

Company Directive

STANDARD TECHNIQUE: CA20/4

Relating to Procedures for Making 11kV Cable Loop Joints

Policy Summary

This Standard Technique document contains all the approved 11kV cold applied/pour Loop Joints for EPR, 3 Core XLPE, 3 Core XLPE SWA, PICAS screened and belted, PISAS and PILC cables. It shall be implemented in conjunction with the appropriate General Requirements in ST: CA2C/8.

This ST has not been written as a training document. It is not intended to be exhaustive in content and you must refer to your supervisor if you require training or instruction.

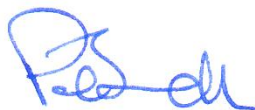
You shall work safely and skilfully, utilising the training/instruction you have already received, relating to the contents of this document and its cross-references.

You must make sure that you understand your job instructions and that you have the necessary tools and equipment for the job.

Author: Peter White

Implementation Date: May 2016

Approved by:



Policy Manager

Date:

17 May 2016

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IMPLEMENTATION PLAN

Introduction

This updated Standard Technique defines all the standard 11kV stop ends which are available for use on the 11kV underground cable used within.

Main Changes

The document has been updated to take into account the WPD losses strategy and some minor changes in the Jointing Procedure kitting lists.

Impact of Changes

None.

Implementation Actions

Team managers to disseminate the information to their respective 11kV Joints.

Implementation Timetable

This Standard Technique can be implemented with immediate effect.

Document Revision & Review Table		
Date	Comments	Author
May 2016	<p>Document modified to take into account the WPD losses strategy.</p> <p>Minor changes in the kit lists to remove errors.</p>	Peter White
April 2013	<p>The changes that have been made to this document are the inclusion of all the 11kV cables which have over the years been used in the Midlands Areas and not used in the South Wales and South Western areas, thus providing a unified common document applicable to the whole company.</p> <p>This document now contains all the required the Jointing Procedures associated to the cables used within the enlarged company thus allowing Loop joints to be installed on the said cables.</p> <p>Earth tail removed from each Loop joint Jointing Procedure.</p> <p>Rectification of known typographic errors.</p>	Peter White

ST: CA2O/4 PROCEDURES FOR MAKING 11kV CABLE LOOP JOINTS

INTRODUCTION

This Standard Technique document contains all the approved 11kV Loop Joints, which shall be implemented in conjunction with the appropriate General Requirements, contained in ST: CA2C/8, including: -

1. General Cleanliness and Accident Prevention.
2. Joint Bay Preparation.
3. General Jointing Procedures – Dead Cables.

If the need arises to undertake a loop joint configuration (i.e. non-standard) not covered within the Standard Technique the Policy Manager, Avonbank, is to be consulted.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

Cable sizes shown are the maximum for the individual joint, cable sizes below the maximum and there combinations are accommodated and are provided for in the relevant Jointing Procedure, this is particularly evident for transitional jointing.

Where 240mm² EPR Triplex is to be found, then for material selection and installation data use 300mm² EPR Triplex; but for the electrical purposes i.e. loadings, ratings etc. then the 240mm² EPR Triplex shall be treated as 185mm² EPR Triplex.

Any reference to PICAS equally applies to screened or belted PICAS as well as PISAS. Any reference to EPR triplex equally applies to XLPE triplex.

Resin encapsulated joints must not be broken down.

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ST: CA2O/4 PROCEDURES FOR MAKING 11kV CABLE LOOP JOINTS.

JOINTING PROCEDURE 7.501

**185mm² EPR TRIPLEX – 185mm² EPR TRIPLEX CABLE
11kV LOOP JOINT**

(This Jointing Procedure covers cables sizes up to and including 185mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual.**

JOINTING PROCEDURE 7.501

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
70 EPR	70 EPR	LJ 1101
	95 EPR	LJ 1102
	185 EPR	LJ 1103
95 EPR	95 EPR	LJ 1104
	185 EPR	LJ 1105
185 EPR	185 EPR	LJ 1106

Note: - Any reference to EPR triplex equally applies to XLPE triplex.

JOINTING PROCEDURE 7.501

JOINT KIT MATERIALS

KIT REF	BASE MODULE	RESIN MODULE		CABLE DEPENDING MODULE		FOAM TAPE BUILD UP MODULE	CONNECTOR		TUBE SET	STOP END MODULE
	KB 85	B	D	D	J	FTBM	HVBRM18SOUTC	BCNE-3	SMOE 28003	SEM K85
LJ 1101	1	1	2		2	1	3	1	2	1
LJ 1102	1	1	2	1	1	1	3	1	2	1
LJ 1103	1	1	2	1	1	1	3	1	2	1
LJ 1104	1	1	2	2			3	1	2	1
LJ 1105	1	1	2	2			3	1	2	1
LJ 1106	1	1	2	2			3	1	2	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 Scotch 13 tape
 Tinned copper wire 16 swg
 Tinned copper wire 20 swg
 De-solvit 1000 FD
 De-solvit 1000
 Workhorse dry wipes
 Emery cloth
 5313 Water block tape
 Cable ties
 Sealing putty
 Aluminium oxide cloth 320 grit
 Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.501

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.501.1, 7.501.2 and 7.501.3**, whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

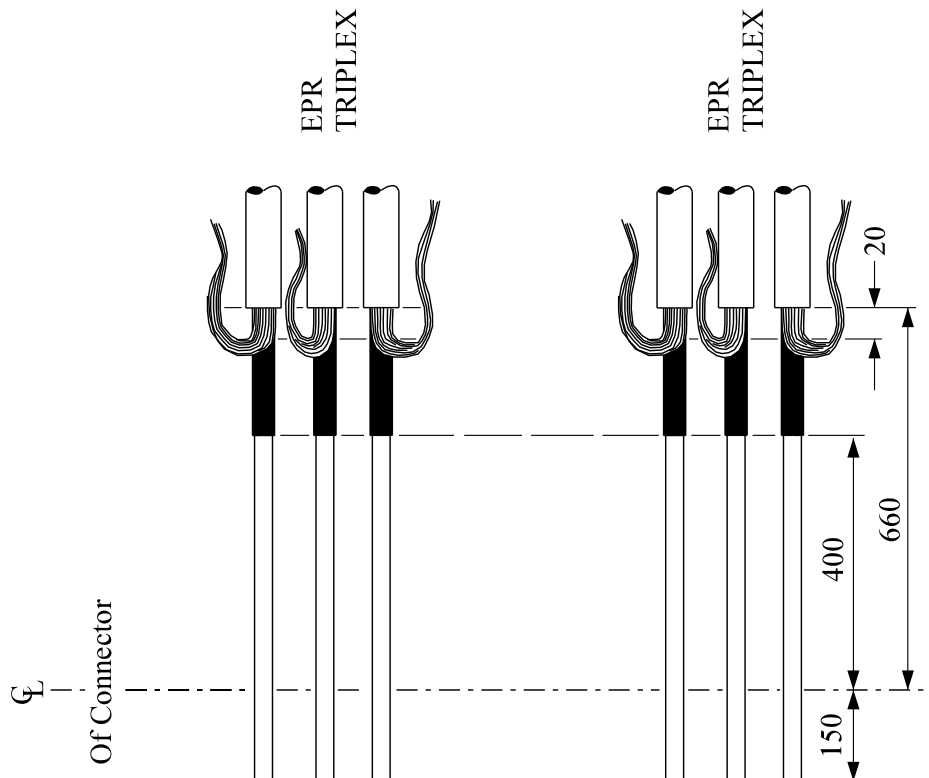
EPR CABLE - Preparation

- | | | |
|-----|--|----|
| 2. | Unravel and straighten individual cores. | -- |
| 3. | Identify and mark core phasing clear of joint position. | -- |
| 4. | Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position. | 25 |
| 5. | Clean each oversheath for a distance of 1.5m. | -- |
| 6. | Apply a temporary earth continuity bond clear of joint position. | 10 |
| 7. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 8. | Set and mark cores ensuring two to the top. | -- |
| 9. | Remove oversheaths and bedding tapes. | 16 |
| 10. | Abrade oversheaths. | 17 |
| 11. | Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point. | -- |
| 12. | Straighten copper screen wires and form into a bunch. | -- |
| 13. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 28 |
| 14. | Fit foam filler pieces and build up cable oversheaths. | 27 |
| 15. | Slide two foam rings over cores to beyond semi-conducting screen termination point. | 32 |

JOINTING PROCEDURE 7.501 – Continued

Actions	General Requirements (ST: CA2C/8)
16. Apply a stress cone to each core.	35
COMPLETION OF JOINT	
17. Fit cable spacer jigs.	6
18. Connect phase conductors ensuring correct connector set up to insulation spacer.	31/36
19. Fit insulation tubes.	37
20. Fit stop end module.	38
21. Fit inner sleeve.	39/40
22. Ensure joint is level and fill with Lovisil.	41
23. Clean and degrease inner sleeve.	43
24. Form copper screen wire bunches into one conductor and fix into connector.	42
26. Remove temporary earth continuity bond applied in 6 and reseal EPR oversheaths.	51
27. Slide and stretch copper stocking across joint and connect to copper screen wires and stop end module.	44
28. Fit and support outer sleeve.	46
29. Mix and pour resin.	47

All dimensions in mm

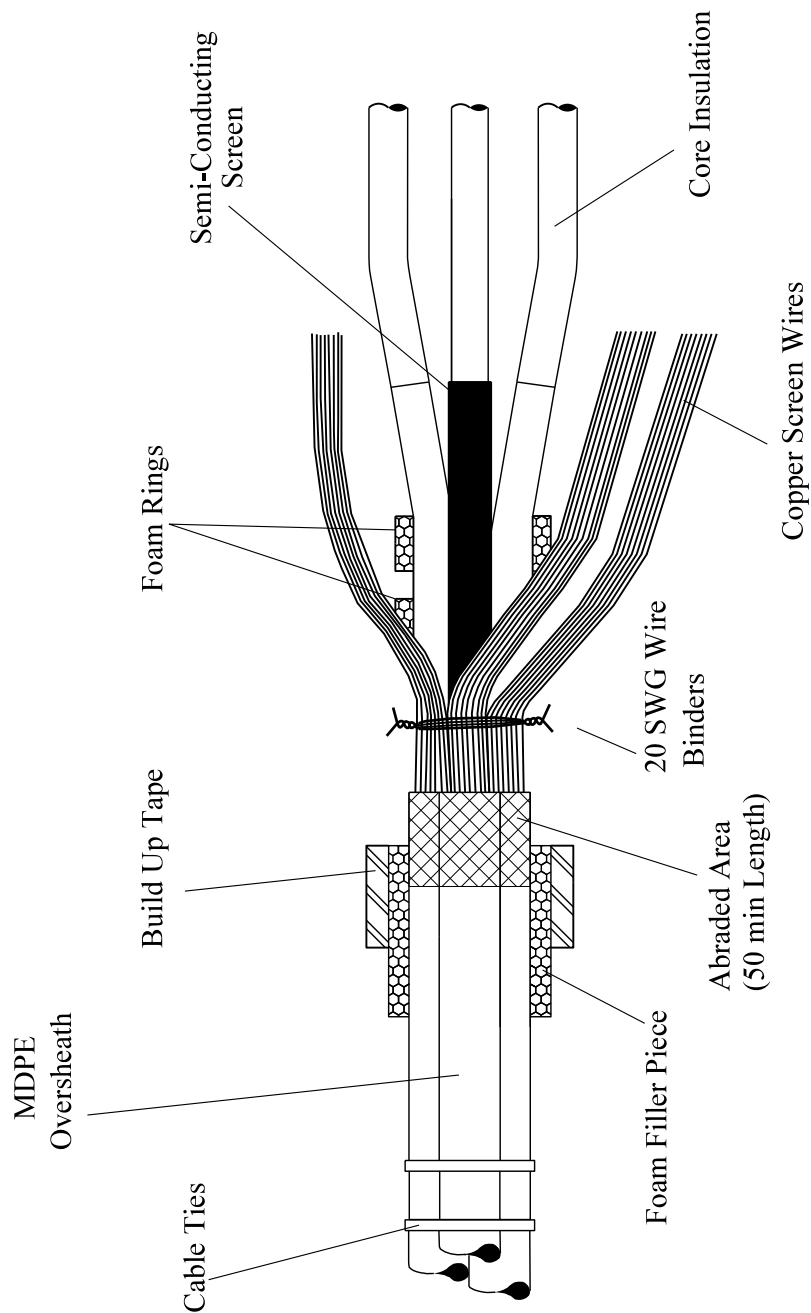



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SCALE		N.T.S.		Title UP TO & INC 185mm ² EPR TRIPLEX LOOP JOINT STRIPPING DIMENSIONS	
				Drg. No. JP2D 7.501.1	
				Rev No	

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All dimensions in mm

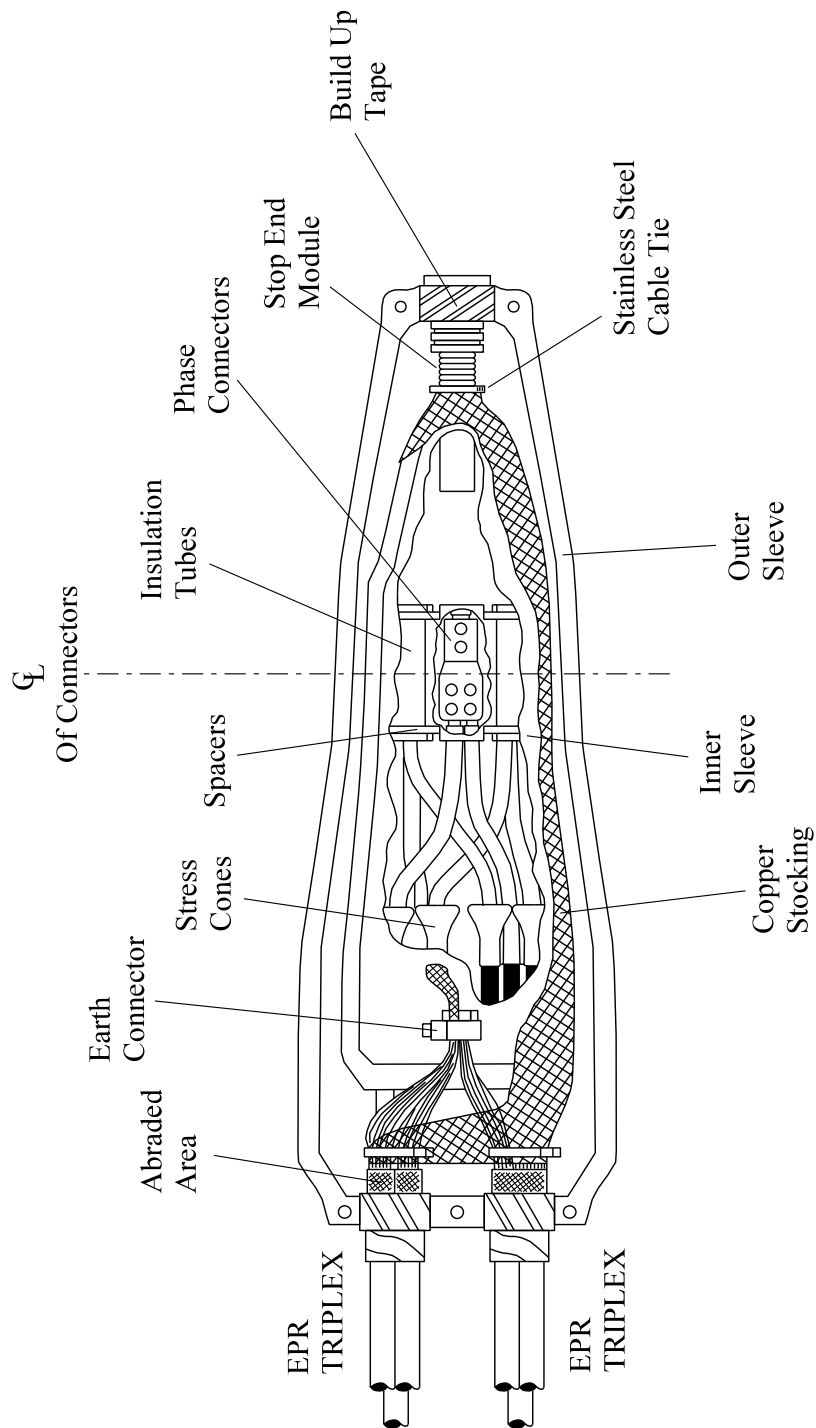
EPR TRIPLEX



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All dimensions in mm



PLAN VIEW

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**ST: CA2O/4 PROCEDURES FOR MAKING 11kV CABLE LOOP
JOINTS.**

JOINTING PROCEDURE 7.502

**300mm² EPR TRIPLEX – 300mm² EPR TRIPLEX CABLE
11kV LOOP JOINT**

(This Jointing Procedure covers cable sizes up to and including 300mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual.**

JOINTING PROCEDURE 7.502

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
70 EPR	300 EPR	LJ 1107
95 EPR	300 EPR	LJ 1108
185 EPR	300 EPR	LJ 1109
300 EPR	300 EPR	LJ 1110

Note: - The jointing materials for 240mm² EPR Triplex will be as 300mm² EPR Triplex.

