

Company Directive

STANDARD TECHNIQUE: CA3N/2

Relating to Procedures for Making 33kV Single Core Cable Stop End Joints

Policy Summary

This Standard Technique document contains all the approved 33kV cold applied Stop End Joints for EPR, XLPE Pb sheath and single core PILC cables. It shall be implemented in conjunction with the appropriate General Requirements in ST: CA3C/2.

Only materials stated in this ST are approved for use on WPD's 33kV Underground Cable System unless the Policy Manager, Avonbank, has granted prior permission.

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: March 2017

Approved by

Policy Manager

Date:

14 March 2017

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IMPLEMENTATION PLAN

Introduction

This new document contains the stop end jointing procedures for EPR, XLPE Pb sheath and PILC single core 33kV cables used on the WPD 33kV underground cable network.

Main Changes

This is a new document.

Impact of Changes

All current 33kV Jointers throughout the company will need to undertake a short conversion course prior to using the new cold applied jointing system there will then be a phased change from the existing jointing systems over to the new harmonized cold applied jointing system.

Implementation Actions

There will be a structured approach to the phased change-over to the new harmonized cold applied jointing system where the old jointing system being used until all current 33kV Jointers in a Depot have been trained and the stores of that particular Depot are purged of the old jointing system.

A short period of formal training will be required.

Implementation Timetable

Once existing 33kV Jointers have been on the conversion course then this Standard Technique can be implemented with immediate effect.

Document Revision & Review Table		
Date	Comments	Author
March 2017	This is a new document.	Peter White

ST: CA3N/2 Relating to Procedures for Making 33kV Single core Cable Stop End Joints.

This Standard Technique document contains all the approved 33kV cold applied Stop End Joints for Single core EPR, XLPE Pb sheath and Single core PILC cables. It shall be implemented in conjunction with the appropriate General Requirements in ST: CA3C/1, including: -

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

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

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 is to be found, then for material selection and installation data use 300mm² EPR; but for the electrical purposes i.e. loadings, ratings etc. then the 240mm² EPR shall be treated as 185mm² EPR. Likewise where 150mm² EPR is to be found, then for material selection and installation data use 185mm² EPR.

Resin encapsulated joints must not be broken down.

Any reference to single core EPR cable equally applies to single core XLPE cable.

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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.301

185/300/400mm² EPR CWS SINGLE CORE 33kV STOP END JOINT.

(This Jointing Procedure covers cable sizes up to and including 400mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.301

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
185 EPR	SE 3301
300 EPR	SE 3302
400 EPR	SE 3303

Note: - The jointing materials for 150mm² EPR will be as for 185mm² EPR and 240mm² EPR will be as 300mm² EPR. Any reference to EPR equally applies to XLPE.

JOINTING PROCEDURE 7.301

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE	STOP END MODULE	CABLE DEPENDING MODULES		CONNECTORS			TUBE SET
	M85	B	SEM M85	CM MX85 EPR SCCWS185	CM MX85 EPR SCCWS300	VTPB21UTB	VTPB27UTB	VTPC28G8 UTB	WCSM 90/25 x 250
SE 3301	3	3	3	3	-	3	-	-	3
SE 3302	3	3	3	-	3	-	3	-	3
SE 3303	3	3	3	-	3	-	-	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.301

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.301.1, 7.301.2 and 7.301.3** whilst undertaking this Jointing Procedure.

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

EPR CABLE - Preparation

- | | | |
|-----|--|-------|
| 2. | Clean each oversheath for a distance of 2m. | -- |
| 3. | Apply a temporary earth continuity bond clear of joint position. | 11 |
| 4. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 5. | Remove oversheaths and bedding tapes. | 17 |
| 6. | Abrade oversheaths. | 18 |
| 7. | Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point. | -- |
| 8. | Straighten copper screen wires and form into a bunch over the cable top. | -- |
| 9. | Park foam ring over semi-con screen close to copper screen wires. | 31 |
| 10. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 25 |
| 11. | Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. | 27/28 |

Note: - Ensure to allow for solid centre block of split connector when cutting core from joint centre line mark.

