



Shrink Polymer Systems

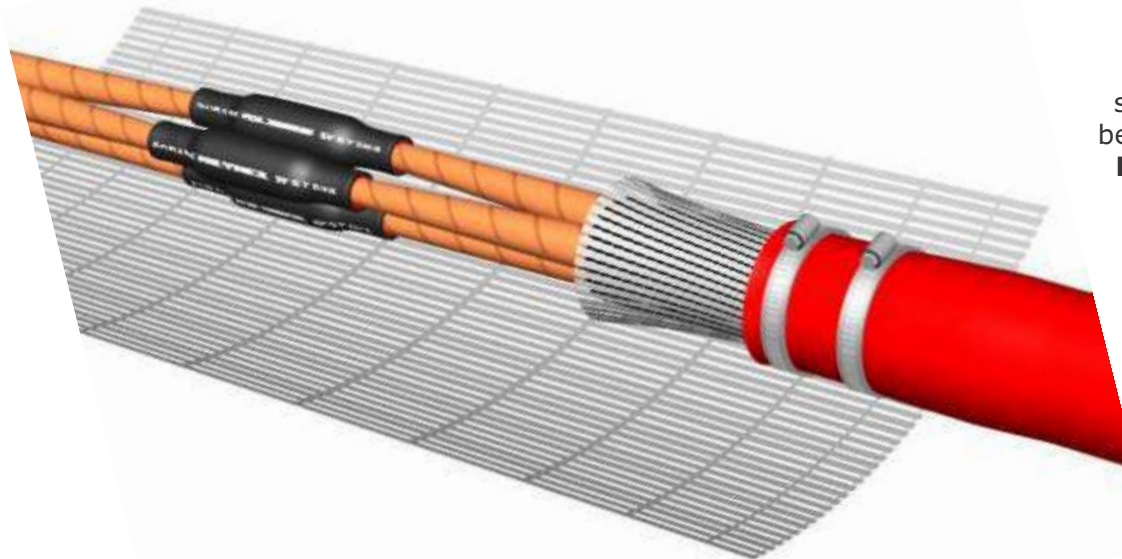
Cable Installation Materials – 24 volts to 36 kV



THORNE &
DERRICK
INTERNATIONAL

Thorne & Derrick
+44 (0) 191 410 4292
www.powerandcables.com

INSTALLATION INSTRUCTION HEATSHRINK UNIVERSAL JOINT 6.35/11(12kV) TO SUIT 3 CORE ARMoured CABLES XLPE TO PILC / XLPE TO XLPE OR PILC TO PILC REFERENCE TYPE: SPAJ 12U-3C



Use free software on your smart phone to scan the QR code below to watch an installation video
Note: Video is for 3 Core PILC to 3 x Single Core XLPE



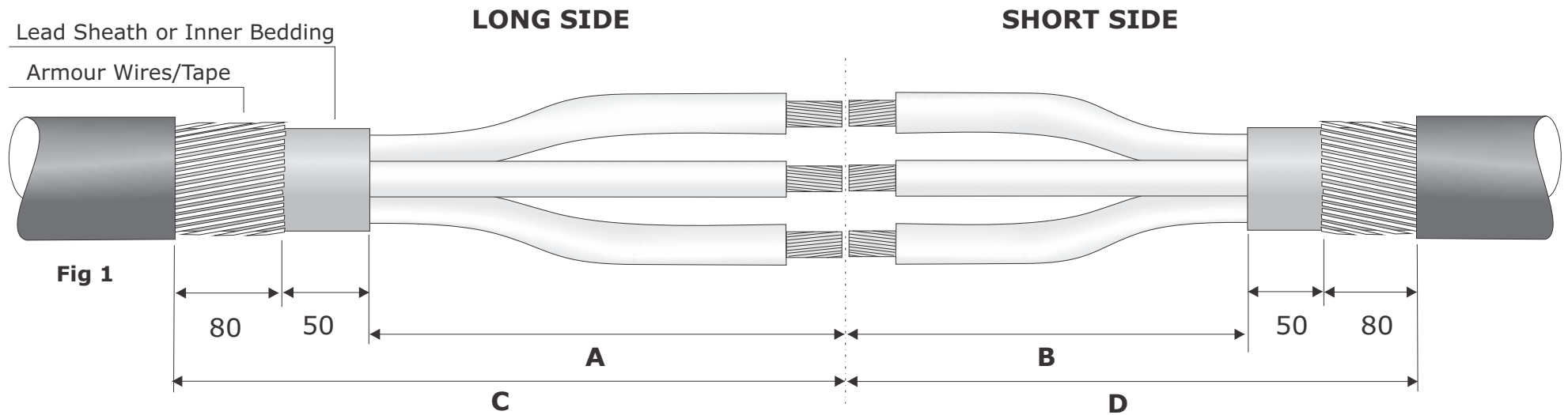
- THESE INSTRUCTIONS SHOULD BE FOLLOWED BY A TRAINED COMPETENT JOINTER
- A PROPANE GAS TORCH IS THE PREFERRED METHOD FOR SHRINKING THESE MATERIALS
- ENSURE THAT THE MATERIALS ARE KEPT CLEAN AND DRY AND ARE FREE FROM DUST, SAND AND GREASE
- PLEASE CALL SHRINK POLYMER SYSTEMS FOR ANY ADVICE