Any reference to EPR triplex equally applies to XLPE triplex.

JOINTING PROCEDURE 7.502

JOINT KIT MATERIALS

KIT REF	BASE MODULE	RESIN MODULE		CABLE DEPENDING MODULE			FOAM TAPE BUILD UP MODULE	CONNECTOR		TUBE SET	STOP END MODULE
	KB 95	B	D	D	F	J	FTBM	HVBRM22SOUTC	BCNE-3	SMOE 28003	SEM K95
LJ 1107	1	2	2		1	1	1	3	1	2	1
LJ 1108	1	2	2	1	1		1	3	1	2	1
LJ 1109	1	2	2	1	1		1	3	1	2	1
LJ 1110	1	2	2		2			3	1	2	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 Scotch 13 tape
 Tinned copper wire 16 swg
 Tinned copper wire 20 swg
 De-solvit 1000 FD
 De-solvit 1000
 Workhorse dry wipes
 Emery cloth
 5313 Water block tape
 Cable ties
 Sealing putty
 Aluminium oxide cloth 320 grit
 Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.502

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.502.1, 7.502.2 and 7.502.3**, whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

EPR CABLE - Preparation

- | | | |
|-----|--|----|
| 2. | Unravel and straighten individual cores. | -- |
| 3. | Identify and mark core phasing clear of joint position. | -- |
| 4. | Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position. | 25 |
| 5. | Clean each oversheath for a distance of 1.5m. | -- |
| 6. | Apply a temporary earth continuity bond clear of joint position. | 10 |
| 7. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 8. | Set and mark cores ensuring two to the top. | -- |
| 9. | Remove oversheaths and bedding tapes. | 16 |
| 10. | Abrade oversheaths. | 17 |
| 11. | Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point. | -- |
| 12. | Straighten copper screen wires and form into a bunch. | -- |
| 13. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 28 |
| 14. | Fit foam filler pieces and build up cable oversheaths. | 27 |
| 15. | Slide two foam rings over cores to beyond semi-conducting screen termination point. | 32 |
| 16. | Apply a stress cone to each core. | 35 |

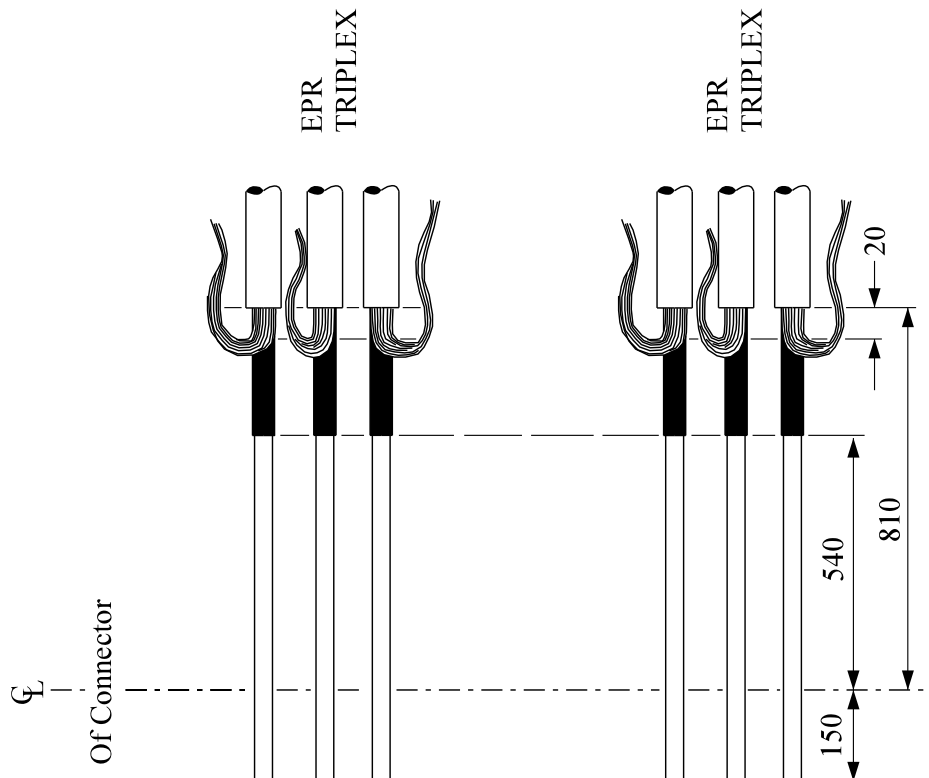
JOINTING PROCEDURE 7.502 – Continued


Actions	General Requirements (ST: CA2C/8)
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COMPLETION OF JOINT

17.	Fit cable spacer jigs.	6
18.	Connect phase conductors ensuring correct connector set up to insulation spacer.	31/36
19.	Fit insulation tubes.	37
20.	Fit stop end module.	38
21.	Fit inner sleeve.	39/40
22.	Ensure joint is level and fill with Lovisil.	41
23.	Clean and degrease inner sleeve.	43
24.	Form copper screen wire bunches into one conductor and fix into connector.	42
26.	Remove temporary earth continuity bond applied in 6 and reseal EPR oversheaths.	51
27.	Slide and stretch copper stocking across joint and connect to copper screen wires and stop end module.	44
28.	Fit and support outer sleeve.	46
29.	Mix and pour resin.	47

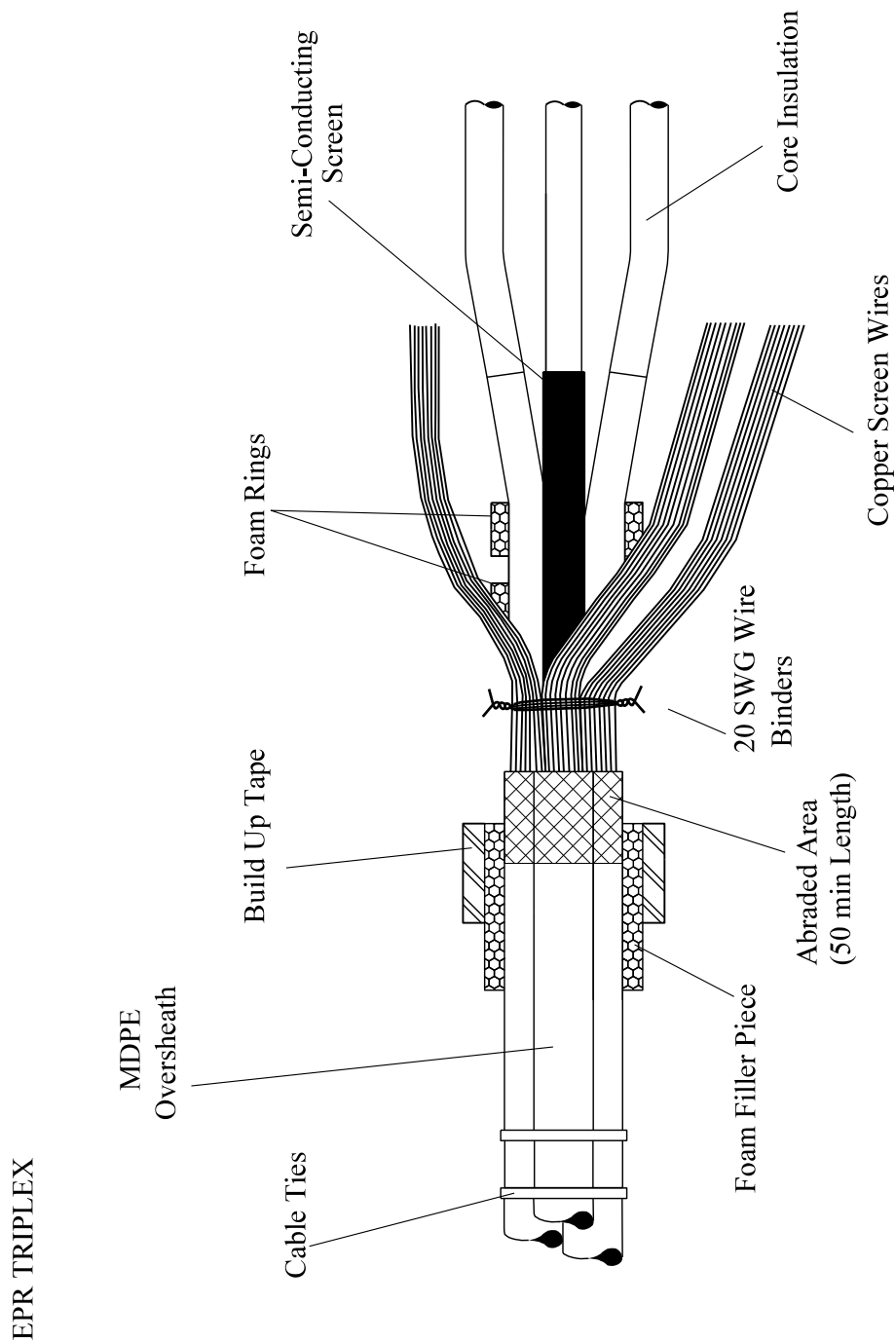
All dimensions in mm




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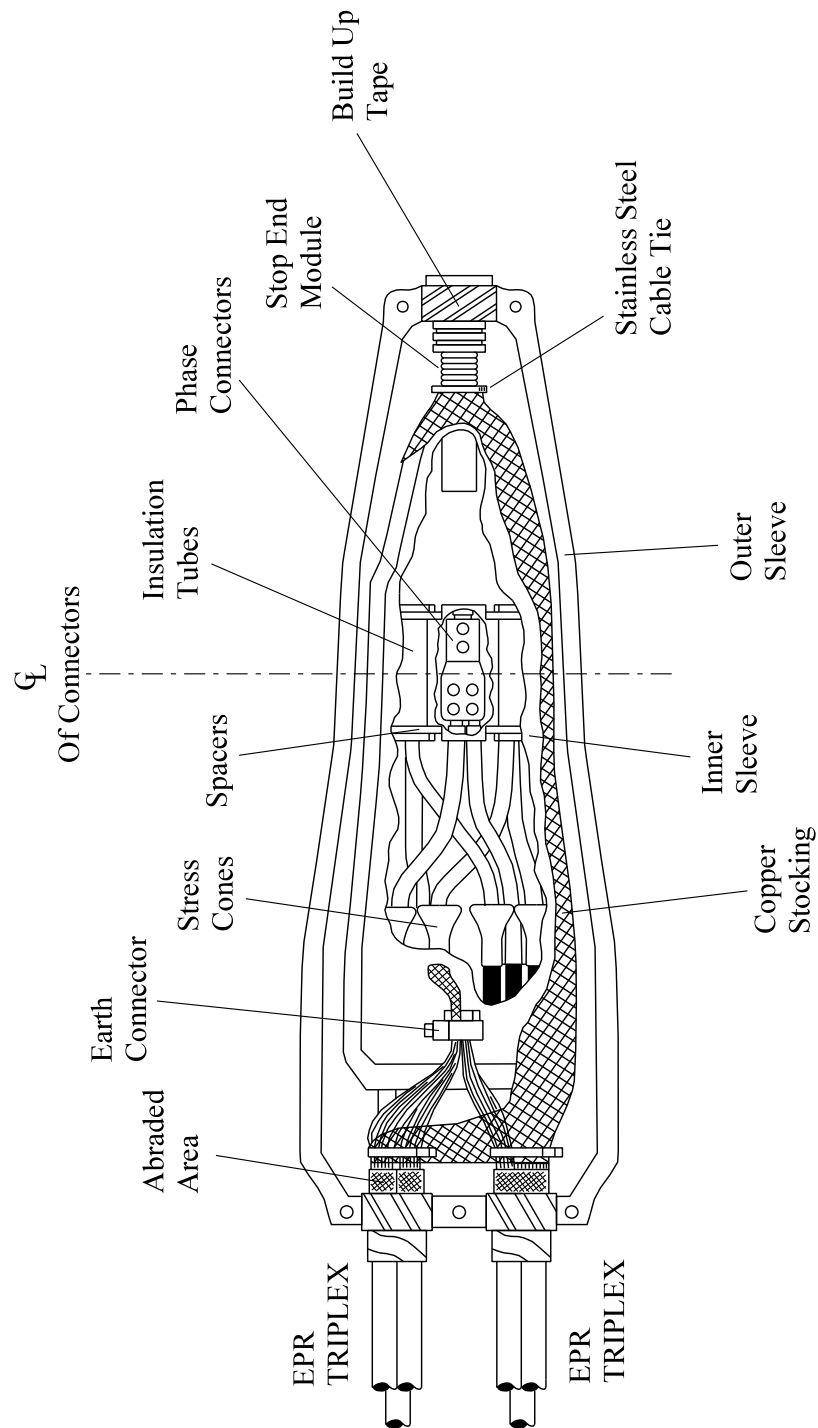
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All dimensions in mm



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**ST: CA2O/4 PROCEDURES FOR MAKING 11kV CABLE LOOP
JOINTS.**

JOINTING PROCEDURE 7.503

**185mm² EPR TRIPLEX – 185mm² PILC/PICAS
CABLE 11kV LOOP JOINT**

(This Jointing Procedure covers cable sizes up to and including 185mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual.**

JOINTING PROCEDURE 7.503

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
16/25/35/50 PILC	70 EPR	LJ 1111
	95 EPR	LJ 1112
	185 EPR	LJ 1113
70/95/120/150 PILC	70 EPR	LJ 1114
	95 EPR	LJ 1115
	185 EPR	LJ 1116
185 PILC	70 EPR	LJ 1117
	95 EPR	LJ 1118
	185 EPR	LJ 1119
95 PICAS	70 EPR	LJ 1120
	95 EPR	LJ 1121
	185 EPR	LJ 1122
185 PICAS	70 EPR	LJ 1123
	95 EPR	LJ 1124
	185 EPR	LJ 1125

Note: - Any reference to PICAS equally applies to PISAS.

Any reference to EPR triplex equally applies to XLPE triplex.

Note: - The jointing materials for 240mm² EPR Triplex will be as 300mm² EPR Triplex.