COMPLETION OF JOINT

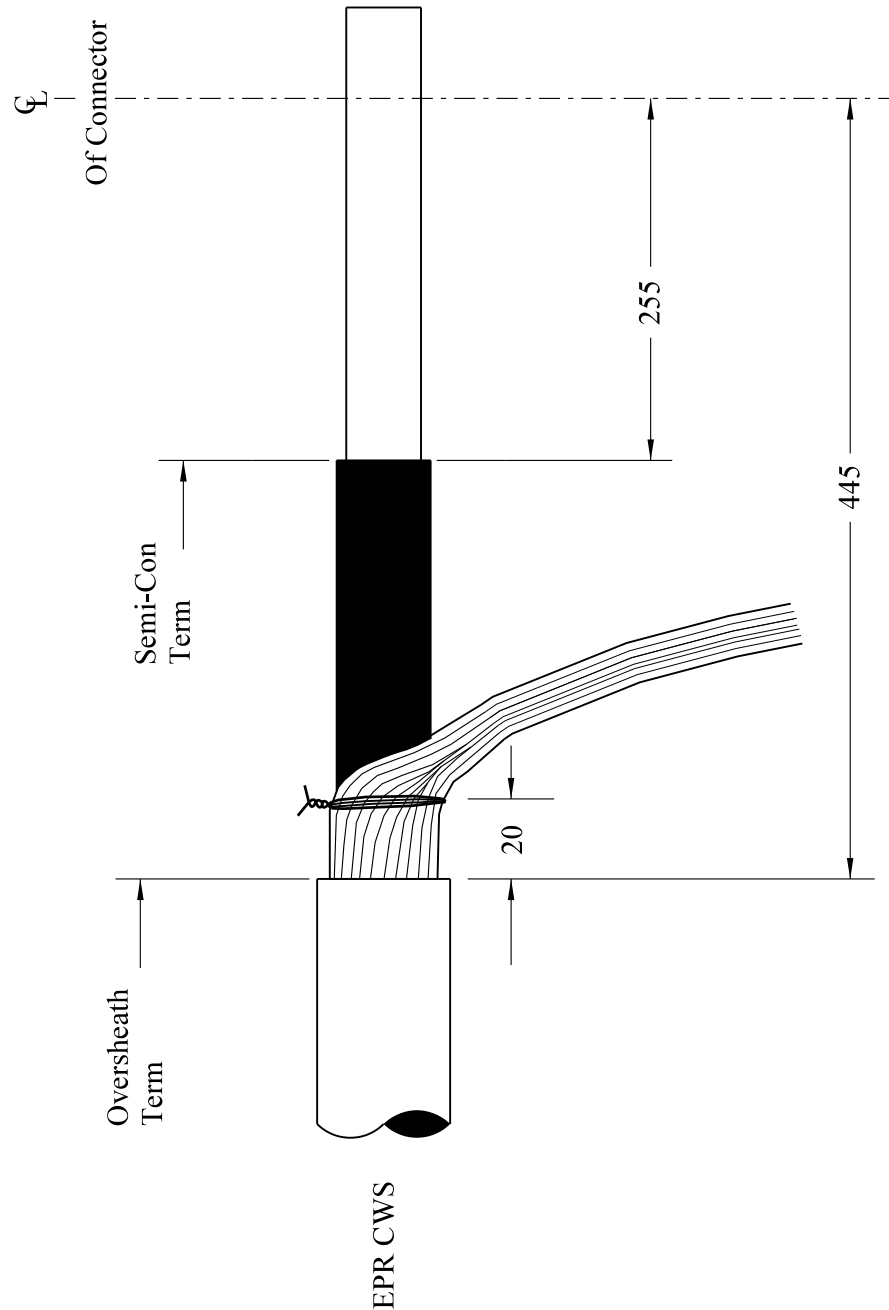
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|-----|--|----|
| 12. | Apply semi-con tape to terminations of semi-con screens. | 32 |
| 13. | Apply a stress cone to semi-con screen termination. | 32 |

Note; - Ensure the flared ends of the cones are facing towards the joint centre - open end of applicator.

JOINTING PROCEDURE 7.301 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Connect phase connector to the core end.	27/28
Note: The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.	
15. Fit foam ring to polymer stop end module.	--
16. Fit copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve and centralise on connector centre.	32
18. Connect copper earth braid from insulation sleeve to semi-con screen	32
19. Fit inner sleeve to joint and to the polymer stop end module.	38
Note: Ensure the stop end module is fitted with foam ring and positioned correctly within the inner sleeve entry and opposite to the cable entry.	
20. Ensure joint is level and fill with Lovisil.	38
21. Clean and degrease inner sleeve.	40
22. Bend the bunched copper screen wires forward towards the cable end, wrap a strand around the bunch in a close lay and cut 50mm from the binder applied in 7.	--
23. Remove temporary earth continuity bond applied in 3 and reseal EPR oversheaths.	11/45
24. Attach and configure copper stocking across joint and connect to copper screen wires.	41
25. Apply 5313 black mastic water blocking tape over oversheath ends onto copper wire screens.	42
26. Build-up cable oversheath and stop end rod.	30
27. Fit and support outer sleeve ensuring 15mm clearance.	43
28. Mix and pour resin.	44

