

# Cable Jointing Manual

## Jointing Procedures

### Module 21

# Breaking Down & Remaking Compound Filled Cable Boxes (11kV)

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## 1. General

This module covers the breaking down of compound filled cable boxes, remaking with XLPE cables and filling with Guroflex resin. This must only be carried out if it is not possible to replace with a new air insulated box (Contact Workshop Manager at Huthwaite for details) this module can only be used in certain situations and in some situations the only solution if an air box is not feasible is to replace the switchgear – see limitations below.

## 2. Hierarchy

- **Breakdown, remove the cable box and replace with an air box – re-tail with a standard termination and heat shrink boots**
- **Break down the cable box, remaking with XLPE cable and filling with Guroflex resin**
- **Replace switchgear**

## 3. Limitations

Transformer boxes – Some transformer boxes utilise brass thimbles which are soldered onto the cable ends. This type of cable box can not be remade.

Warning before starting – Ensure that the three Triplex cables will pass through the gland / gland plate on the bottom of the box. If they will not the switchgear must be replaced or the gland plate remade.

#### 4. Tools and Equipment

SPECIAL TOOLS/EQUIPMENT	
Small Step Ladder	Cleaning Fluid / wipes
Gas Torch	Barrier Cream
Gasketing Material	Forced Air and / or Extraction unit
Waste Cardboard Container	Lintless Cloths (synthetic)
Approved Heat Lamps (For Compound Removal)	Standard Personal Protective Equipment i.e. FR clothing, safety footwear, etc.
Fire extinguisher	Leather Type Gauntlets (arm length)
PVC Dipped Gloves	3M 4000 Series Mask - ABEK1P2 Filter

ITEM	SAFETY
1	Equipment shall be released for work as required by the Distribution Safety Rules and the Power System Operation Manual. Access to live spouts shall be secured and <i>Danger Live Equipment</i> notices displayed.
2	A pre-work risk assessment shall be completed, and all hazards identified shall be effectively controlled. Refer to Central Networks Safety, Health & Environment Handbook.
3	Prepare the work area ensuring that suitable lighting is available and that there is sufficient room to carry out the work and set up equipment without risk of injury.
4	Use the Personal Protective Equipment detailed in the Central Networks Safety, Health & Environment Handbook for tasks involving bitumen compound and cleaners. The use of goggles / visor, respirator (3M 4000 Series Mask with an ABEK1P2 Filter), leather type gauntlets (arm length) and a leather type apron are required when preparing, heating and handling bitumen compound.
5	Use other Personal Protective Equipment as detailed in the COSHH Assessment for the specific chemical/s being used, and the activity being undertaken.
6	Never leave the heat lamps unattended and have a fire extinguisher at the worksite throughout the duration of the job.
7	Ensure adequate Approved extraction / ventilation – For indoor use this must be used. For advice contact CN General Safety.

## 5. Breaking Down the Cable Box

5.1 Cut the cable under the plumb and position a large substantial cardboard box to catch any melted compound below the cable box. This box should have 50mm of sand in the bottom to prevent any leakage of molten compound.

5.2 Remove the filler cap and drain plug. Then remove all but two (one each side) of the front cover bolts.

5.3 Remove any flammable tapes from around the plumb and then melt the entire plumb into the box using a blow lamp. Remove the gland from the gland plate.

5.4 Position the heat lamps in front of the cable box and heat the lid until sufficient compound has drained to enable the lid to be removed.

5.5 Remove the heat lamps, the remaining two bolts and lift the lid from the box – the lid will be hot and heavy so two people will be required.

5.6 Reposition the heat lamps and melt the remaining compound into the box.

5.7 Once the remaining compound has melted remove the existing termination by unbolting the lugs from the bushing.

5.8 Unbolt the base plate and remove all gaskets.

5.9 Thoroughly clean the inside of the cable box, cover plates and glands using cable cleaning solvent wipes. Particular attention must be paid to cleaning the bushes. Where extra heat is required the heat lamps must be used and not a gas torch as the direct heat may crack porcelain or blister shellac / paper bushings.

5.10 Remake all gaskets, replace any sheared bolts / set pins and remove the taper from the end of the gland by cutting with a hacksaw to provide the largest aperture possible.