DATE OF ISSUE: 14.04.16

CABLE PREPARATION

ALL DIMENSIONS SHOWN IN mm



1. Ensure the cables overlap before preparing to the dimensions shown above and in accordance with the Table 1 below for conductor size. Follow the dimensions according to the size range of the kit supplied.

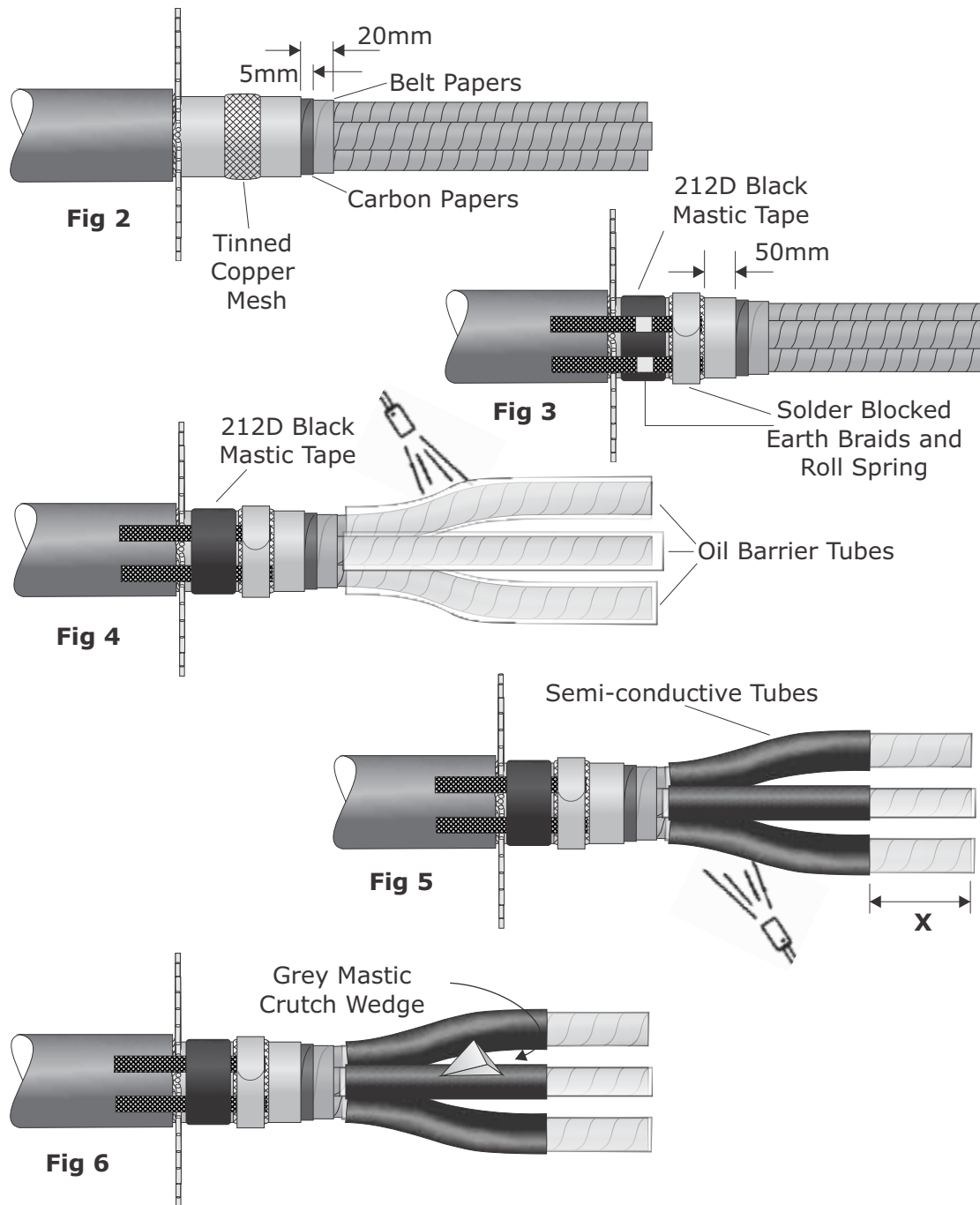
The joint is suitable for various cable combinations, follow the individual guidance on the pages within this instruction for the relevant cable preparation. Dimension X is from the centre of the connector to the screen points.