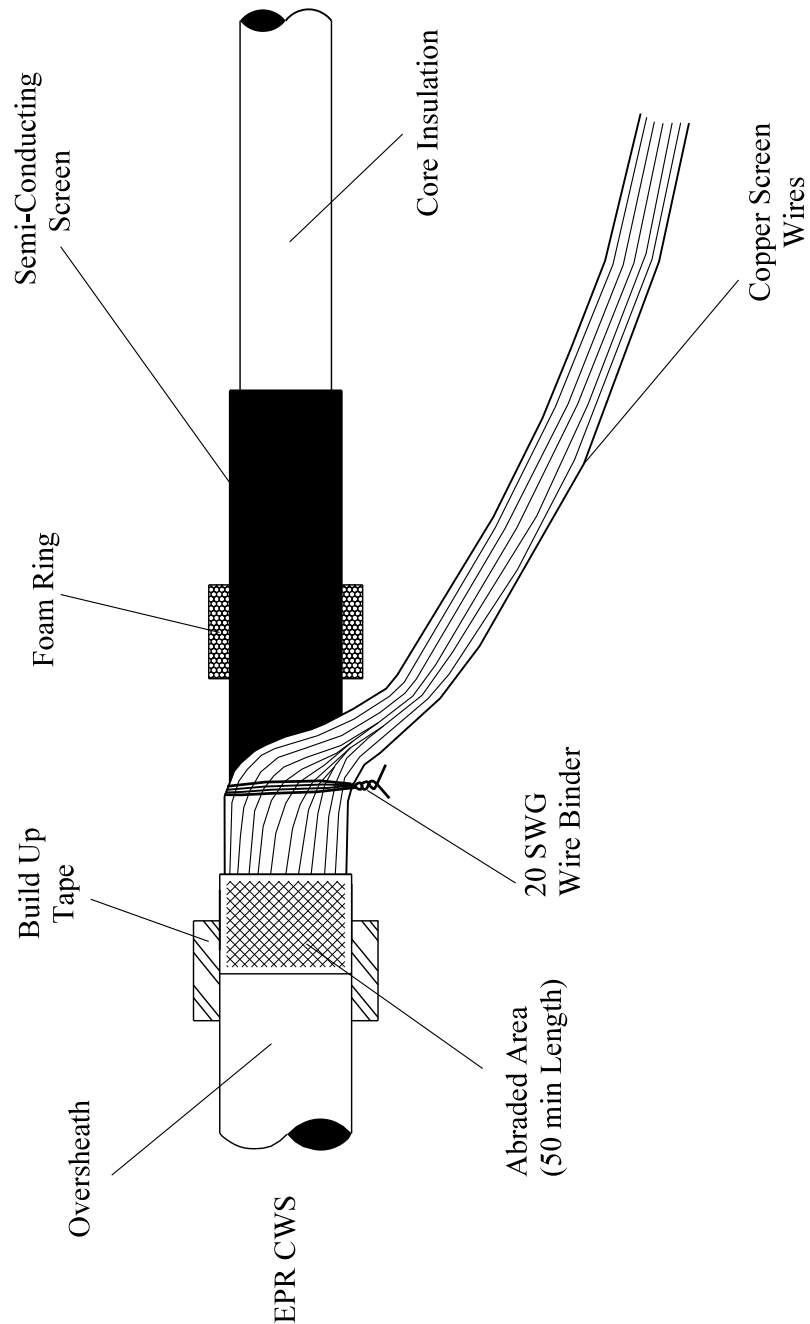
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				185/300 ² /400mm EPR CWS SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS	
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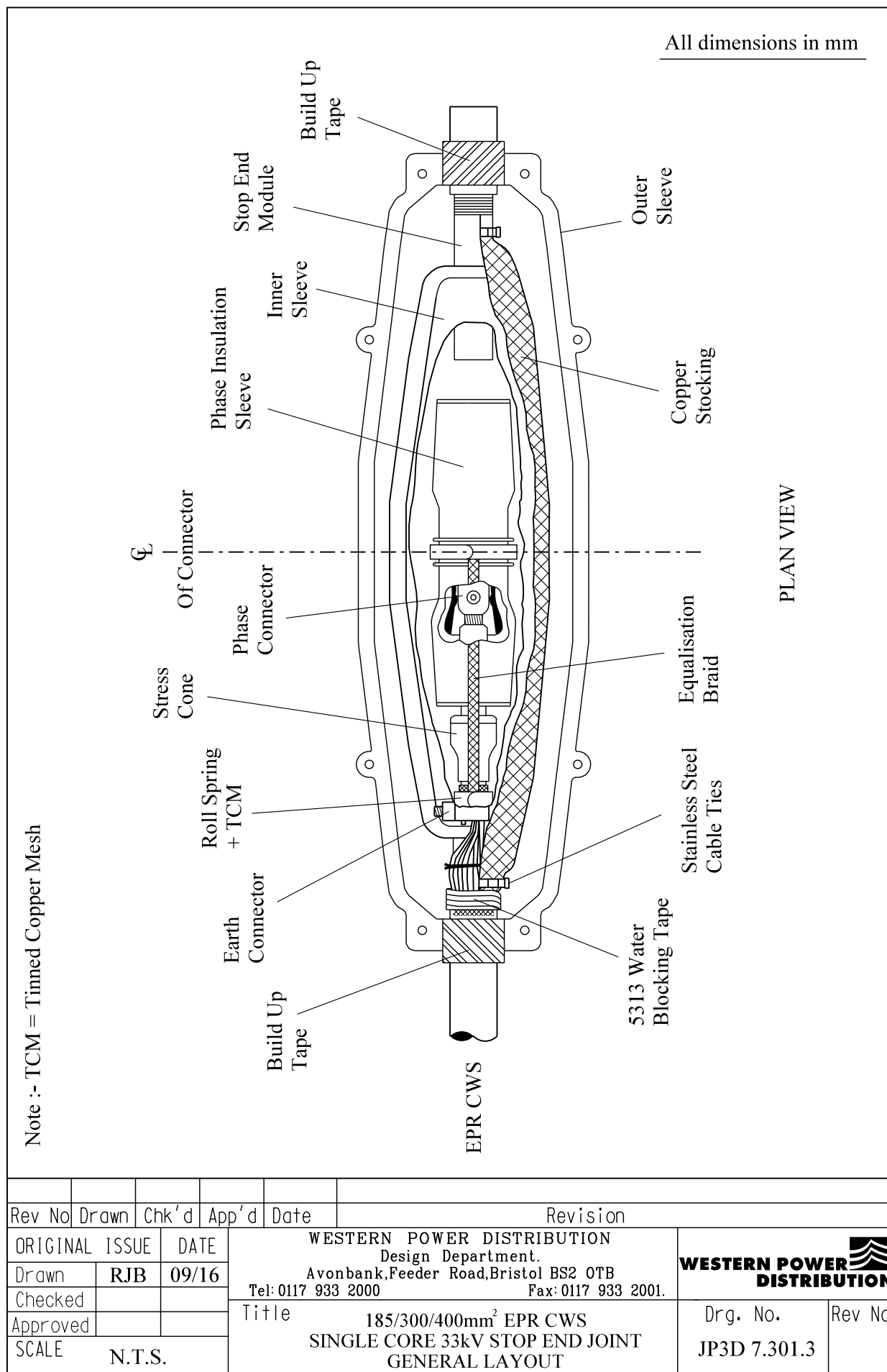
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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.302