JOINTING PROCEDURE 7.503

JOINT KIT MATERIALS

KIT REF	BASE MODULE	RESIN MODULE		CABLE DEPENDING MODULE							FOAM TAPE BUILD UP MODULE	TUBE SET
	KB 85	B	D	Belted			Screened				FTBM	WCSM 120/40 x 350
LJ 1111	1	1	2	1				1			1	1
LJ 1112	1	1	2	1			1				1	1
LJ 1113	1	1	2	1			1				1	1
LJ 1114	1	1	2		1			1			1	1
LJ 1115	1	1	2		1		1					1
LJ 1116	1	1	2		1		1					1
LJ 1117	1	1	2			1		1		1	1	1
LJ 1118	1	1	2			1	1			1		1
LJ 1119	1	1	2			1	1			1		1
LJ 1120	1	1	2		1			1	1		1	1
LJ 1121	1	1	2		1		1		1			1
LJ 1122	1	1	2		1		1		1			1
LJ 1123	1	1	2			1		1		1	1	1
LJ 1124	1	1	2			1	1			1		1
LJ 1125	1	1	2			1	1			1		1

KIT REF	CONNECTOR		ARMOUR BONDING MODULE	TUBE SET	STOP END MODULE
	HVBRM18SOUTC	BCNE-3	ABM STA/SWA	SMOE 28003	SEM K85
LJ 1111	3	1	1	1	1
LJ 1112	3	1	1	1	1
LJ 1113	3	1	1	1	1
LJ 1114	3	1	1	1	1
LJ 1115	3	1	1	1	1
LJ 1116	3	1	1	1	1
LJ 1117	3	1	1	1	1
LJ 1118	3	1	1	1	1
LJ 1119	3	1	1	1	1
LJ 1120	3	1		1	1
LJ 1121	3	1		1	1
LJ 1122	3	1		1	1
LJ 1123	3	1		1	1
LJ 1124	3	1		1	1
LJ 1125	3	1		1	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.503

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.503.1, 7.503.2, 7.503.3, 7.503.4, 7.503.5** and **7.503.6** whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

PILC/PICAS CABLE - Preparation

- | | | |
|----|--|----|
| 2. | PILC: - Remove serving, armour and clean lead sheath. | 11 |
| | PICAS: - Remove PVC oversheath and clean aluminium sheath. | 15 |
| 3. | PILC / PICAS: - Abrade metallic sheath from its termination point to serving/oversheath termination point. | -- |
| 4. | PILC: - Apply armour bond. | 12 |
| | PICAS: - Abrade PVC oversheath. | 17 |
| 5. | Apply a temporary earth continuity bond to metallic sheath. | 10 |
| 6. | Slide two foam rings over metallic sheath to beyond its termination point. | 34 |
| 7. | Remove metallic sheath: - PILC (lead). | 18 |
| | PICAS (aluminium). | 19 |
| 8. | Terminate board of trade sheath (if present). | 20 |
| 9. | Carry out moisture test. | 8 |

BELTED CABLES

- | | | |
|-----|---|----|
| 10. | Terminate carbon (if present) and belt papers. | 22 |
| 11. | Apply a silicon tape seal to belt papers and metallic sheath. | 24 |
| 12. | Remove core fillers. | -- |
| 13. | Using a clean dry wipe remove excess impregnate from cores. | -- |
| 14. | Apply metallic sheath bond to PILC/PICAS cable. | 42 |

JOINTING PROCEDURES 7.503 – Continued

Actions	General Requirements (ST: CA2C/8)
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SCREENED CABLES

15.	Cut off and remove copper woven fabric tape.	23
16.	Apply a silicon tape seal to copper woven fabric tape and metallic sheath.	24
17.	Remove core fillers.	--
18.	Using a clean dry wipe remove excess impregnate from cores.	--
19.	Remove metallic screens, carbon paper and two conductor papers.	27
20.	Apply a stress cone to each core.	35
21.	Apply metallic sheath bond to PILC/PICAS cable.	42

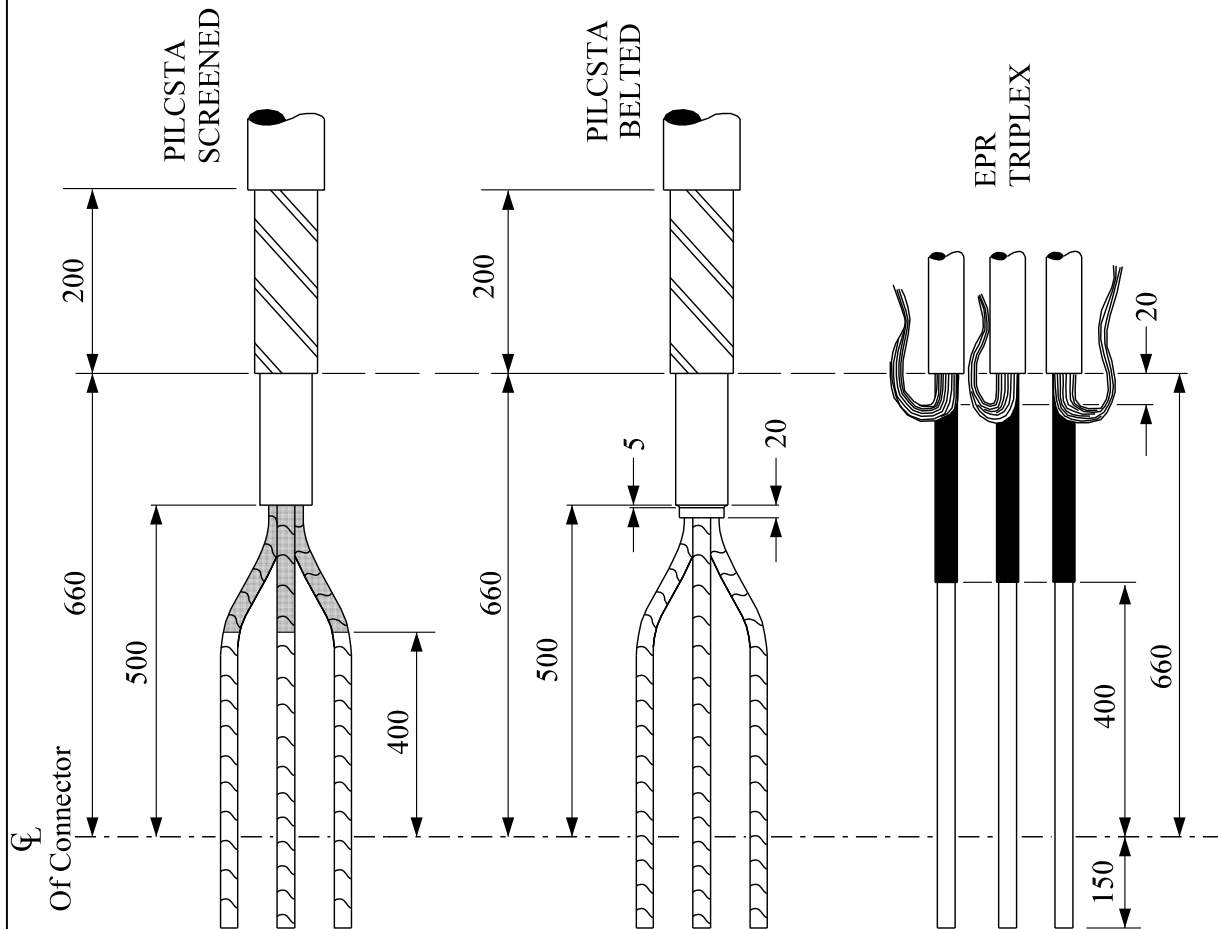
EPR CABLE - Preparation


22.	Unravel and straighten individual cores.	--
23.	Identify and mark core phasing clear of joint position.	--
24.	Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position.	25
25.	Clean each oversheath for a distance of 1.5m.	--
26.	Apply a temporary earth continuity bond clear of joint position.	10
27.	Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
28.	Set and mark cores ensuring two to the top.	--
29.	Remove oversheaths and bedding tapes.	16
30.	Abrade oversheaths.	17
31.	Apply a 20swg binder around copper screen wires 20mm from oversheath termination point.	--
32.	Straighten copper screen wires and form into a bunch.	--

JOINTING PROCEDURES 7.503 – Continued

Actions	General Requirements (ST: CA2C/8)
32. Remove semi-conducting screens ensuring insulation is free from all conducting material.	28
33. Fit foam filler piece and build up cable oversheaths.	32
34. Slide two foam rings over cores to beyond semi-conducting screen termination point.	34
35. Apply a stress cone to each core.	35
COMPLETION OF JOINT	
36. Build up PILC/PICAS cable oversheath.	32
37. Fit cable spacer jigs.	6
38. Connect phase conductors ensuring correct connector set up to insulation spacer.	31/36
39. Fit insulation tubes.	37
40. Fit stop end module.	38
41. Fit inner sleeve.	39/40
42. Ensure joint is level and fill with Lovisil.	41
43. Clean and degrease inner sleeve.	38
44. Form copper screen wire bunches into one conductor and into connector.	42
45. Remove temporary earth continuity bond applied in 5 and reseal EPR oversheaths.	51
46. Slide and stretch copper stocking across joint and connect to metallic sheath, copper screen wires and stop end module.	44
47. Apply water block tape to metallic sheath.	45
48. Fit and support outer sleeve.	46
49. Mix and pour resin.	47

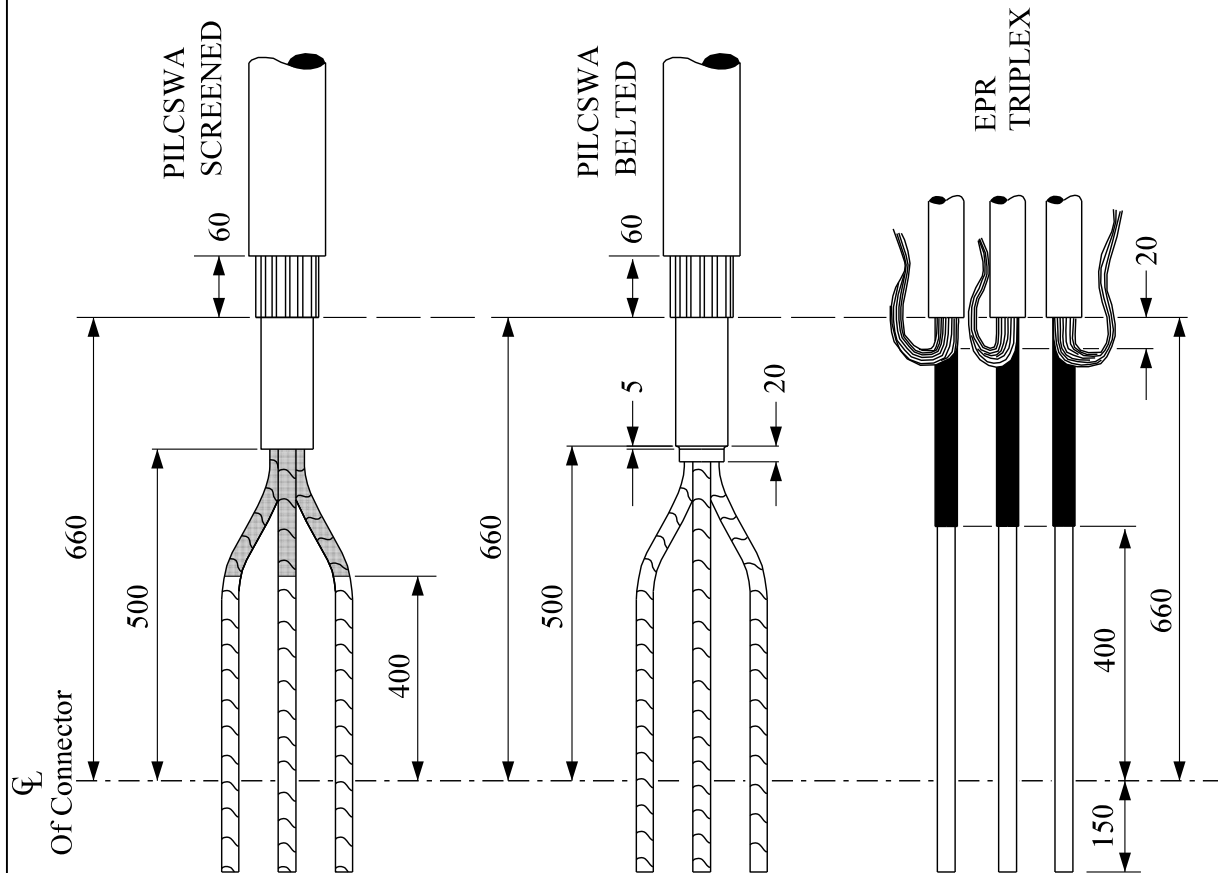
All dimensions in mm




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Checked						
Approved						
SCALE		N.T.S.				
Title				UP TO & INC 185mm ² EPR TRIPLEX - PILC/PICAS LOOP JOINT STRIPPING DIMENSIONS	Drg. No. JP2D 7.503.1	Rev No

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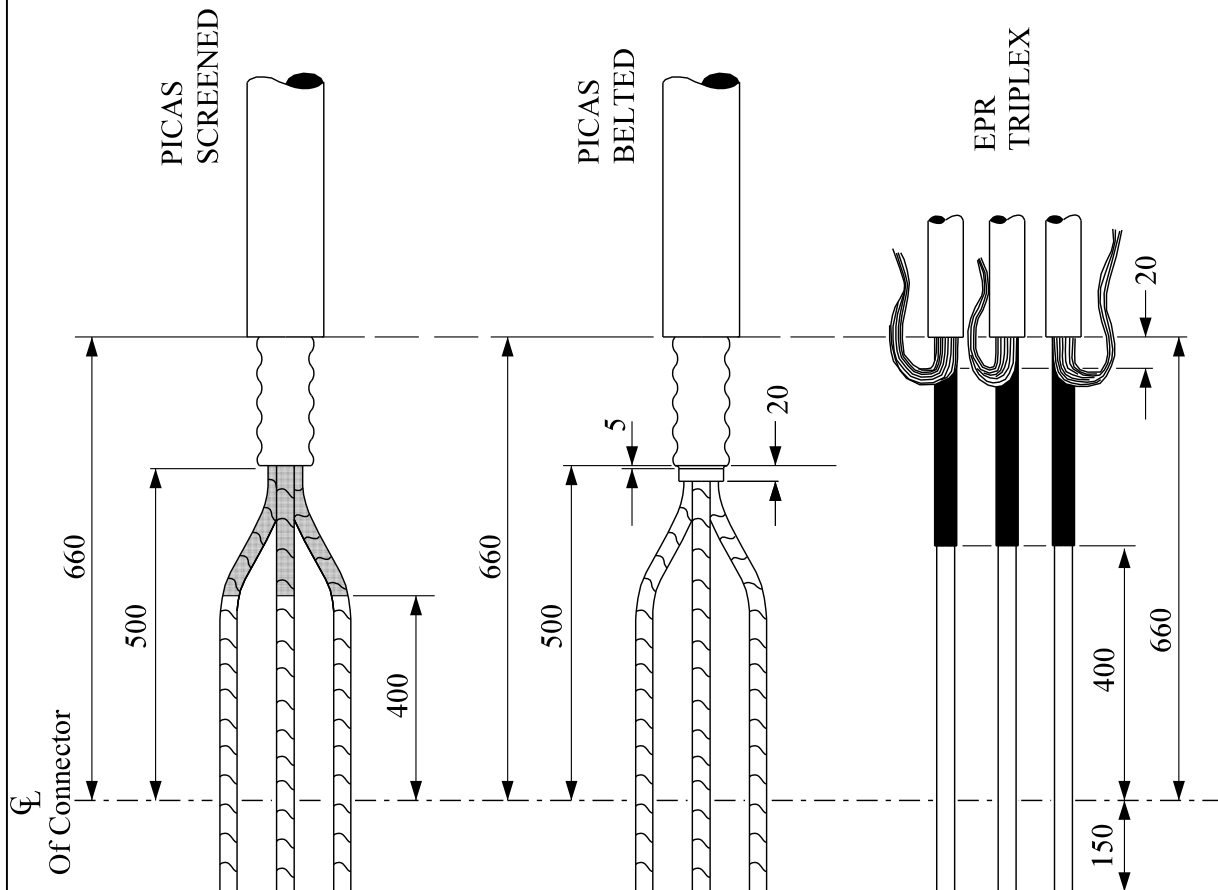
All dimensions in mm