Note:- If only one of the cables is paper insulated (PILC), make this the short side of the joint and use "pilc pack - short side".

CONDUCTOR SIZE (mm ²)	A	B	C	D	X (mm)	MAX CONNECTOR LENGTH (mm)
35-70	520	330	650	460	160	100
95-185	520	330	650	460	170	130
185-300	670	380	800	510	180	140

Table 1

Note:- These joints are designed for use with MV compression ferules and "tapered centralised conductor" mechanical connectors.



Paper Belted Cable

2. Lift the wire armours, clean and de-grease the exposed lead for approx 150mm.

Remove the lead sheath to the dimensions shown in Fig 1 and Table 1.

3. Tie a binder 5mm from the lead cut and remove the black carbon papers. Tie a further binder 20mm from the lead cut and remove the belt papers as shown in Fig 3. Remove any fillers to this point and remove any excess cable grease present.

4. Tightly wrap (stretching to about half its width) a layer of tinned copper mesh 50mm from the lead cut, and using the constant force roll spring provided, secure the 2 x short earth braids as shown in Fig 3.

5. Apply a turn of 212D black tape behind the ppring and lay the solder blocked braids upon it. Apply another turn over as shown in Fig 3+4.

6. Position the clear oil barrier tubes over each core, stopping approx. 50mm from the belt papers. With a suitable heat source, shrink the tubes from the crutch end for approx 50mm.

Allow to cool, twist slightly in the direction of the paper lay and slide as far as possible into the crutch in order to protect the papers when setting the cores. Continue to shrink the tubes ensuring they are wrinkle free.

7. Position the black semi-conductive tubes over each core ensuring the "X" (shown in Table 1) dimension is maintained (trim tubes if needed). With a suitable heat source, gently shrink the tubes into place starting from the open end working towards the crutch.

8. Take the grey mastic crutch wedge and with the aid of a little cable grease, force it into the crutch between the cores as far as possible as in Fig 6.