500/630mm² EPR CWS SINGLE CORE 33kV STOP END JOINT.

(This Jointing Procedure covers cable sizes up to and including 630mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.302

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
500 EPR	SE 3304
630 EPR	SE 3305

JOINTING PROCEDURE 7.302

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULES		STOP END MODULE	CABLE DEPENDING MODULES		CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MX105 EPR CWS630	CM MX105 EPR CWS630	VTPC36UTB	WCSM 90/25 x 250
SE 3305	3	3	3	3	3	-	3	3
SE 3306	3	3	3	3	-	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.302

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.302.1, 7.302.2 and 7.302.3** whilst undertaking this Jointing Procedure.

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

EPR CABLE - Preparation

- | | | |
|-----|--|-------|
| 2. | Clean each oversheath for a distance of 2m. | -- |
| 3. | Apply a temporary earth continuity bond clear of joint position. | 11 |
| 4. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 5. | Remove oversheaths and bedding tapes. | 17 |
| 6. | Abrade oversheaths. | 18 |
| 7. | Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point. | -- |
| 8. | Straighten copper screen wires and form into a bunch over the cable top. | -- |
| 9. | Park foam ring over semi-con screen close to copper screen wires. | 31 |
| 10. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 25 |
| 11. | Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. | 27/28 |

Note: - Ensure to allow for solid centre block of split connector when cutting core from joint centre line mark.