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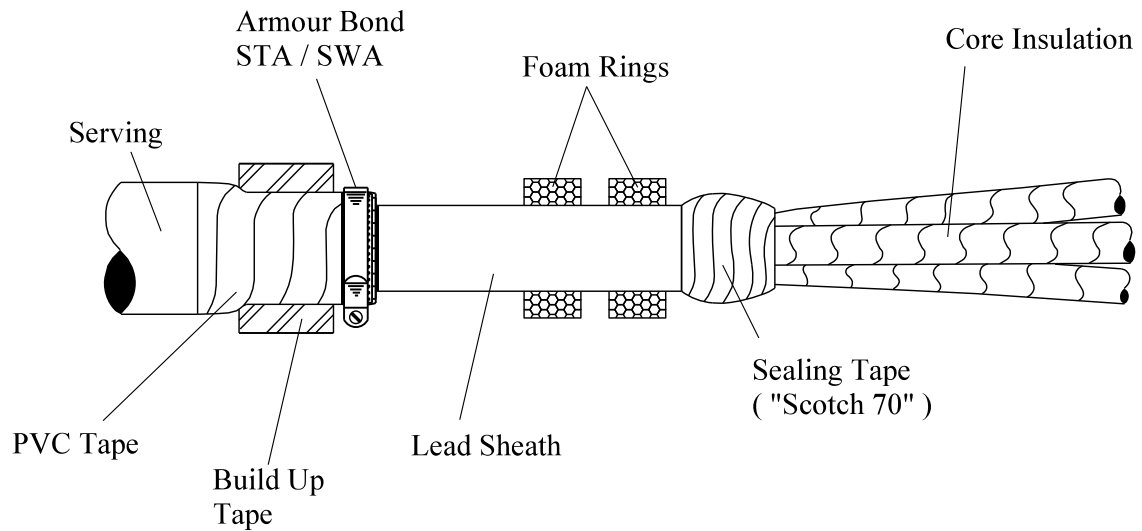


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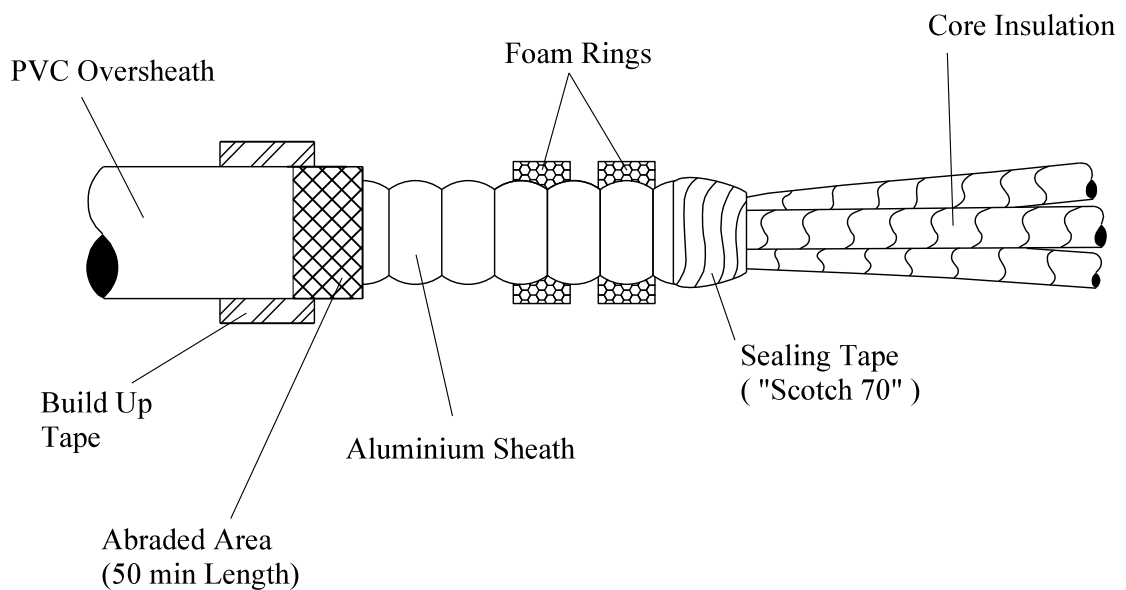
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PILC

All dimensions in mm



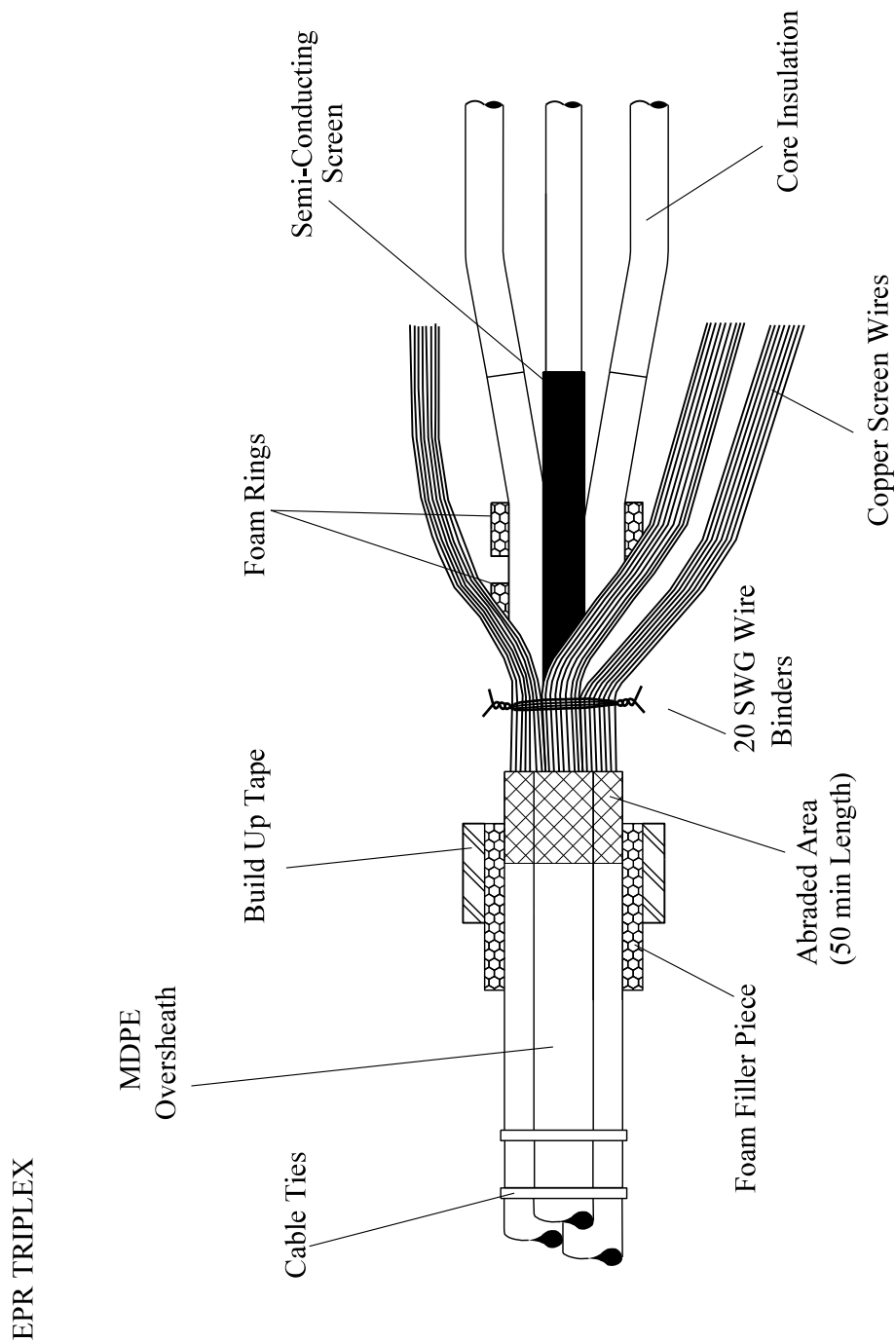
PICAS / PISAS




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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				PREPARATION OF PILC/PICAS		JP2D 7.503.4	

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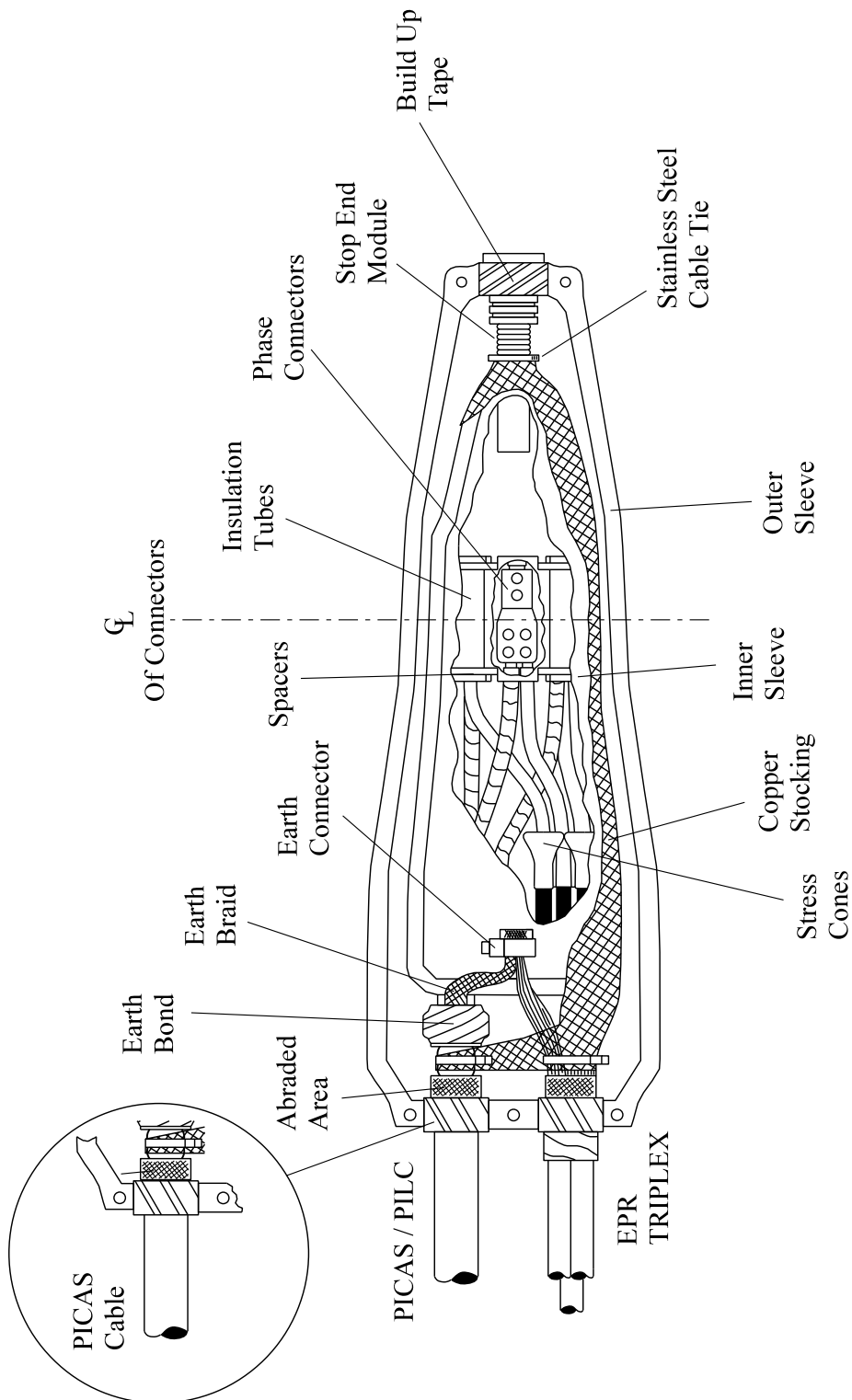
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Approved					
SCALE		N.T.S.		PREPARATION OF EPR TRIPLEX	
				Drg. No. JP2D 7.503.5	
				Rev No	

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All dimensions in mm



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Drawn	RJB	04/13	Title UP TO & INC 185mm ² EPR TRIPLEX - PILC/PICAS LOOP JOINT GENERAL LAYOUT		
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Approved			Drg. No. JP2D 7.503.6 Rev No		
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**ST: CA2O/4 PROCEDURES MAKING FOR 11kV CABLE LOOP
JOINTS.**

JOINTING PROCEDURE 7.504

**300mm² EPR TRIPLEX – 300mm² PILC/PICAS
CABLE 11kV LOOP JOINT**

(This Jointing Procedure covers cable sizes up to and including 300mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual.**

JOINTING PROCEDURE 7.504

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
16/25/35/50 PILC	300 EPR	LJ 1126
70/95/120/150 PILC	300 EPR	LJ 1127
240/300 PILC	70 EPR	LJ 1128
	95 EPR	LJ 1129
	185 EPR	LJ 1130
	300 EPR	LJ 1131
95 PICAS	300 EPR	LJ 1132
185 PICAS	300 EPR	LJ 1133
300 PICAS	70 EPR	LJ 1134
	95 EPR	LJ 1135
	185 EPR	LJ 1136
	300 EPR	LJ 1137

Note: - The jointing materials for 240mm² EPR Triplex will be as 300mm² EPR Triplex.

Any reference to PICAS equally applies to PISAS.

Any reference to EPR triplex equally applies to XLPE triplex.

JOINTING PROCEDURE 7.504

JOINT KIT MATERIALS

KIT REF	BASE MODULE	RESIN MODULE		CABLE DEPENDING MODULE									FOAM TAPE BUILD UP MODULE
				Belted					Screened				
	KB 95	B	D	A	B	D	E	F	J	K	L	M	FTBM
LJ 1126	1	2	2	1				1					1
LJ 1127	1	2	2		1			1		1			1
LJ 1128	1	2	2				1		1		1		1
LJ 1129	1	2	2			1	1				1		1
LJ 1130	1	2	2			1	1				1		1
LJ 1131	1	2	2				1	1				1	
LJ 1132	1	2	2		1			1		1			1
LJ 1133	1	2	2				1	1			1		
LJ 1134	1	2	2				1		1			1	1
LJ 1135	1	2	2			1	1					1	1
LJ 1136	1	2	2			1	1					1	1
LJ 1137	1	2	2				1	1				1	

KIT REF	CONNECTOR		ARMOUR BONDING MODULE	TUBE SET	STOP END MODULE	TUBE SET
	HVBRM22SOUTC	BCNE-3	ABM STA/SWA	SMOE 2803	SEM K95	WCSM 120/40 x 350
LJ 1126	3	1	1	1	1	1
LJ 1127	3	1	1	1	1	1
LJ 1128	3	1	1	1	1	1
LJ 1129	3	1	1	1	1	1
LJ 1130	3	1	1	1	1	1
LJ 1131	3	1	1	1	1	1
LJ 1132	3	1		1	1	1
LJ 1133	3	1		1	1	1
LJ 1134	3	1		1	1	1
LJ 1135	3	1		1	1	1
LJ 1136	3	1		1	1	1
LJ 1137	3	1		1	1	1
LJ 1138	3	1		1	1	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.504

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.504.1, 7.504.2, 7.504.3, 7.504.4, 7.504.5** and **7.504.6** whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

PILC/PICAS CABLE - Preparation

- | | | |
|----|--|----|
| 2. | PILC: - Remove serving, armour and clean lead sheath. | 11 |
| | PICAS: - Remove PVC oversheath and clean aluminium sheath. | 15 |
| 3. | PILC / PICAS: - Abrade metallic sheath from its termination point to serving/oversheath termination point. | -- |
| 4. | PILC: - Apply armour bond. | 12 |
| | PICAS: - Abrade PVC oversheath. | 17 |
| 5. | Apply a temporary earth continuity bond to metallic sheath. | 10 |
| 6. | Slide two foam rings over metallic sheath to beyond its termination point. | 34 |
| 7. | Remove metallic sheath: - PILC (lead). | 18 |
| | PICAS (aluminium). | 19 |
| 8. | Terminate board of trade sheath (if present). | 20 |
| 9. | Carry out moisture test. | 8 |