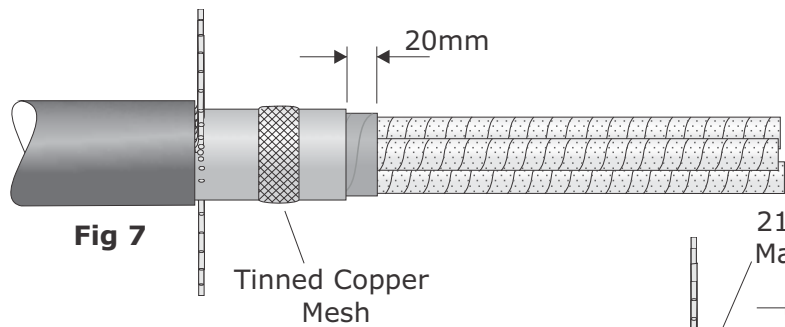


Fig 7

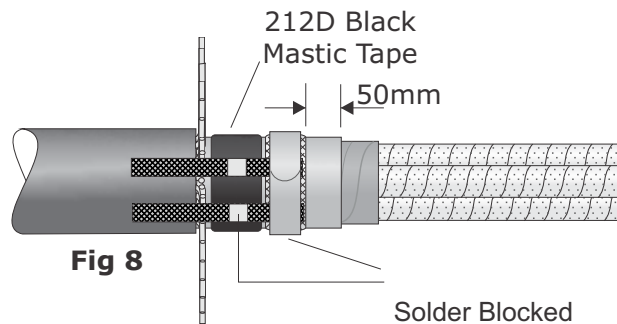


Fig 8

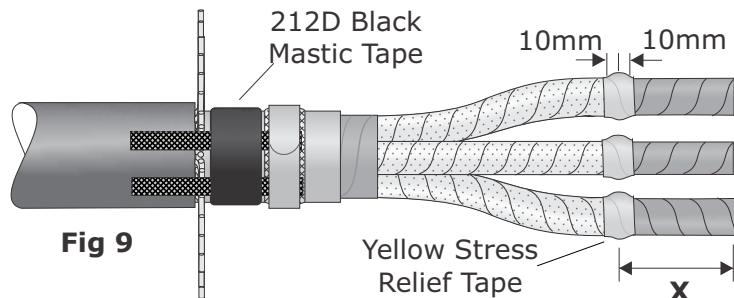


Fig 9

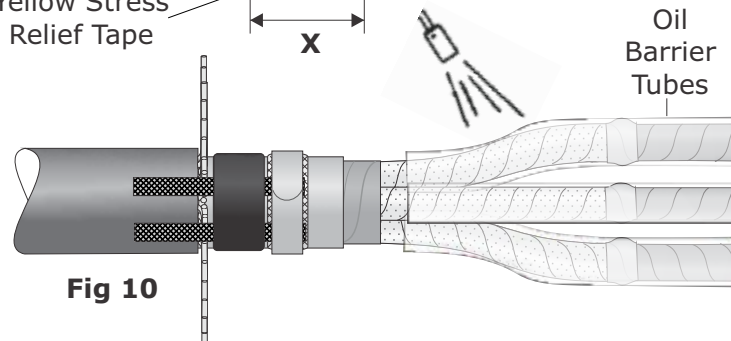


Fig 10

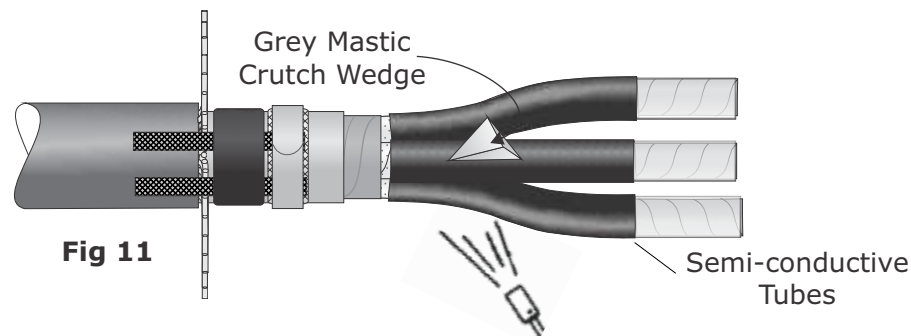


Fig 11

Paper Screened Cable

9. Lift the wire armours. Clean and de-grease the exposed lead for approx 150mm.

Remove the lead sheath to the dimensions shown in Fig 1 and Table 1.

10. Remove the cloth or paper binding tape 20mm from the sheath cut as shown. Remove the core fillers and any excess cable grease.

11. Tightly wrap (stretching to about half its width) a layer of tinned copper mesh 50mm from the lead cut, and using the constant force roll spring provided, secure the 2 x short earth braids as shown in Fig 8.

12. Apply a turn of 212D black tape behind the spring and lay the solder blocked braids upon it. Apply another turn over as shown in Fig 8+9.

13. Carefully remove the metalised paper screens to dimension "X" as shown in Fig 9 and Table 1.

14. Stretch the yellow stress relief tape and apply over the end of the each screen by 10mm either side as shown in Fig 9.

15. Position the clear oil barrier tubes over each core, stopping approx. 50mm from the crutch. With a suitable heat source, shrink the tubes from the crutch end for approx 50mm.

Allow to cool, twist slightly in the direction of the paper lay and slide as far as possible into the crutch in order to protect the papers when setting the cores. Continue to shrink the tubes ensuring they are wrinkle free.

16. Position the black semi-conductive tubes over each core just beyond the yellow stress tape as in Fig 11. With a suitable heat source gently shrink the tubes into place starting from the open end working towards the crutch.

17. Take the grey mastic crutch wedge and with the aid of a little cable grease, force it into the crutch between the cores as far as possible as in Fig 11.