COMPLETION OF JOINT

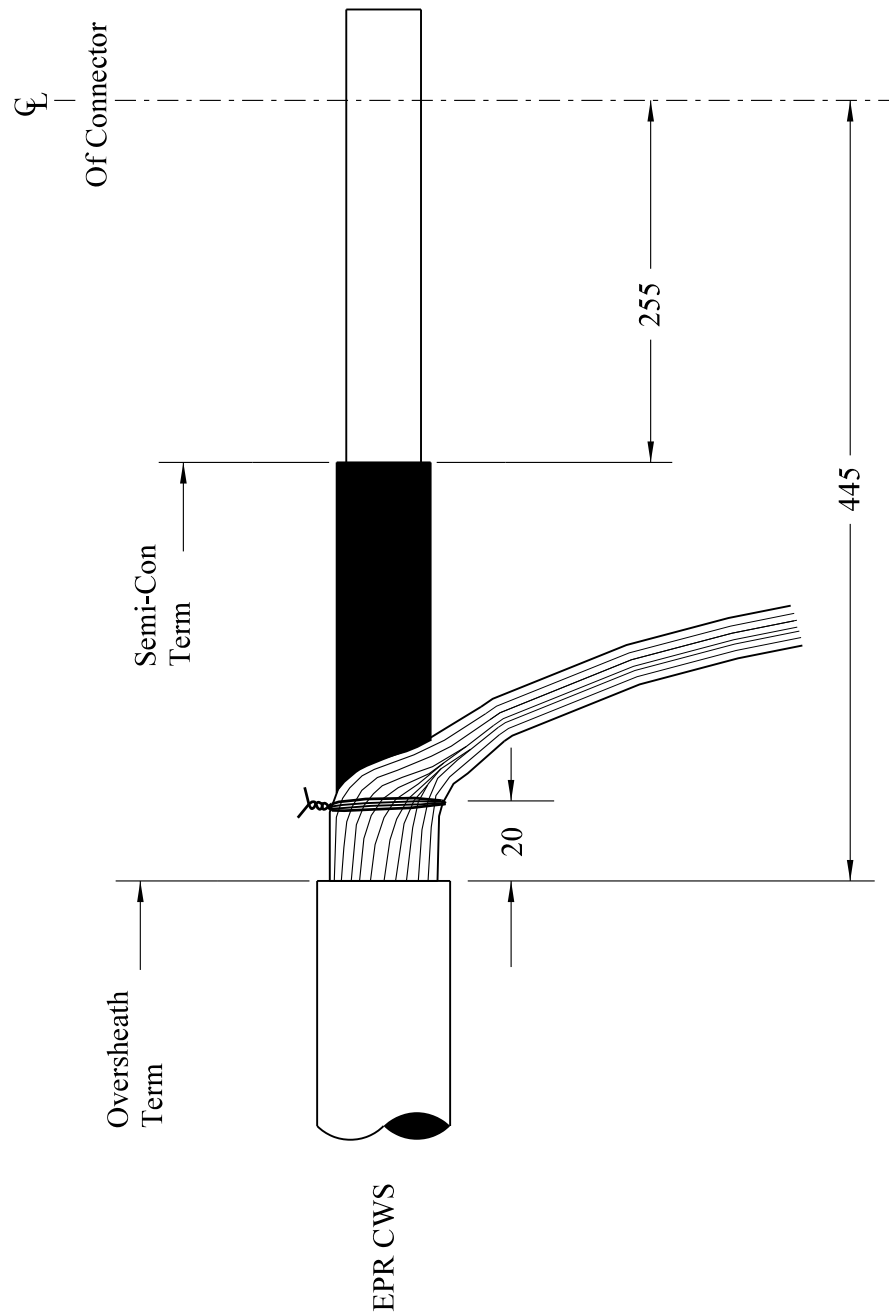
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|-----|--|----|
| 12. | Apply semi-con tape to terminations of semi-con screens. | 32 |
| 13. | Apply a stress cone to semi-con screen termination. | 32 |

Note; - Ensure the flared ends of the cones are facing towards the joint centre - open end of applicator.

JOINTING PROCEDURE 7.302 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Connect phase connector to the core end.	27/28
Note: The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.	
15. Fit foam ring to polymer stop end module.	--
16. Fit copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve and centralise on connector centre.	32
18. Connect copper earth braid from insulation sleeve to semi-con screen	32
19. Fit inner sleeve to joint and to the polymer stop end module.	38
Note: Ensure the stop end module is fitted with foam ring and positioned correctly within the inner sleeve entry and opposite to the cable entry.	
20. Ensure joint is level and fill with Lovisil.	38
21. Clean and degrease inner sleeve.	40
22. Bend the bunched copper screen wires forward towards the cable end, wrap a strand around the bunch in a close lay and cut 50mm from the binder applied in 7.	--
23. Remove temporary earth continuity bond applied in 3 and reseal EPR oversheaths.	11/45
24. Attach and configure copper stocking across joint and connect to copper screen wires.	41
25. Apply 5313 black mastic water blocking tape over oversheath ends onto copper wire screens.	42
26. Build-up cable oversheath and stop end rod.	30
27. Fit and support outer sleeve ensuring 15mm clearance.	43
28. Mix and pour resin.	44