BELTED CABLES

- | | | |
|-----|---|----|
| 10. | Terminate carbon (if present) and belt papers. | 22 |
| 11. | Apply a silicon tape seal to belt papers and metallic sheath. | 24 |
| 12. | Remove core fillers. | -- |
| 13. | Using a clean dry wipe remove excess impregnate from cores. | -- |
| 14. | Apply metallic sheath bond to PILC/PICAS cable. | 42 |

JOINTING PROCEDURES 7.504 – Continued

Actions	General Requirements (ST: CA2C/8)
----------------	--

SCREENED CABLES

15.	Cut off and remove copper woven fabric tape.	23
16.	Apply a silicon tape seal to copper woven fabric tape and metallic sheath.	24
17.	Remove core fillers.	--
18.	Using a clean dry wipe remove excess impregnate from cores.	--
19.	Remove metallic screens, carbon paper and two conductor papers.	27
20.	Apply a stress cone to each core.	35
21.	Apply metallic sheath bond to PILC/PICAS cable.	42

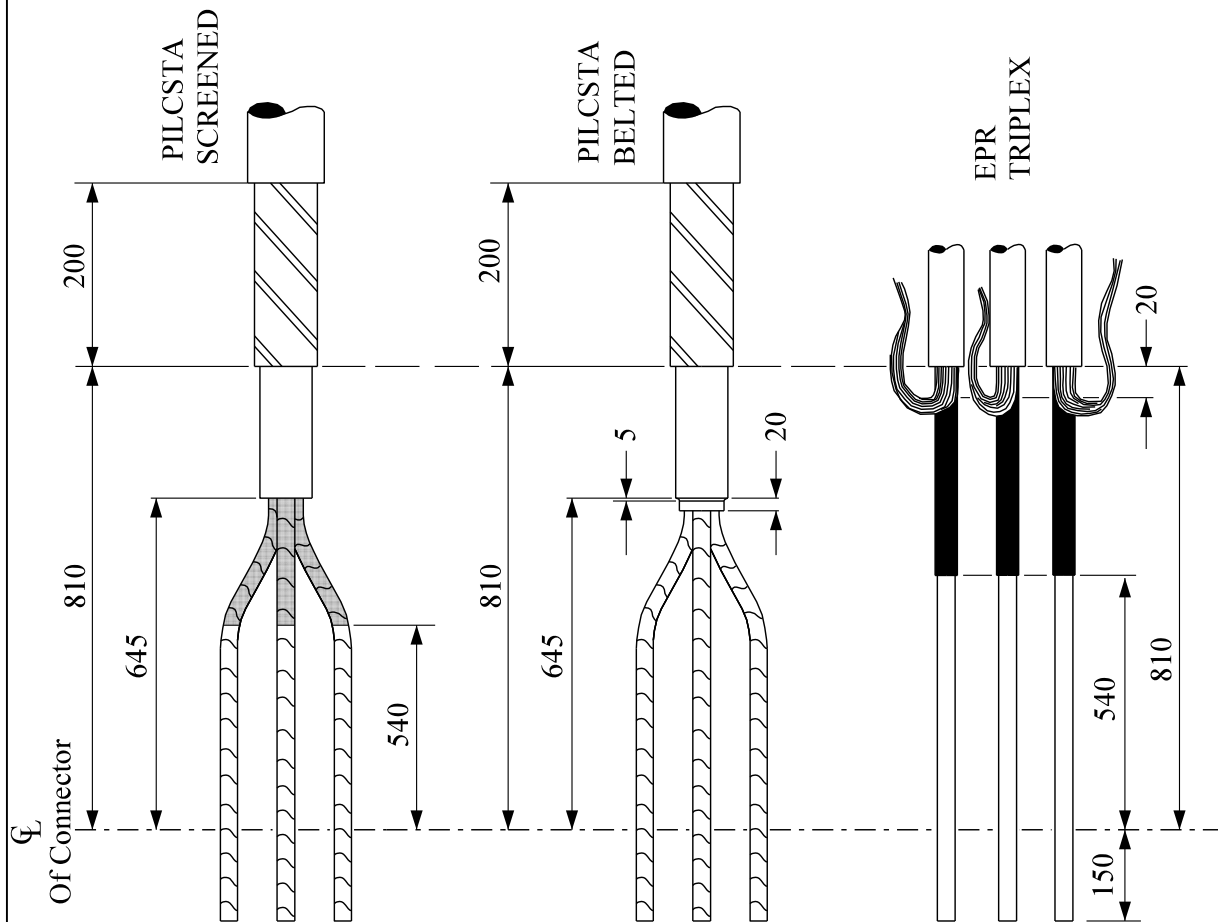
EPR CABLE - Preparation

22.	Unravel and straighten individual cores.	--
23.	Identify and mark core phasing clear of joint position.	--
24.	Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position.	25
25.	Clean each oversheath for a distance of 1.5m.	--
26.	Apply a temporary earth continuity bond clear of joint position.	10
27.	Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
28.	Set and mark cores ensuring two to the top.	--
29.	Remove oversheaths and bedding tapes.	16
30.	Abrade oversheaths.	17
31.	Apply a 20swg binder around copper screen wires 20mm from oversheath termination point.	--
32.	Straighten copper screen wires and form into a bunch.	--

JOINTING PROCEDURES 7.504 – Continued

Actions	General Requirements (ST: CA2C/8)
32. Remove semi-conducting screens ensuring insulation is free from all conducting material.	28
33. Fit foam filler piece and build up cable oversheaths.	32
34. Slide two foam rings over cores to beyond semi-conducting screen termination point.	34
35. Apply a stress cone to each core.	35
COMPLETION OF JOINT	
36. Build up PILC/PICAS cable oversheath.	32
37. Fit cable spacer jigs.	6
38. Connect phase conductors ensuring correct connector set up to insulation spacer.	31/36
39. Fit insulation tubes.	37
40. Fit stop end module.	38
41. Fit inner sleeve.	39/40
42. Ensure joint is level and fill with Lovisil.	41
43. Clean and degrease inner sleeve.	38
44. Form copper screen wire bunches into one conductor and into connector.	42
45. Remove temporary earth continuity bond applied in 5 and reseal EPR oversheaths.	51
46. Slide and stretch copper stocking across joint and connect to metallic sheath, copper screen wires and stop end module.	44
47. Apply water block tape to metallic sheath.	45
48. Fit and support outer sleeve.	46
49. Mix and pour resin.	47

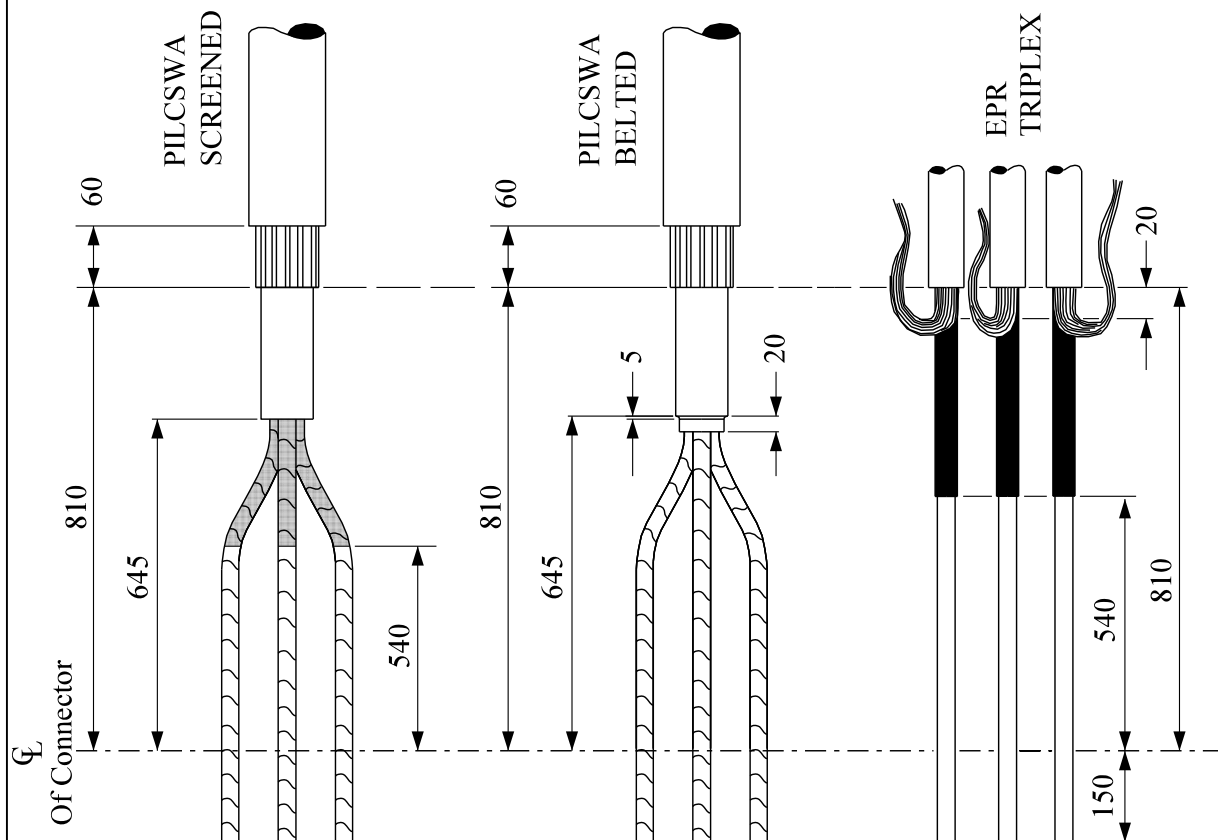
All dimensions in mm




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Drawn	RJB	04/13	Title UP TO & INC 300mm ² PER TRIPLEX - PILC/PICAS LOOP JOINT STRIPPING DIMENSIONS		
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SCALE N.T.S.				Drg. No. JP2D 7.504.1	Rev No

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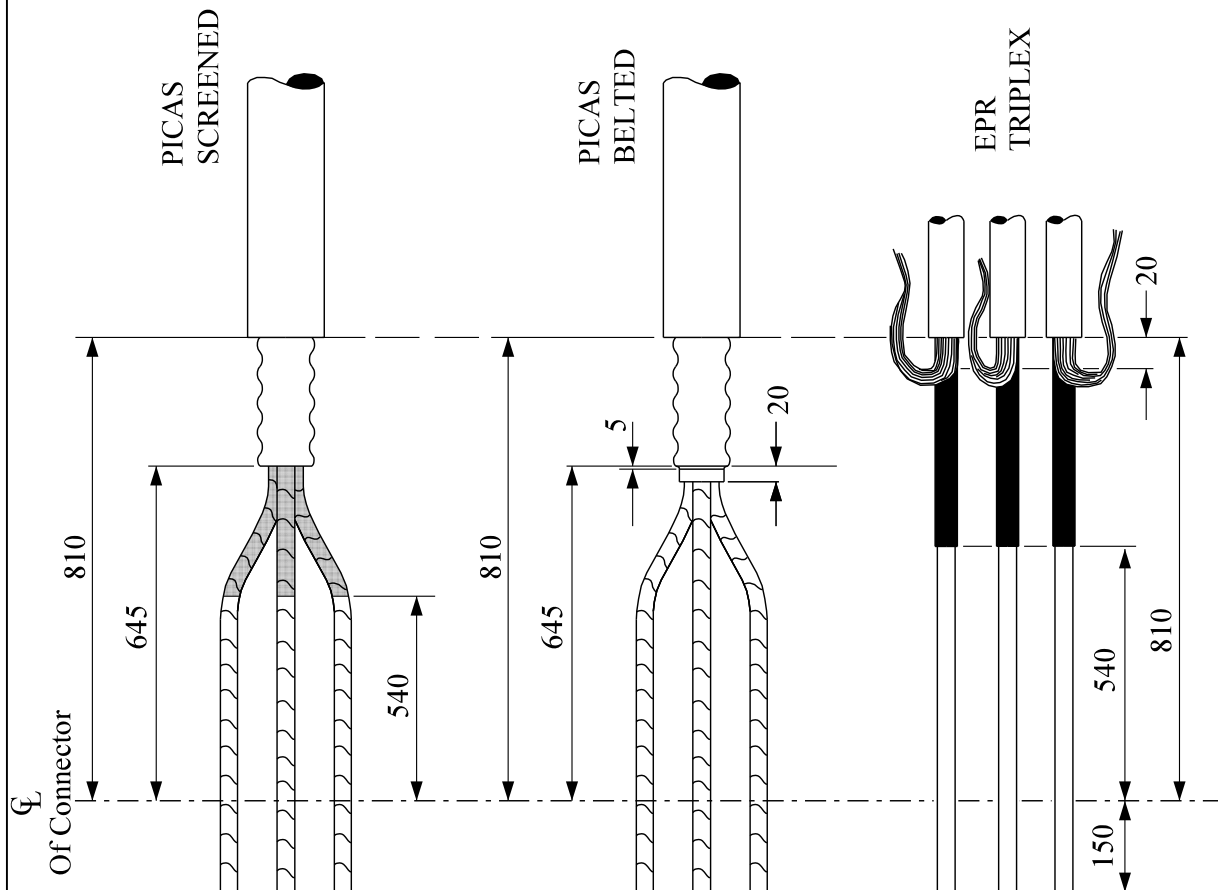
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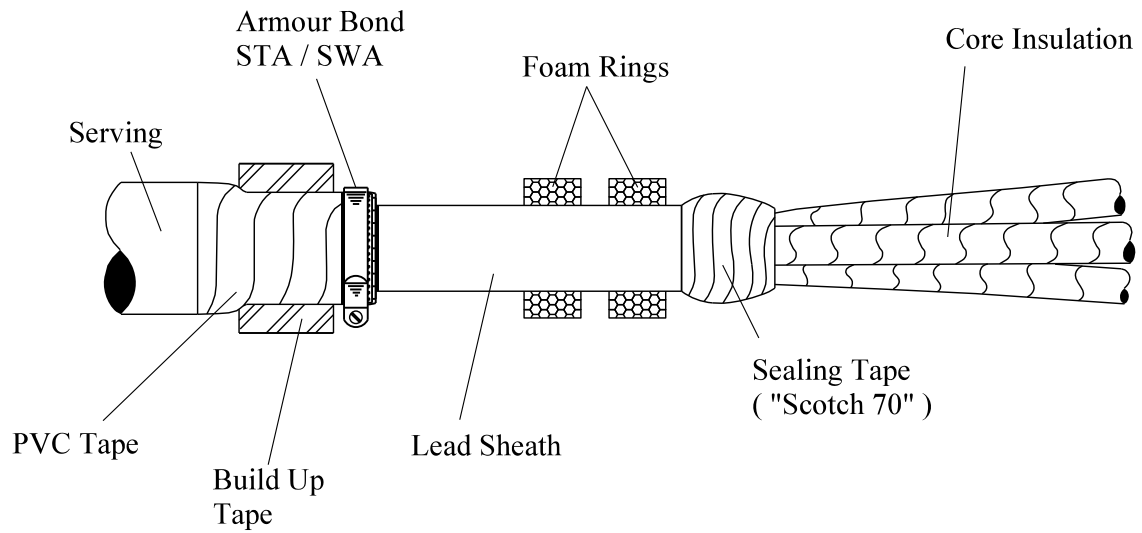