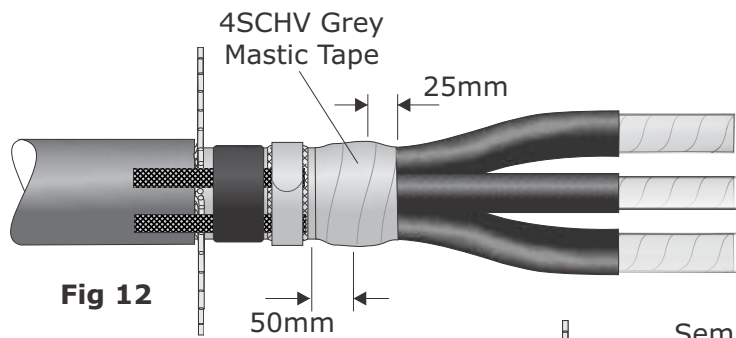


Fig 12

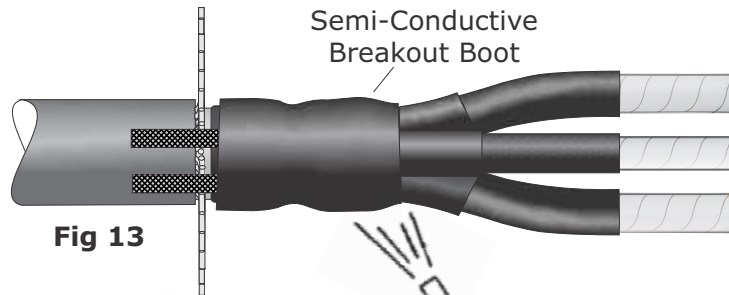


Fig 13

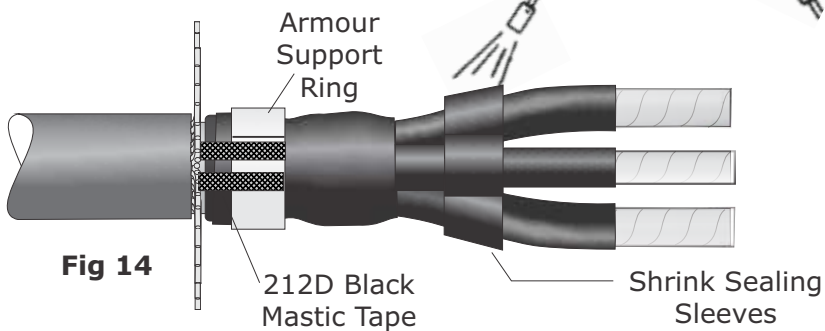


Fig 14

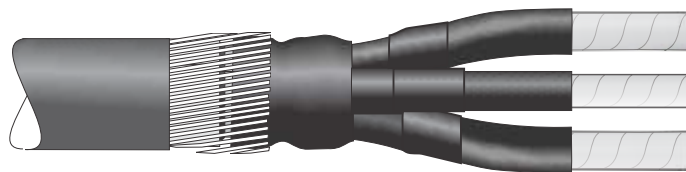


Fig 15

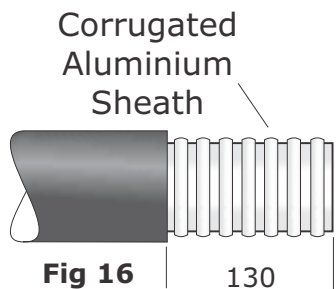


Fig 16

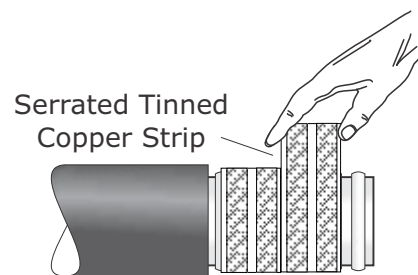


Fig 17

Paper Belted and Screened Cable

18. Remove any binders holding the carbon and belt papers.

Wrap the 4SCHV grey mastic tape over the carbon and belt papers, extending 50mm onto the lead sheath and 25mm onto the semi-conductive tubes, creating a smooth profile, as shown in Fig 12.

19. Thoroughly de-grease the exposed lead sheath and slide over the semi-conductive cable breakout.

Using a suitable heat source and starting from the mould line and working towards the armours, shrink the breakout body. Continue to shrink down the breakout fingers.

20. Apply the 212D black mastic tape over any exposed lead sheath as shown in Fig 14 and position the armour support rings over the bottom of the breakout body. **Note:** if steel tape armoured, no need to fit armour ring.

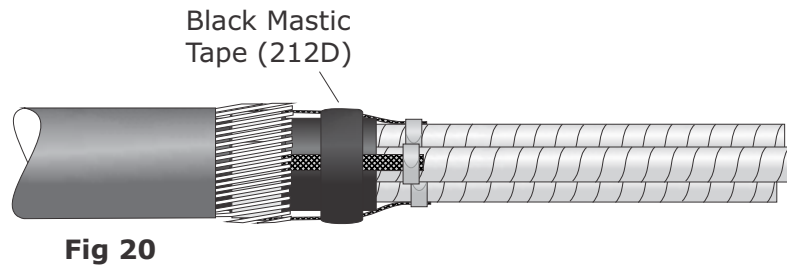
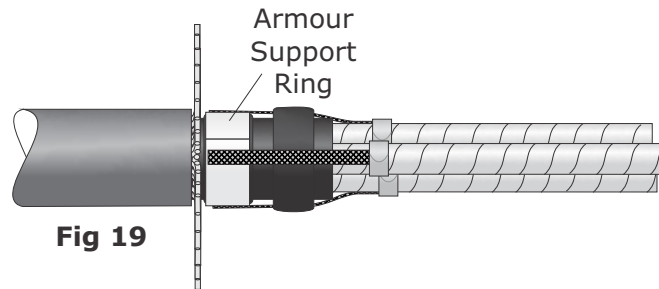
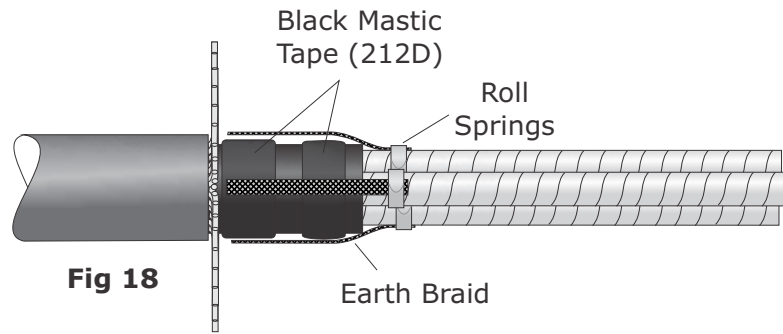
21. Position the short adhesive lined shrink sealing sleeves (Fig 14) and shrink into position so they cover the end of the breakout boot fingers.