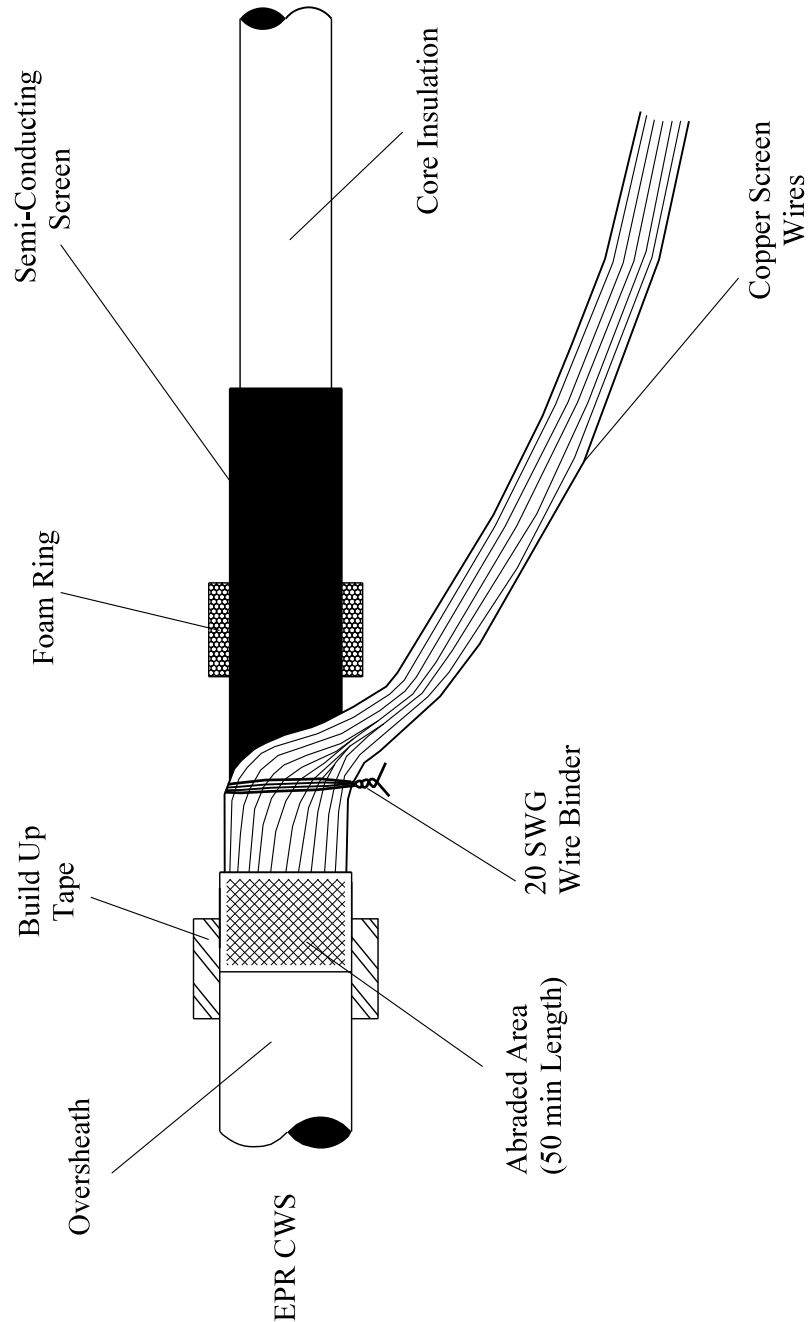
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				500/630mm ² EPR CWS SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS	
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				Rev No	