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				<div>Drg. No. JP2D 7.504.3</div>	
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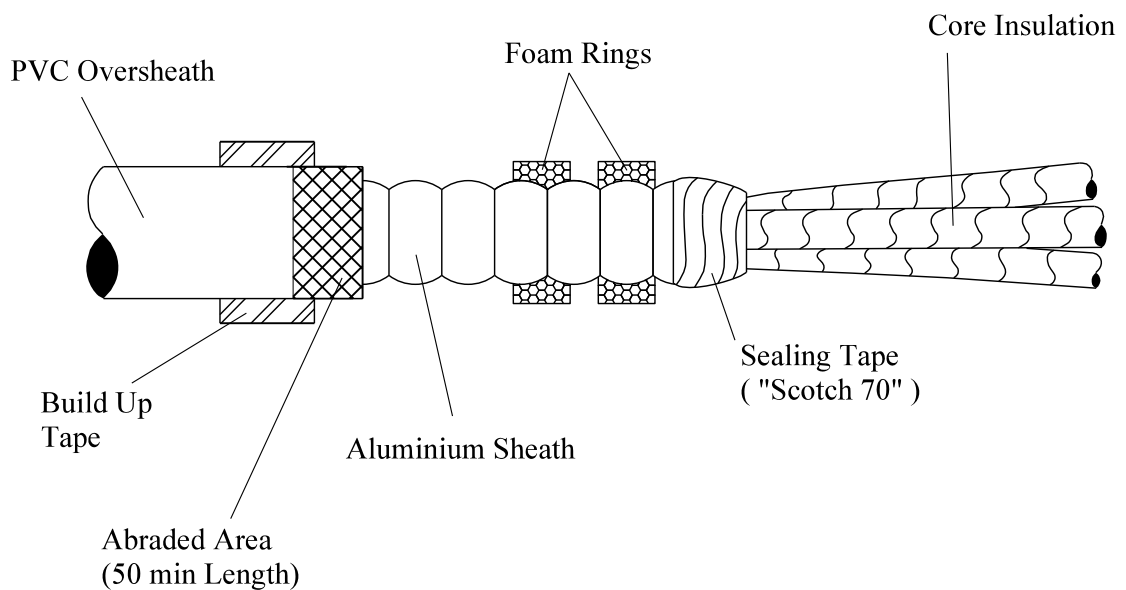
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PILC

All dimensions in mm



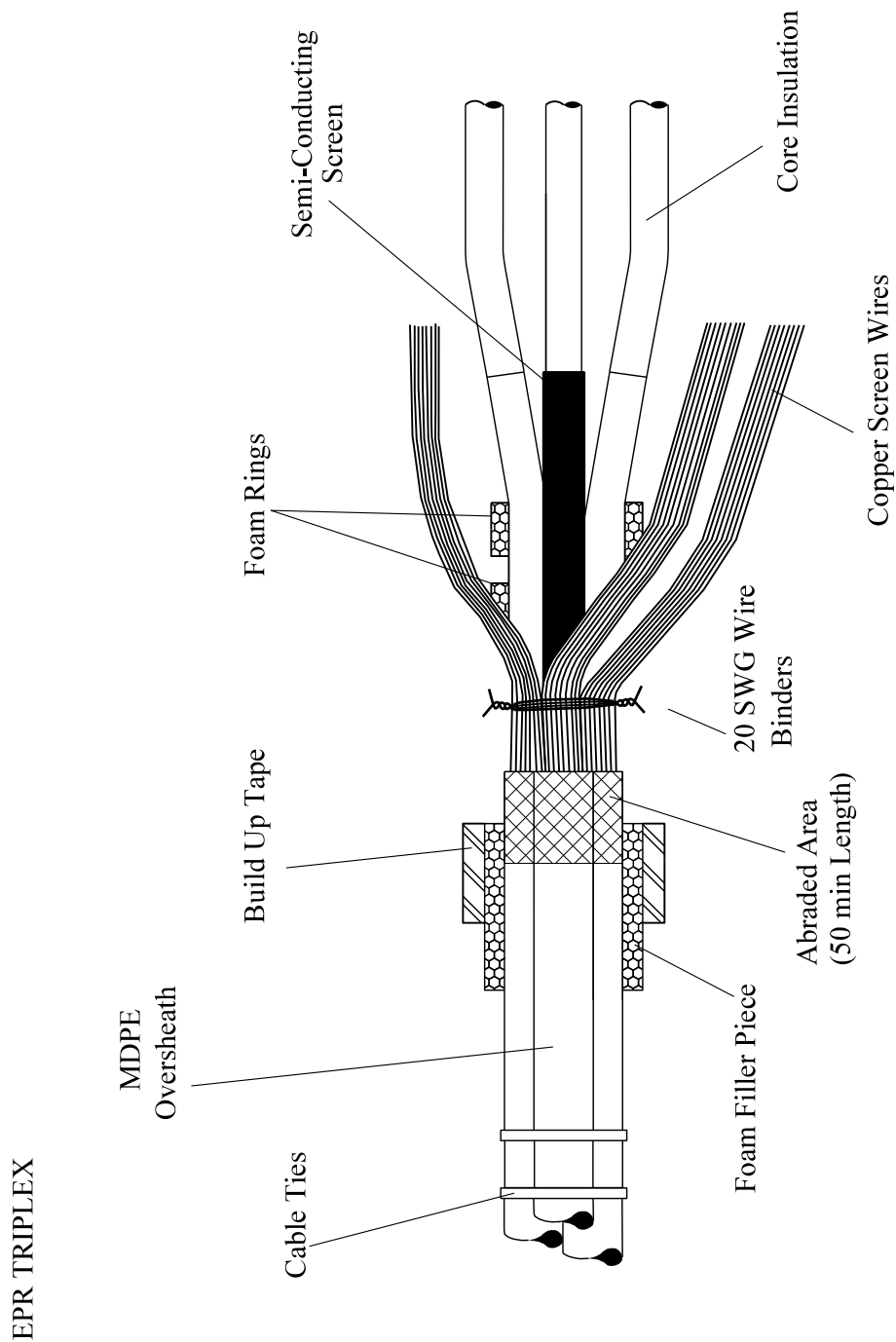
PICAS / PISAS




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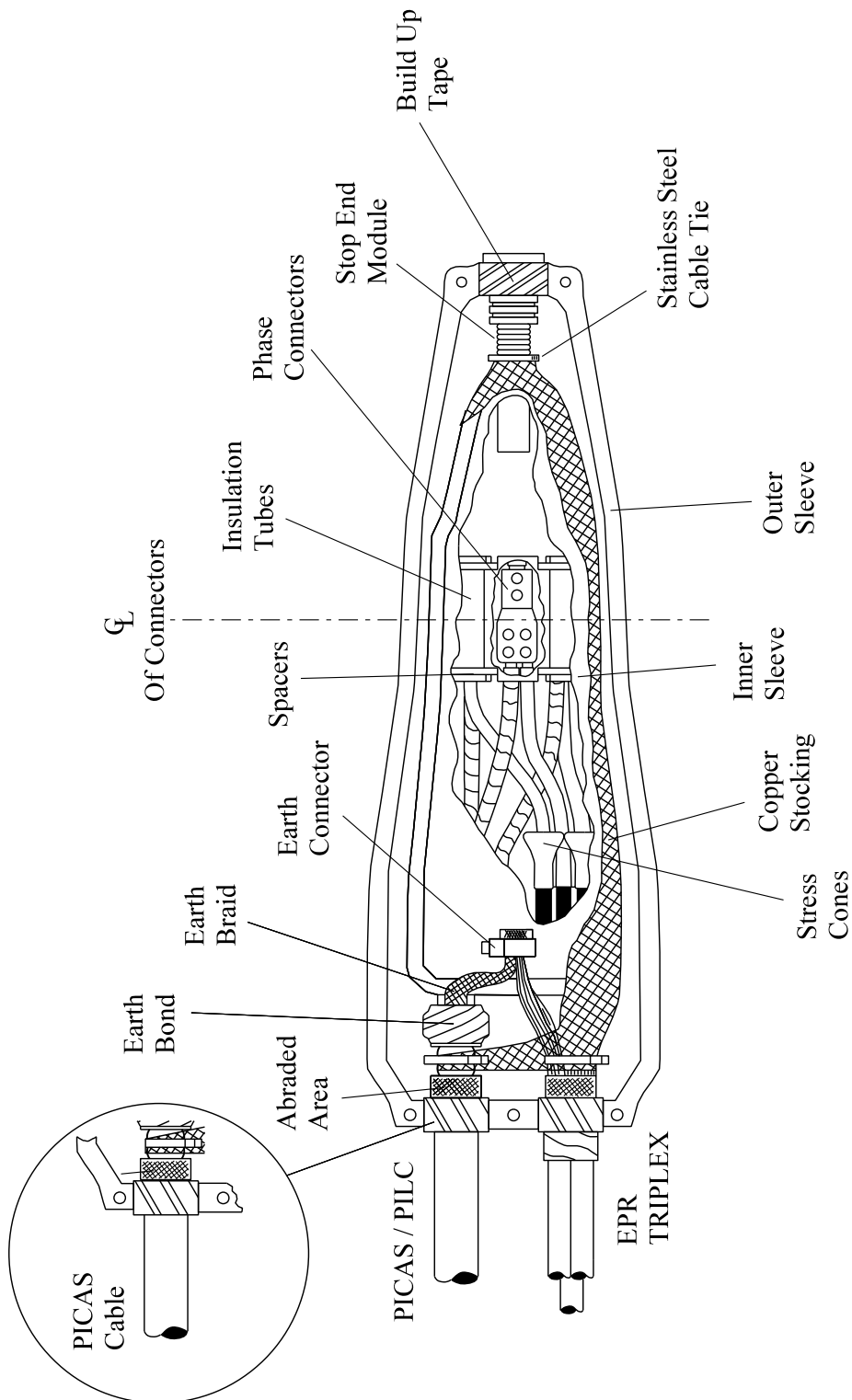
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PLAN VIEW

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Checked				Title UP TO & INC 300mm ² EPR TRIPLEX - PILC/PICAS LOOP JOINT GENERAL LAYOUT	
Approved				Drg. No. JP2D 7.504.6	
SCALE N.T.S.				Rev No	

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ST: CA2O/4 PROCEDURES FOR MAKING 11kV CABLE BRANCH JOINTS

JOINTING PROCEDURE 7.505

185mm² 3 CORE XLPE - 185mm² EPR TRIPLEX CABLE 11kV LOOP JOINT

(This Jointing Procedure covers cable sizes up to and including 185mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.505

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
3 Core 95 XLPE	70 EPR	LJ 1139
	95 EPR	LJ 1140
	185 EPR	LJ 1141
3 Core 185 XLPE	70 EPR	LJ 1142
	95 EPR	LJ 1143
	185 EPR	LJ 1144

Any reference to EPR triplex equally applies to XLPE triplex.

JOINTING PROCEDURE 7.505

JOINT KIT MATERIALS

KIT REF	BASE MODULE		RESIN MODULE			CABLE DEPENDING MODULE			FOAM TAPE BUILD UP MODULE	CONNECTOR		STOP END MODULE	TUBE SET	TUBE SET
	KB 85	KB 85X	B	D	G	D	J	N	FTBM	HVBRM18SOUTC	BCNE-3	SEM K85	SMOE 28003	WCSM 120/40 x 350
LJ 1139	1	1	1	2	3		1	1	1	3	2	1	1	1
LJ 1140	1	1	1	2	3	1		1		3	2	1	1	1
LJ 1141	1	1	1	2	3	1		1		3	2	1	1	1
LJ 1142	1	1	1	2	3		1	1	1	3	2	1	1	1
LJ 1143	1	1	1	2	3	1		1		3	2	1	1	1
LJ 1144	1	1	1	2	3	1		1		3	2	1	1	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 Scotch 13 tape
 Tinned copper wire 16 swg
 Tinned copper wire 20 swg
 De-solvit 1000 FD
 De-solvit 1000
 Workhorse dry wipes
 Emery cloth
 5313 Water block tape
 Cable ties
 Sealing putty
 Aluminium oxide cloth 320 grit
 Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.505

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.505.1, 7.505.2, 7.505.3** and **7.505.4**, whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

3 CORE XLPE CABLE - Preparation

- | | | |
|-----|--|-------|
| 2. | Clean each oversheath for a distance of 1.5m. | -- |
| 4. | Apply a temporary earth continuity bond clear of joint position. | 10 |
| 5. | Park a mastic lined heat shrink tube next to temporary earth continuity bond . | -- |
| 6. | Remove oversheath. | 15/16 |
| 7. | Apply 20 swg binding wire 70mm from oversheath termination point to collective copper wire screen. | 21 |
| 8. | Fold back collective copper screen wires and apply 20 swg binder 50mm from oversheath termination form into a bunch. | 21 |
| 9. | Remove the semi-conducting bedding layer. | -- |
| 10. | Apply 13 tape to screen wires and semi-conductor screens. | 21 |
| 11. | Abrade MDPE oversheath. | 17 |
| 12. | Set and mark cores ensuring two to the top. | -- |
| 13. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 28 |
| 15. | Fit foam filler pieces and build up cable oversheaths. | 32 |
| 16. | Slide two foam rings over cores to beyond semi-conducting screen termination point. | 34 |
| 17. | Remove core insulation to allow connector fitting. | 31 |
| 18. | Apply a stress cone to each core. | 35 |

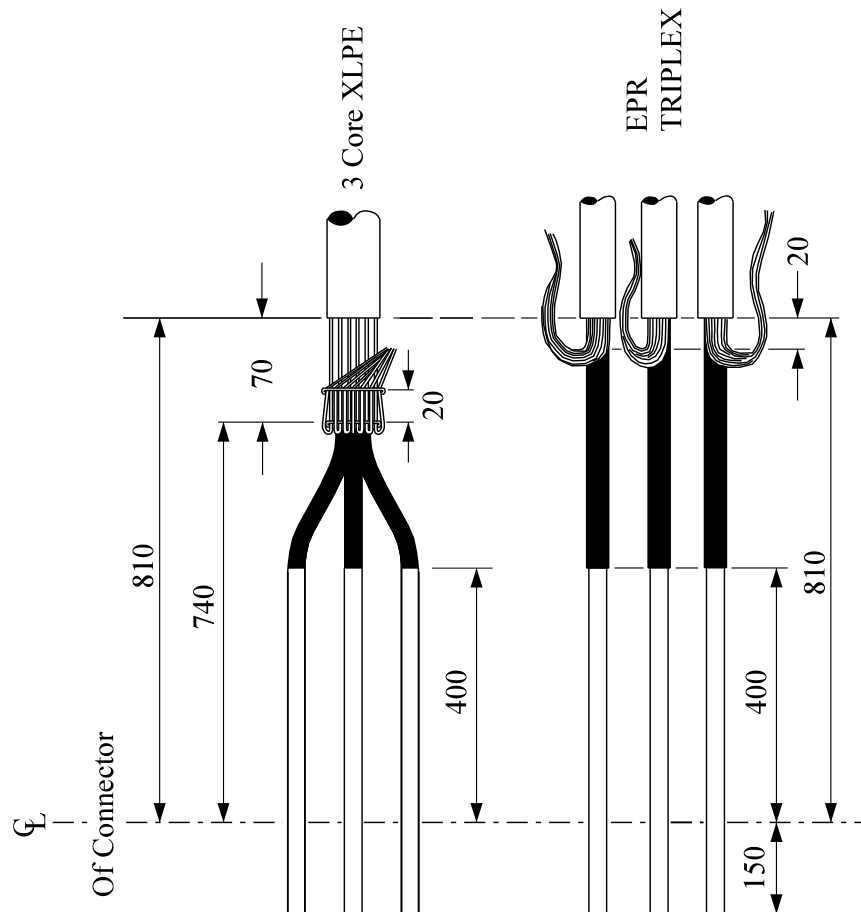
JOINTING PROCEDURES 7.505 – Continued

Actions	General Requirements (ST: CA2C/8)
EPR CABLE - Preparation	
19. Unravel and straighten individual cores.	--
20. Identify and mark core phasing clear of joint position.	--
21. Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position.	25
22. Clean each oversheath for a distance of 1.5m.	--
23. Apply a temporary earth continuity bond clear of joint position.	10
24. Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
25. Set and mark cores ensuring two to the top.	--
26. Remove oversheaths and bedding tapes.	16
27. Abrade oversheaths.	17
28. Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point.	--
29. Straighten copper screen wires and form into a bunch.	--
30. Remove semi-conducting screens ensuring insulation is free from all conducting material.	28
31. Fit foam filler pieces and build up cable oversheaths.	32
32. Slide two foam rings over cores to beyond semi-conducting screen termination point.	34
33. Apply a stress cone to each core.	35
34. Fit cable spacer jigs at double end ensuring cables are positioned central to stop end and maintain this position until completion.	6
35. Connect phase conductors ensuring correct connector set up to insulation spacer.	36