Bend back the short earth braids over the support ring.

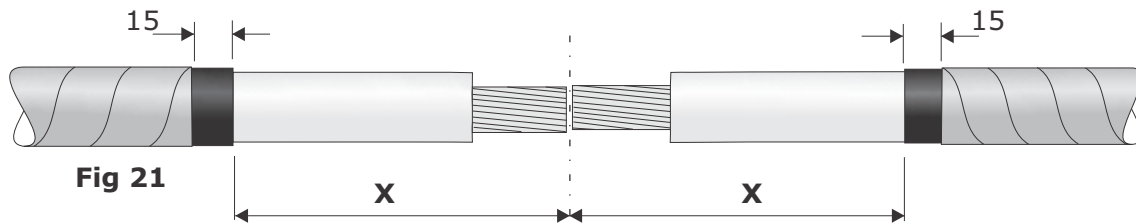
Lay the wire armours down over the armour support ring as shown in Fig 15 and temporarily secure.

Corrugated Aluminium Sheath (PICAS)

22. If picas, expose aluminium layer to 130mm as in Fig 16. Clean and abrade and wrap two turns of serrated tinned copper strip around it in place of the tinned copper mesh (Fig 17). For an improved connection, abrade metal sheath and apply approved jointing compound e.g penetrox over the earth bond area. This stage could be completed at a later stage prior to fitting the armour cage.



Single core shown for clarity



Xlpe Cable Preparation

23. Lift the wire armours and apply a two bands of black mastic tape as shown in Fig 18. Secure the three earth braids to the copper tape screens using the roll springs supplied.

24. Fit the under armour support ring and fold down the armours as shown in Fig 19. Apply further mastic over the earth braids as in Fig 20.

25. Remove the copper tape screen to dimension $X + 15\text{mm}$ (Fig 21). Using a suitable tool, remove the semi-conductive layer to dimension X , taking care not to damage the primary insulation, particularly at the screen ends.

Note:- screen removal tools can be provided. See website for screen removal advice/videos.

Thoroughly de-grease the exposed insulation using the cleaning tissues provided or other suitable solvent. Aluminium oxide paper grade 240 may also be used to polish the cores.

26. Remove the insulation to half the length of the connector + 5mm. Make sure the core conductors are not damaged.

Using the cleaning tissues provided, thoroughly de-grease the area.

