap is then withdrawn by the required distance as measured between the mould and the mark.

5.10 CONNECTION TO RAIL FURSEWELD INSTRUCTIONS

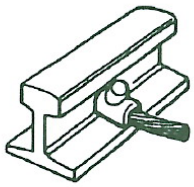
R4



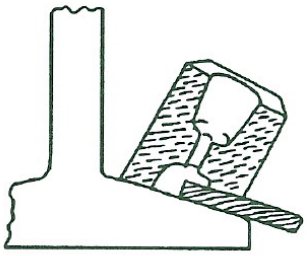
Insert end of cable under centre of tap hole. Use T5 clamp to secure mould.



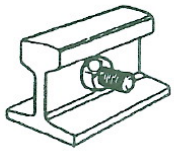
R5



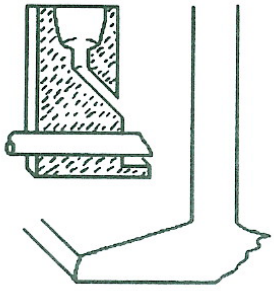
Insert end of cable under centre of tap hole. Use T4 clamp to secure mould.



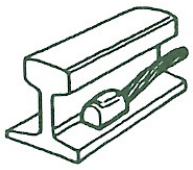
R8



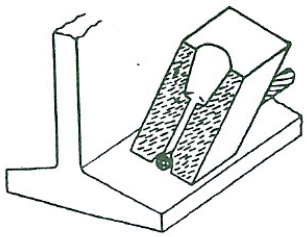
End of stud should be cut to an angle of 25°. If this is not possible gap stud 3mm from rail. Use T5 clamp to secure mould.



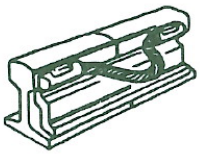
RLX



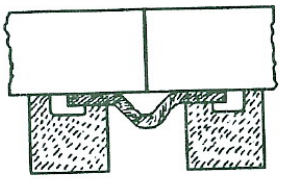
Insert end of cable under centre of tap hole. Use T4 clamp to secure mould.



TRL



Insert ends of cable under centres of tap holes. Use T3 clamps to secure moulds.

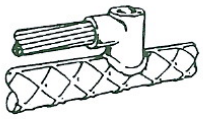


5.11 **CABLE TO RE-BAR FURSEWELD INSTRUCTIONS**

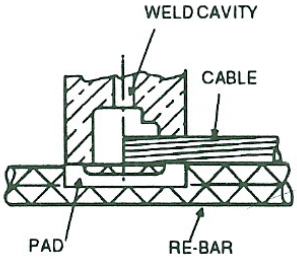
PREPARATION OF RE-BAR

1. Surface to be welded must be bright, clean and dry.
2. Remove rust and mill scale with coarse file or grinder.
3. Remove oil, grease or paint coatings with solvent or torch.

CRE1

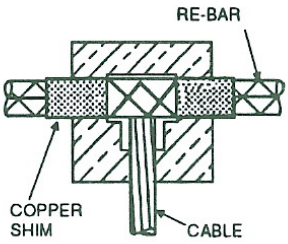


Use Fibre Packing (Batting).
Form the packing to the re-bar with the hole running lengthways over the cleaned area. Press the mould over the the packing so that the edges are even with the edges of the mould.
Ensure that the cable is butted up to the re-bar prior to firing the powder.

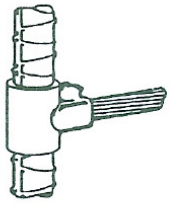


CRE2

Wrap 2 layers of copper shim either side of the weld area - the shim should be flush with the side faces of the mould. DO NOT over wrap in excess as this will prevent the mould from closing and cause leakage.
Ensure that the cable is butted up to the re-bar prior to firing the powder.



CRE6



Use Fibre Packing (Batting).
Form the packing to the re-bar with the hole running lengthways over the cleaned area. Press the mould over the packing so that the edges are even with the edges of the mould.
Secure backing plate when required.
Ensure that the cable is butted up to the re-bar prior to firing the powder.