JOINTING PROCEDURE 7.505 – Continued

Actions	General Requirements (ST: CA2C/8)
COMPLETION OF JOINT	
36. Fit insulation tubes.	37
37. Fit stop end module.	38
38. Fit inner sleeve.	39/40
39. Ensure joint is level and fill with Lovisil.	41
40. Clean and degrease inner sleeve.	43
41. Form copper screen wire bunches into one conductor and apply connector.	42
42. Remove temporary earth continuity bond applied in 7 and reseal EPR oversheaths.	--
43. Slide and stretch copper stocking across joint and connect to copper screen wires.	44
44. Fit and support outer sleeve.	46
45. Mix and pour resin.	47

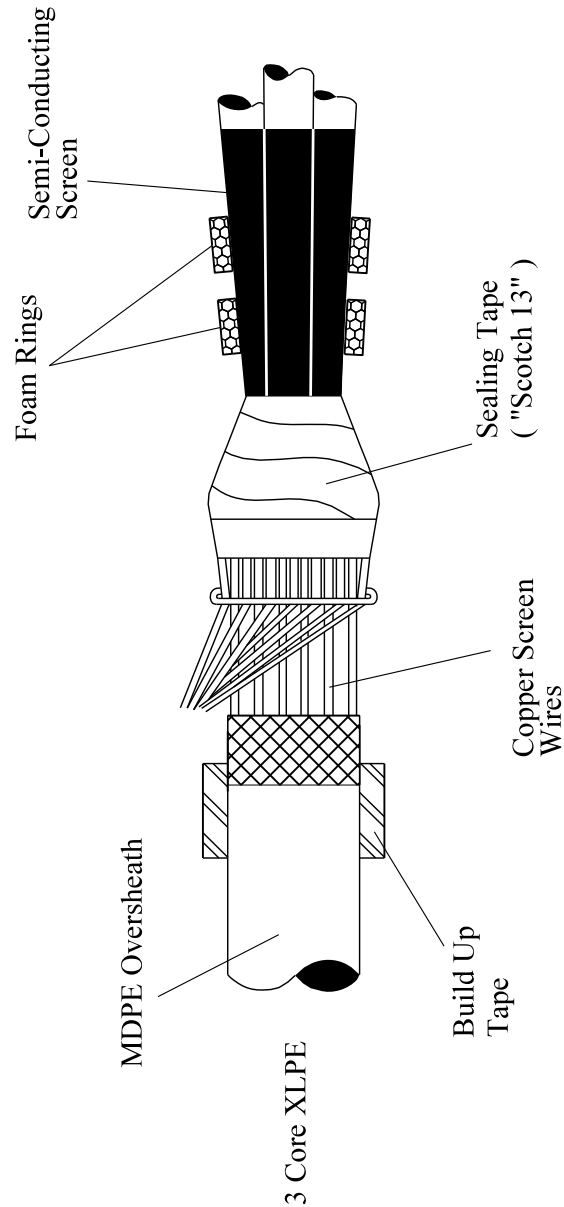
All dimensions in mm




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Drawn	RJB	04/13			
Checked					
Approved					
SCALE		N.T.S.		Title UP TO & INC 185mm ² EPR TRIPLEX - 3 CORE XLPE LOOP JOINT STRIPPING DIMENSIONS	
				Drg. No. JP2D 7.505.1	
				Rev No	

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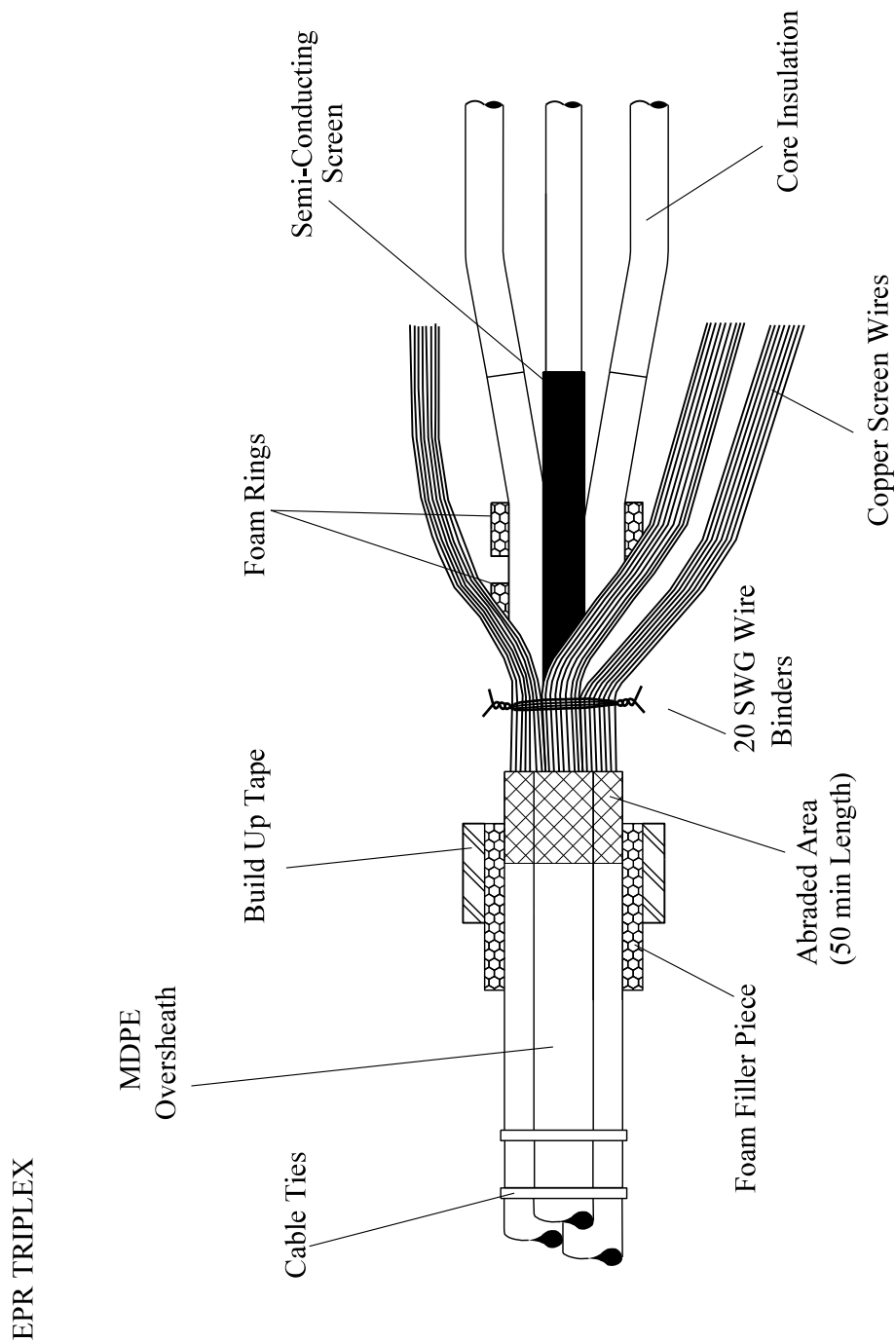
All dimensions in mm




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Drawn	RJB	04/13					
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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				PREPARATION OF THREE CORE XLPE		JP2D 7.505.2	

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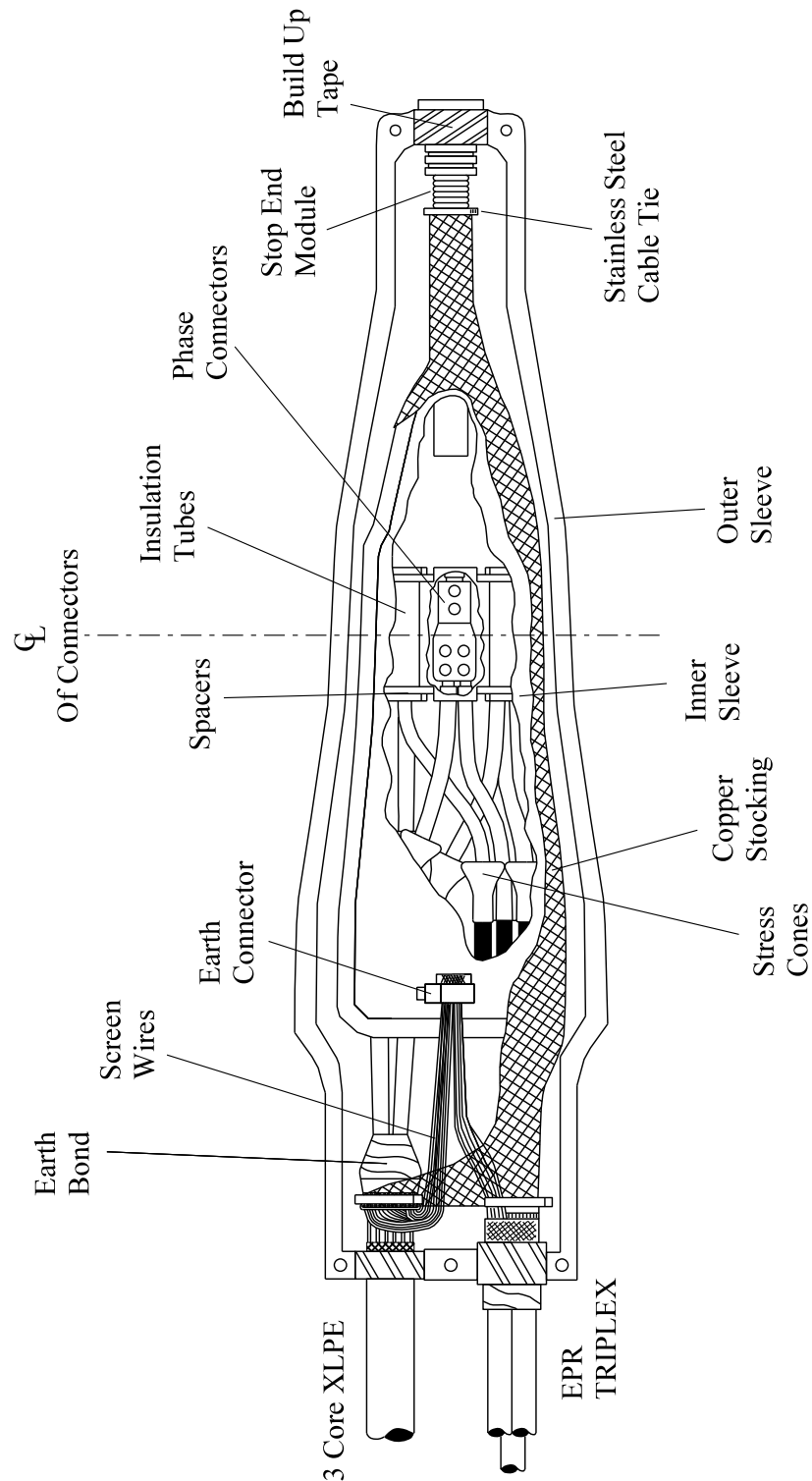
All dimensions in mm




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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				PREPARATION OF EPR TRIPLEX		JP2D 7.505.3	

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All dimensions in mm



PLAN VIEW

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Approved							
SCALE		N.T.S.		Title UP TO & INC 185mm ² EPR TRIPLEX 3 CORE XLPE LOOP JOINT GENERAL LAYOUT		Drg. No. JP2D 7.505.4	Rev No

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ST: CA20/4 PROCEDURES FOR MAKING 11kV CABLE BRANCH JOINTS

JOINTING PROCEDURE 7.506

300mm² 3 CORE XLPE – 300mm² EPR TRIPLEX CABLE 11kV LOOP JOINT

(This Jointing Procedure covers cable sizes up to and including 300mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirement ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.506

JOINT KIT REFERENCES

CABLE SIZE		JOINT REFERENCE
From	To	Loop Joint
95 3 Core XLPE	300 EPR	LJ 1145
185 3 Core XLPE	300 EPR	LJ 1146
300 3 Core XLPE	70 EPR	LJ 1147
	95 EPR	LJ 1148
	185 EPR	LJ 1149
	300 EPR	LJ 1150

Any reference to EPR triplex equally applies to XLPE triplex.

JOINTING PROCEDURE 7.506

JOINT KIT MATERIALS

KIT REF	BASE MODULE		RESIN MODULE			CABLE DEPENDING MODULE					FOAM TAPE BUILD UP MODULE	CONNECTOR		STOP END MODULE	TUBE SET	TUBE SET
	KB 95	KB 95X	B	D	G	D	F	J	N	O	FTBM	HVBRM22SOUTC	BCNE-3	SEM 95	SMOE 28003	WCSM 120/40 x 350
LJ 1145	1	1	2	2	3		1		1		1	3	2	1	1	1
LJ 1146	1	1	2	2	3		1		1		1	3	2	1	1	1
LJ 1147	1	1	2	2	3			1		1	1	3	2	1	1	1
LJ 1148	1	1	2	2	3	1				1	1	3	2	1	1	1
LJ 1149	1	1	2	2	3	1				1	1	3	2	1	1	1
LJ 1150	1	1	2	2	3		1			1		3	2	1	1	1

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 Scotch 13 tape
 Tinned copper wire 16 swg
 Tinned copper wire 20 swg
 De-solvit 1000 FD
 De-solvit 1000
 Workhorse dry wipes
 Emery cloth
 5313 Water block tape
 Cable ties
 Sealing putty
 Aluminium oxide cloth 320 grit
 Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.506

Actions

General Requirements (ST: CA2C/8)

Refer to Drawings **JP2D 7.506.1, 7.506.2, 7.506.3** and **7.506.4**, whilst undertaking this Jointing Procedure.