## 6. Remaking the Cable Box

6.1 Termination kit commodity codes:

70/95mm solid Al retro-fit termination kit	5321200
185 -300mm solid Al retro-fit termination kit	5321240
300-400mm Stranded Cu retro-fit termination kit	5321310
GUROFLEX-MV-C530 5.3Ltr TIN	5336310
GUROFLEX-MV-C1000 10Ltr TIN	5336320
Tyco Gland for Cable Box Size "Y"	5503170

6.2 Slide the breakout (single, large hole facing up) and the gland onto the cables.

6.3 Strip the cables to the dimensions in the kit – ensure the earth wires are long enough to exit the box through the breakout and then reach the gland bolt / earth bar.

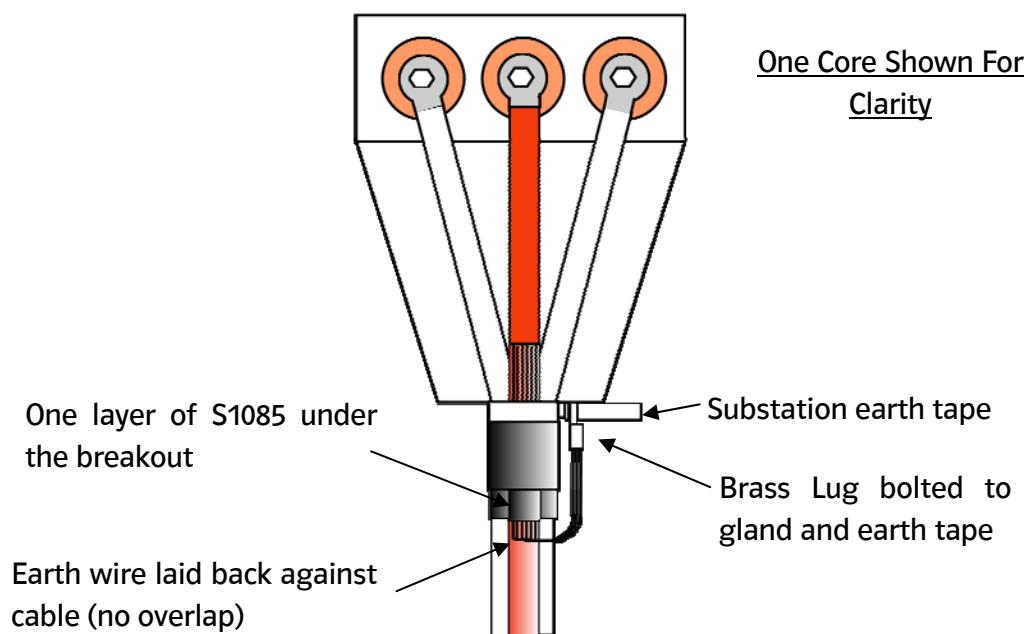
6.4 Remake the termination in accordance with the termination instructions supplied in the Kit.

6.5 DO NOT FIT HEATSHRINK OR COLD FIT BUSHING BOOTS – LEAVE THE LUG / BOLTED CONNECTION EXPOSED and tighten with torque wrench.

6.6 Fit the remade gaskets and reassemble the cable box – When tightening the bolts, start by tightening the gland plate bolts otherwise the bottom gasket will not be compressed and may leak.

6.7 Apply one layer of red S1085 tape over the earth wires where the fingers of the breakout will seal onto the earth wires.

6.8 Refit the gland and shrink the heatshrink breakout. Combine all of the earth wires into a core and fit one brass shear head lug before bolting onto the substation earth bar and brass gland. Do not tape up the earth wires with PVC tape, leave bare.



## 7. Filling With Guroflex Resin

7.1 Once assembled the cable box must be filled with Guroflex. Guroflex is a two part cold pour resin that must be mixed until all streaking has disappeared. As this mixing takes considerable time the use of a paint mixer attached to a battery drill is recommended (set drill to slow and note that this mixer can only be used for Guroflex resin). When mixing and pouring this resin eye protection and disposable plastic gloves must be worn.

7.2 Check for leaks allow to set before sealing the box.

## 8. Disposal of Waste Materials

8.1 Waste materials should be left securely on site and arrangements made for collection by Veolia on tel. 0870 6060686.