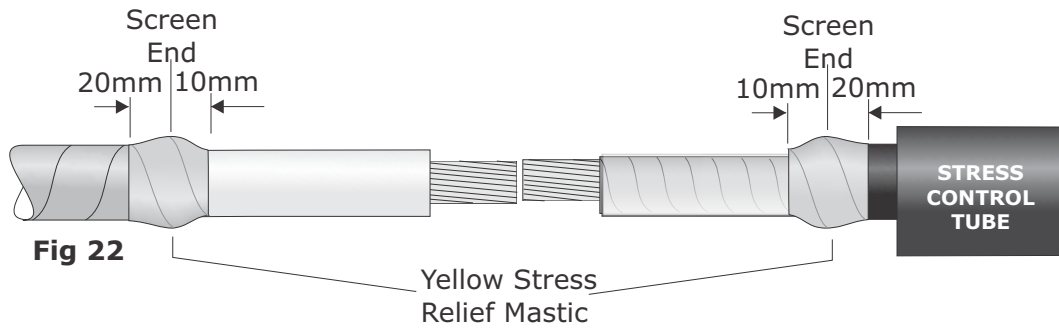


Fig 22

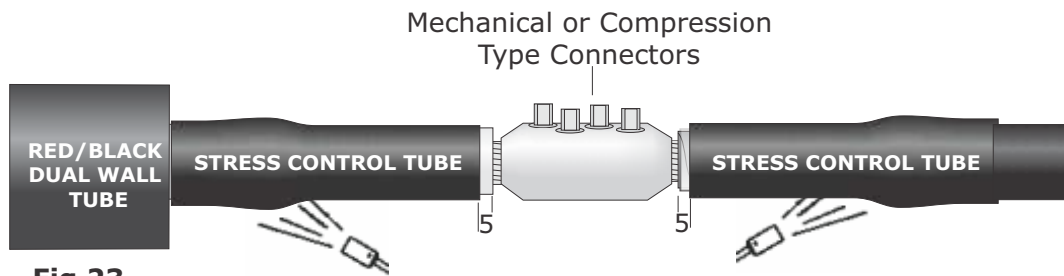


Fig 23

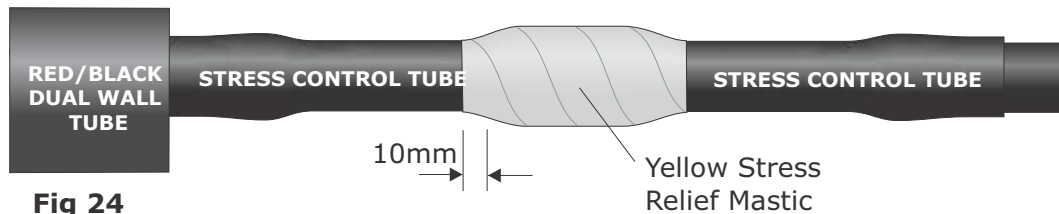


Fig 24



Fig 25

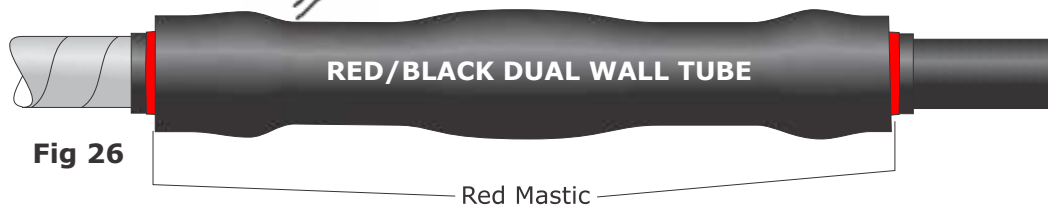


Fig 26

Cable Preparation all Cables (shows Xlpe to Pilc)

27. On the PILC cable end, stretch the yellow stress relief tape and apply 20mm over the end of the semi-conductive tubing, extending onto the clear tube by 10mm (Fig 22).

28. On the XLPE cable end stretch the yellow stress relief tape and apply over the semi-conductive screen, extending onto the insulation by 10mm and onto the copper tape screens by 5mm. **Note:** it may not be necessary to use all of the yellow tape supplied.

29. Position the stress control tubes 5mm back from the end of the insulation as shown in Fig 23. Starting from the insulation end and using a soft flame torch, apply heat all around the tubes until fully recovered.

30. Before proceeding, position the outer shrink tube/s over the cable end/s and red/black dual wall tubes over each core as shown in Fig 23.

31. Fit the approved MV 'tapered' connectors using the appropriate tool. Clean and de-grease before proceeding. Fit the centering rings but don't use the black caps.

32. Stretch and apply the yellow stress relief mastic over the connector area with a 50% overlap. Extend onto the black stress control tubes by 10mm, as shown in Fig 24.

Important:- Fill in the gap between primary insulation and ensure a smooth taper to the connector. Don't apply too much tape, two layers maximum over the main body of connector. Also if mechanical connectors used, fill any voids that the bolts leave after they have been sheared with the grey hv mastic tape supplied.

33. Stretch and apply the short red mastic tape pieces over the stress control tubes as shown in Fig 25+26, so that the red/black tubes sit upon it. This will create an additional moisture seal.

34. Slide over and centralise the 3 x red/black dual wall tubes over the connector area.

Starting in the middle and working towards the ends, shrink down the dual wall tubes, keeping the flame moving all around the tubes to ensure an even recovery.