- | | | |
|----|----------------------|-----|
| 1. | Set and mark cables. | 5/6 |
|----|----------------------|-----|

3 CORE XLPE CABLE - Preparation

- | | | |
|-----|--|-------|
| 2. | Clean each oversheath for a distance of 1.5m. | -- |
| 4. | Apply a temporary earth continuity bond clear of joint position. | 10 |
| 5. | Park a mastic lined heat shrink tube next to temporary earth continuity bond . | -- |
| 6. | Remove oversheath. | 15/16 |
| 7. | Apply 20 swg binding wire 70mm from oversheath termination point to collective copper wire screen. | 21 |
| 8. | Fold back collective copper screen wires and apply 20 swg binder 50mm from oversheath termination form into a bunch. | 21 |
| 9. | Remove the semi-conducting bedding layer. | -- |
| 10. | Apply 13 tape to screen wires and semi-conductor screens. | 21 |
| 11. | Abrade MDPE oversheath. | 17 |
| 12. | Set and mark cores ensuring two to the top. | -- |
| 13. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 28 |
| 15. | Fit foam filler pieces and build up cable oversheaths. | 32 |
| 16. | Slide two foam rings over cores to beyond semi-conducting screen termination point. | 34 |
| 17. | Remove core insulation to allow connector fitting. | 31 |
| 18. | Apply a stress cone to each core. | 35 |

JOINTING PROCEDURES 7.506 – Continued

Actions	General Requirements (ST: CA2C/8)
EPR CABLE - Preparation	
19. Unravel and straighten individual cores.	--
20. Identify and mark core phasing clear of joint position.	--
21. Set and align cores into their joint positions, ensuring that any cross is undertaken well away from joint position.	25
22. Clean each oversheath for a distance of 1.5m.	--
23. Apply a temporary earth continuity bond clear of joint position.	10
24. Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
25. Set and mark cores ensuring two to the top.	--
26. Remove oversheaths and bedding tapes.	16
27. Abrade oversheaths.	17
28. Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point.	--
29. Straighten copper screen wires and form into a bunch.	--
30. Remove semi-conducting screens ensuring insulation is free from all conducting material.	28
31. Fit foam filler pieces and build up cable oversheaths.	32
32. Slide two foam rings over cores to beyond semi-conducting screen termination point.	34
33. Apply a stress cone to each core.	35
34. Fit cable spacer jigs at double end ensuring cables are positioned central to stop end and maintain this position until completion.	6
35. Connect phase conductors ensuring correct connector set up to insulation spacer.	36

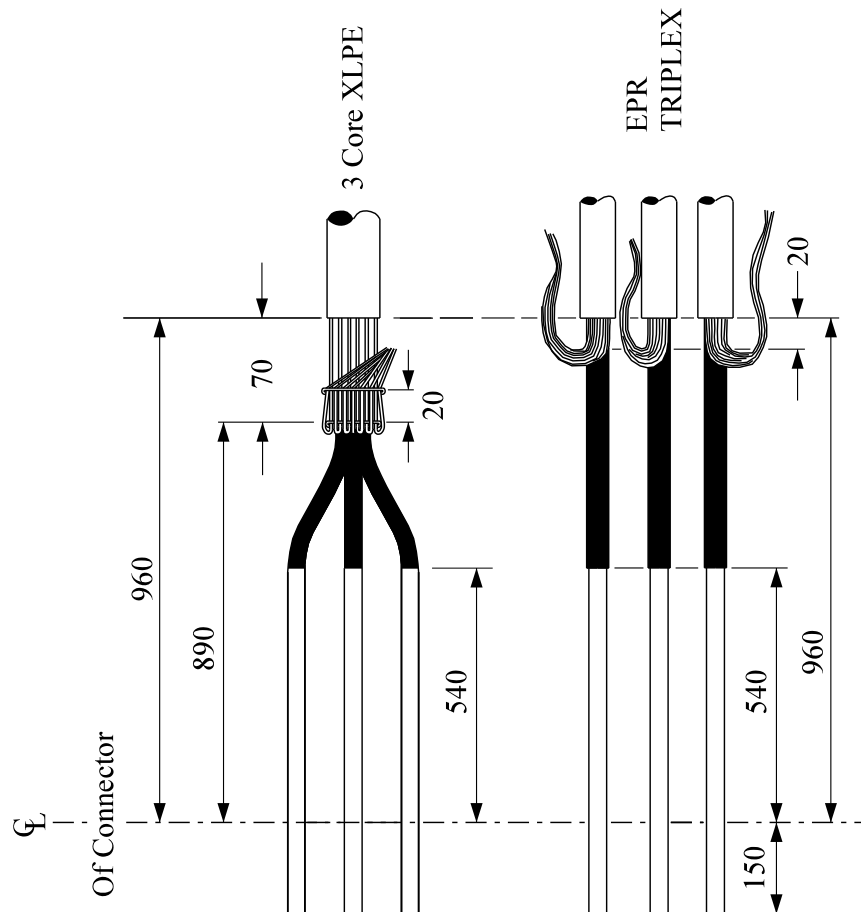
JOINTING PROCEDURE 7.506 – Continued


Actions	General Requirements (ST: CA2C/8)
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COMPLETION OF JOINT

36.	Fit insulation tubes.	37
37.	Fit stop end module.	38
38.	Fit inner sleeve.	39/40
39.	Ensure joint is level and fill with Lovisil.	41
40.	Clean and degrease inner sleeve.	43
41.	Form copper screen wire bunches into one conductor and apply connector.	42
42.	Remove temporary earth continuity bond applied in 7 and reseal EPR oversheaths.	--
43.	Slide and stretch copper stocking across joint and connect to copper screen wires.	44
44.	Fit and support outer sleeve.	46
45.	Mix and pour resin.	47

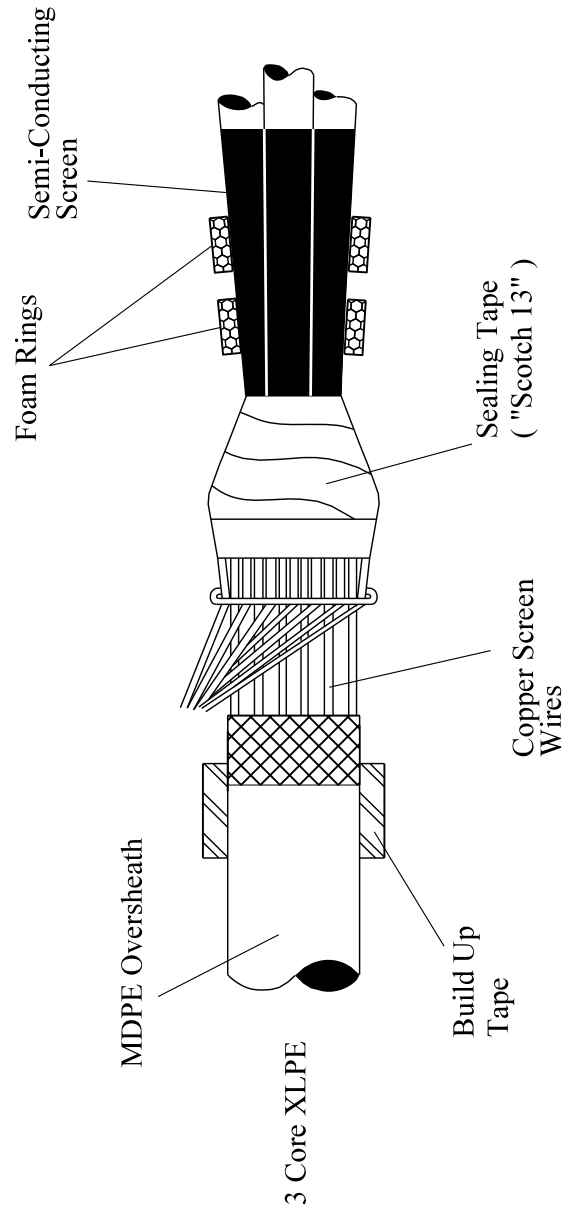
All dimensions in mm



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Checked						
Approved						
SCALE	N.T.S.		Title UP TO & INC 300mm ² EPR TRIPLEX - PILC/PICAS LOOP JOINT STRIPPING DIMENSIONS			Drg. No. JP2D 7.506.1 Rev No

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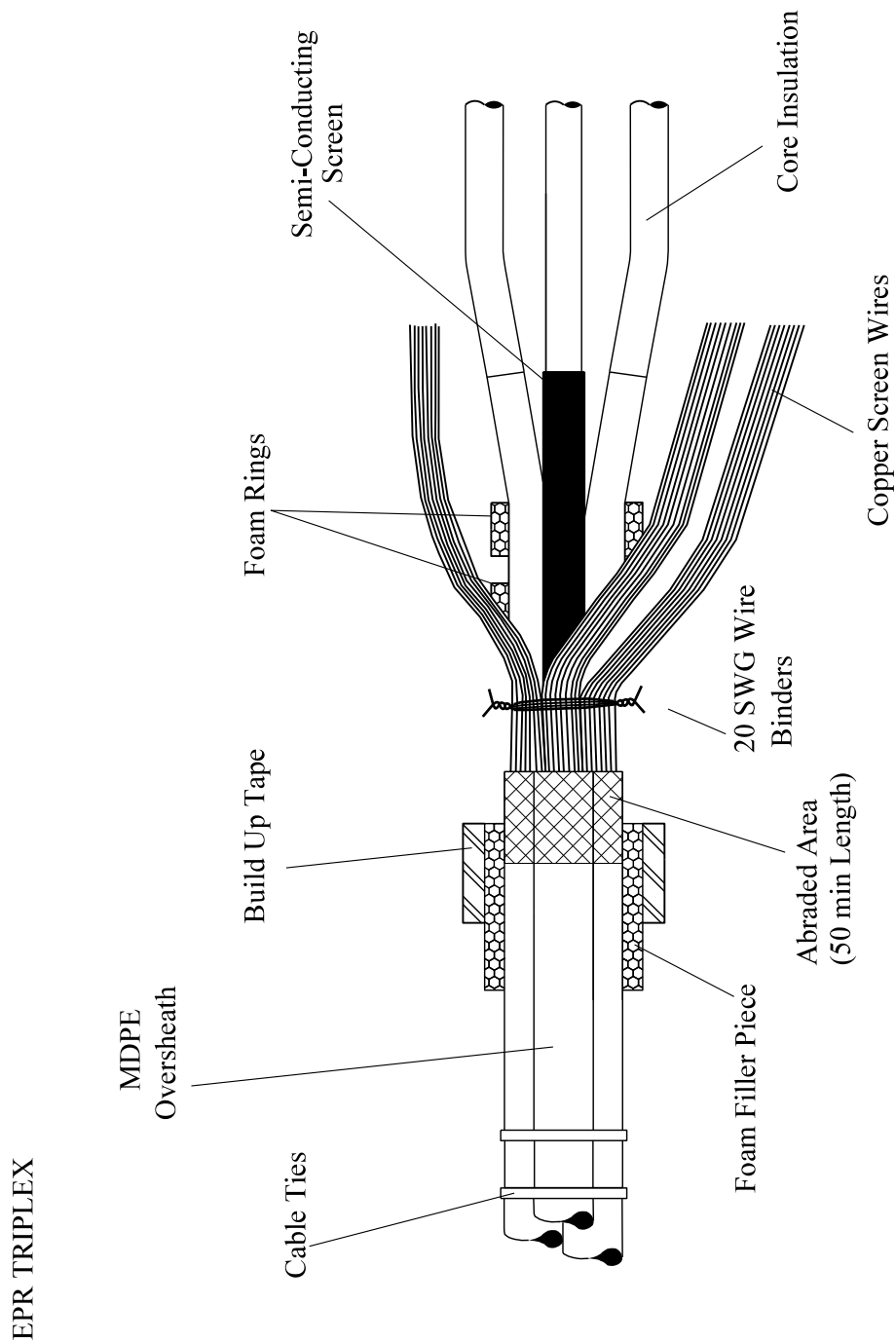
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Approved					
SCALE		N.T.S.		Title	
				PREPARATION OF THREE CORE XLPE	
				Drg. No. JP2D 7.506.2	
				Rev No	

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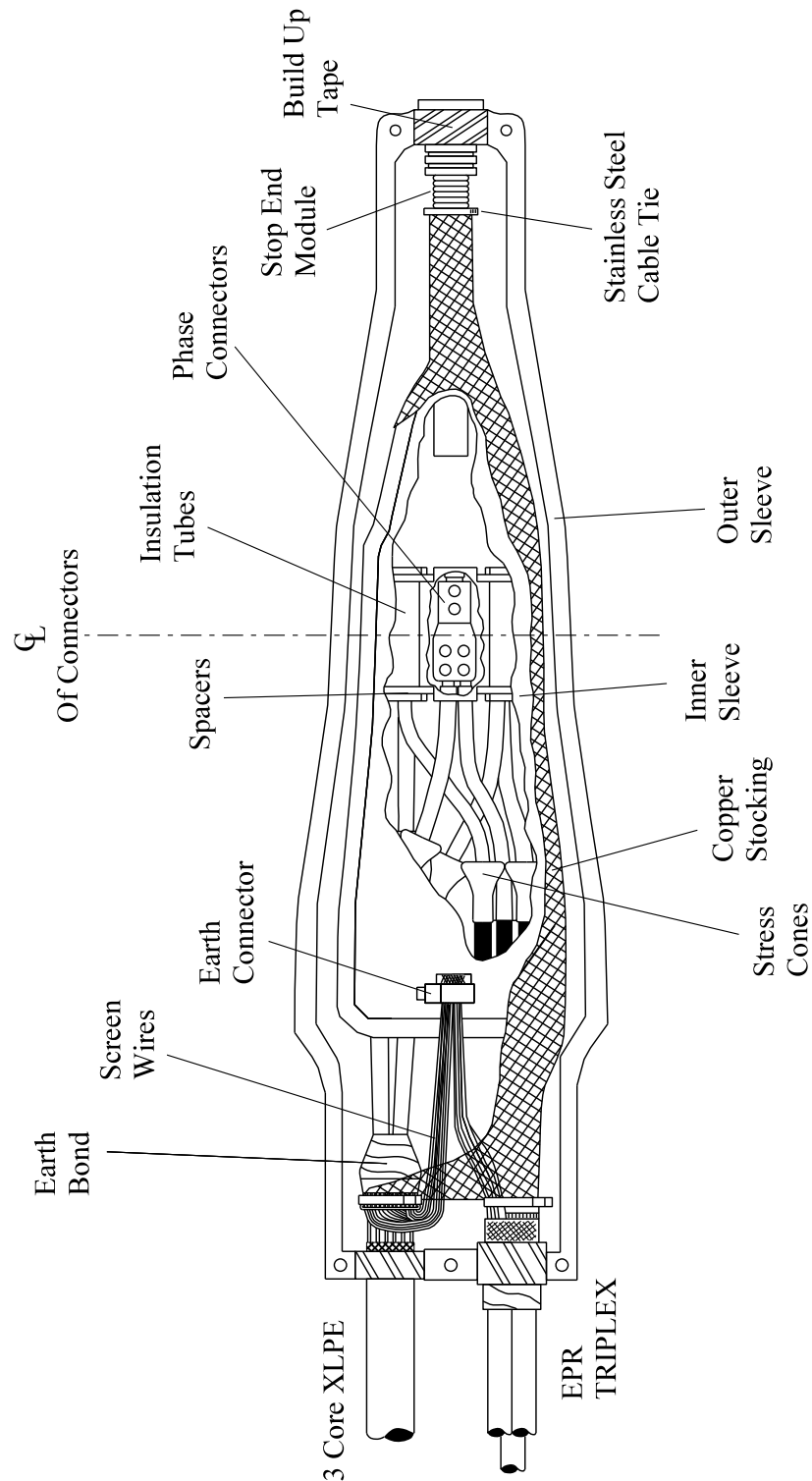
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Checked					
Approved			Drg. No. JP2D 7.506.3		
SCALE	N.T.S.		Rev No		

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All dimensions in mm



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SCALE		N.T.S.		Title UP TO & INC 300mm ² EPR TRIPLEX 3 CORE XLPE LOOP JOINT GENERAL LAYOUT		Drg. No. JP2D 7.506.4	Rev No

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APPENDIX A

SUPERSEDED DOCUMENTATION

This document replaces ST: CA2O/3 dated April 2013 which should now be withdrawn.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST:CA2A, ST:CA2C, ST:CA2M, ST:CA2N, ST:CA2S, ST:CA2T, ST:CA2U, ST:CA2V.

APPENDIX C

IMPACT ON COMPANY POLICY

None, as this document has just been updated to incorporate the WPD Losses strategy.

APPENDIX D

IMPLEMENTATION OF POLICY

For WPD staff Team Managers shall ensure that all relevant 11kV Jointing staff are aware of the changes to 11kV Jointing Manual of which this Standard Technique forms a major part. It can be implemented into all areas of WPD with immediate effect. Managers shall ensure that all staff involved in the design, installation, maintenance and operation of the 11kV system are familiar with, and follow, the requirements of this document.

Independent Connection Providers (ICPs) shall follow the requirements of ST: CA2O/4 or of this document (ST: CA2O/3) for a period of up to 3 months from the issue of this document. After this date, all jointing works shall comply with ST: CA2O/4.

Where any difficulty is encountered in the application of this Standard Technique the author shall be notified who will determine whether a variation is appropriate.

APPENDIX E

KEY WORDS

11kV loop joints, 11kV transitional loop joints.