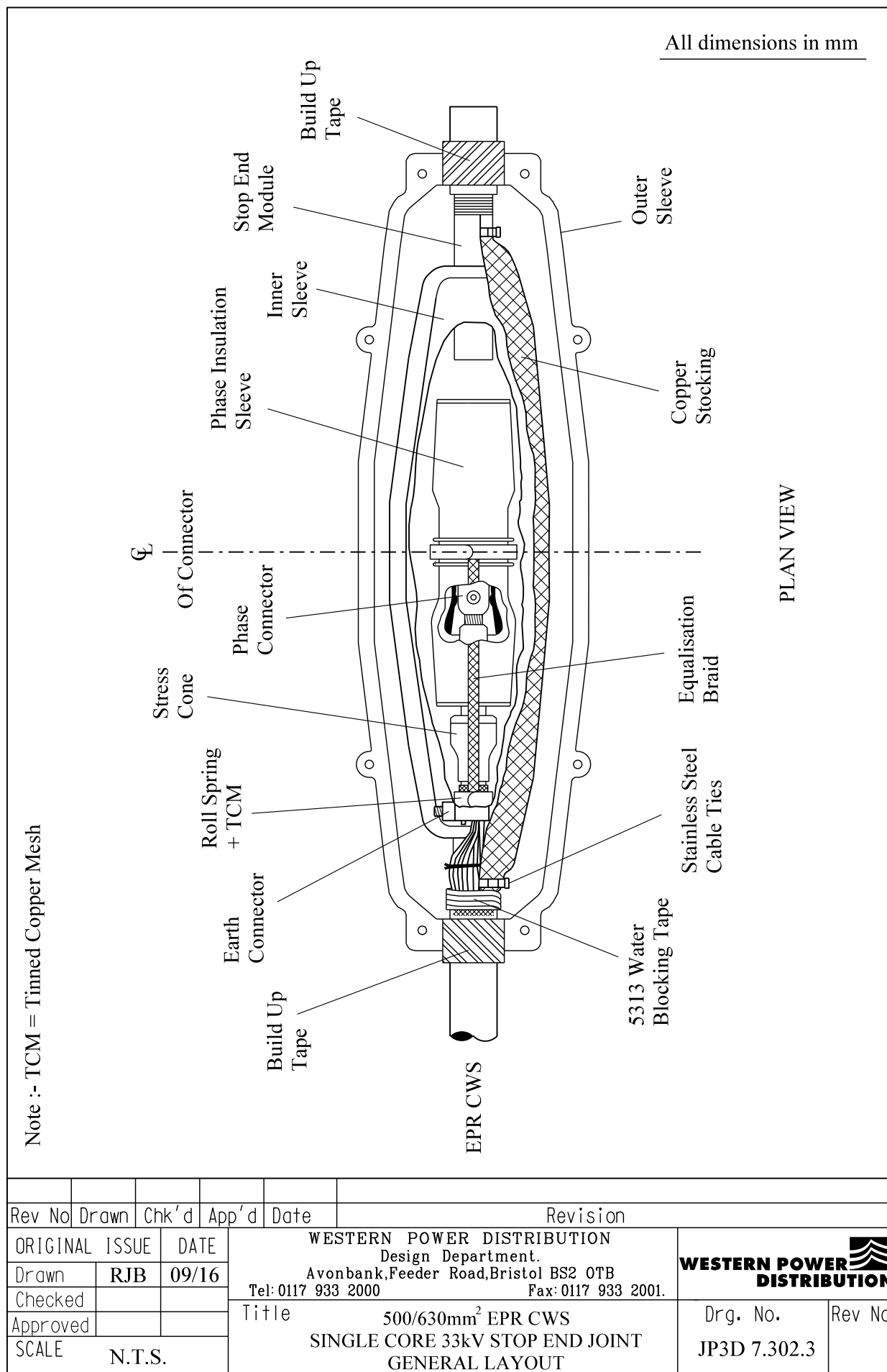
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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.303

800/1000mm² EPR CWS SINGLE CORE 33kV STOP END JOINT.

(This Jointing Procedure covers cable sizes up to and including 1000mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.303

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
800 EPR	SE 3307
1000 EPR	SE 3308

JOINTING PROCEDURE 7.303

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULES		STOP END MODULE	CABLE DEPENDING MODULES	CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MX105 EPR CWS800	VTPC44UTB	WCSM 90/25 x 250
SE 3307	3	3	3	3	3	3	3
SE 3308	3	3	3	3	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.303

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.303.1, 7.303.2 and 7.303.3** whilst undertaking this Jointing Procedure.

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

EPR CABLE - Preparation

- | | | |
|-----|--|-------|
| 2. | Clean each oversheath for a distance of 2m. | -- |
| 3. | Apply a temporary earth continuity bond clear of joint position. | 11 |
| 4. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 5. | Remove oversheaths and bedding tapes. | 17 |
| 6. | Abrade oversheaths. | 18 |
| 7. | Apply a 20 swg binder around copper screen wires 20mm from oversheath termination point. | -- |
| 8. | Straighten copper screen wires and form into a bunch over the cable top. | -- |
| 9. | Park foam ring over semi-con screen close to copper screen wires. | 31 |
| 10. | Remove semi-conducting screens ensuring insulation is free from all conducting material. | 25 |
| 11. | Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. | 27/28 |

Note: - Ensure to allow for solid centre block of split connector when cutting core from joint centre line mark.