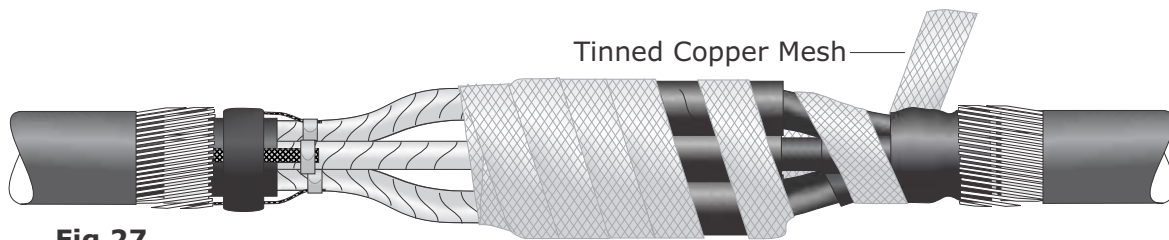


Fig 27

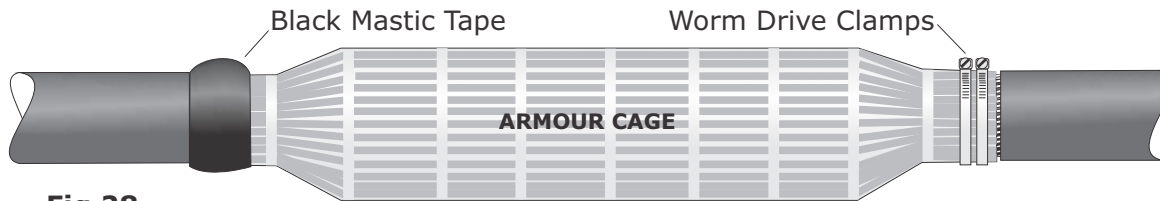


Fig 28

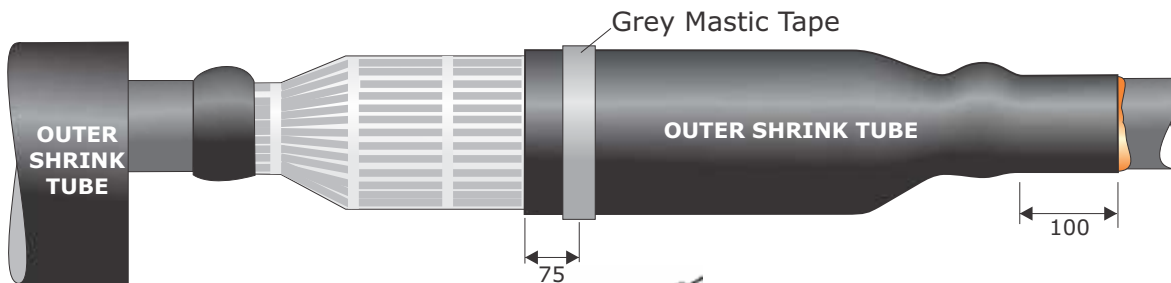


Fig 29

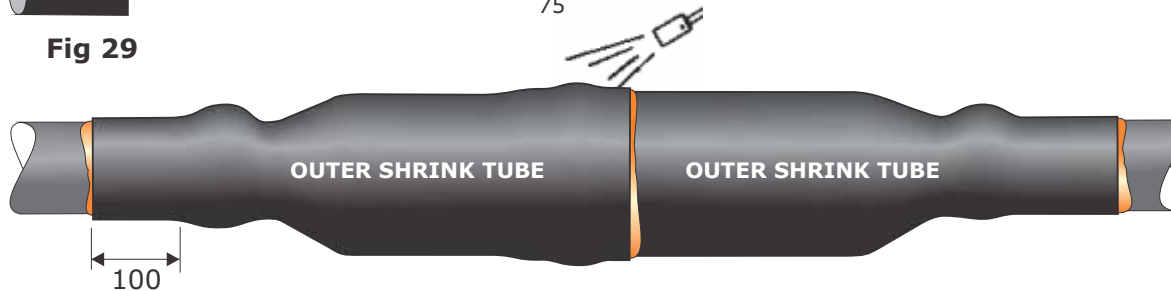


Fig 30

35. Using the tinned copper mesh, pull the cores together. Extend the mesh onto the semi-conductive tubes as shown in Fig 27.

With an open spiral take one end of the tinned copper mesh and wrap around the armours.

36. Wrap the armour cage around the completed joint and secure using the worm drive clamps provided. Ensure all earth braids/mesh are connected along with it.

37. Abrade the outer sheath for approximately 100mm on each side.

Remove the backing papers from the black mastic strips and apply over the worm drive clamps.

38. Position one of the outer shrink tubes approx. 100mm over the cable sheath.

Using a suitable heat source, start shrinking from the centre and work toward one end at a time. Keep the flame moving all around the tubes to ensure an even recovery.

39. Apply a band of the grey mastic tape approx. 75mm from the end of the tube as shown in Fig 29.

40. Now fit the second outer shrink tube as before. Once fully recovered sealant should be visible at the ends of the tubes.

Allow the joint to completely cool before applying mechanical strain.