COMPLETION OF JOINT

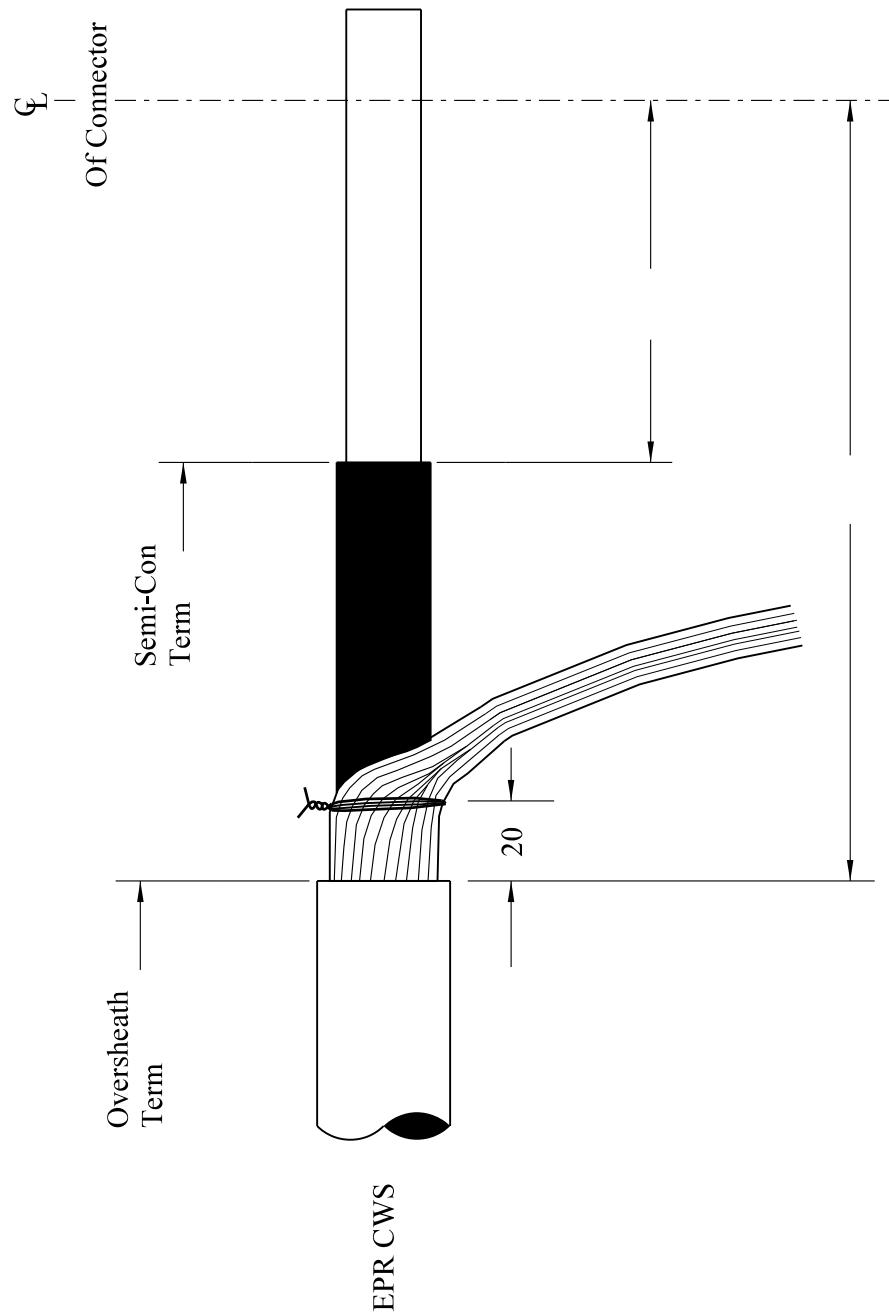
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|-----|--|----|
| 12. | Apply semi-con tape to terminations of semi-con screens. | 32 |
| 13. | Apply a stress cone to semi-con screen termination. | 32 |


Note; - Ensure the flared ends of the cones are facing towards the joint centre - open end of applicator.

JOINTING PROCEDURE 7.303 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Connect phase connector to the core end.	27/28
Note: The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.	
15. Fit foam ring to polymer stop end module.	--
16. Fit copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve and centralise on connector centre.	32
18. Connect copper earth braid from insulation sleeve to semi-con screen	32
19. Fit inner sleeve to joint and to the polymer stop end module.	38
Note: Ensure the stop end module is fitted with foam ring and positioned correctly within the inner sleeve entry and opposite to the cable entry.	
20. Ensure joint is level and fill with Lovisil.	38
21. Clean and degrease inner sleeve.	40
22. Bend the bunched copper screen wires forward towards the cable end, wrap a strand around the bunch in a close lay and cut 50mm from the binder applied in 7.	--
23. Remove temporary earth continuity bond applied in 3 and reseal EPR oversheaths.	11/45
24. Attach and configure copper stocking across joint and connect to copper screen wires.	41
25. Apply 5313 black mastic water blocking tape over oversheath ends onto copper wire screens.	42
26. Build-up cable oversheath and stop end rod.	30
27. Fit and support outer sleeve ensuring 15mm clearance.	43
28. Mix and pour resin.	44

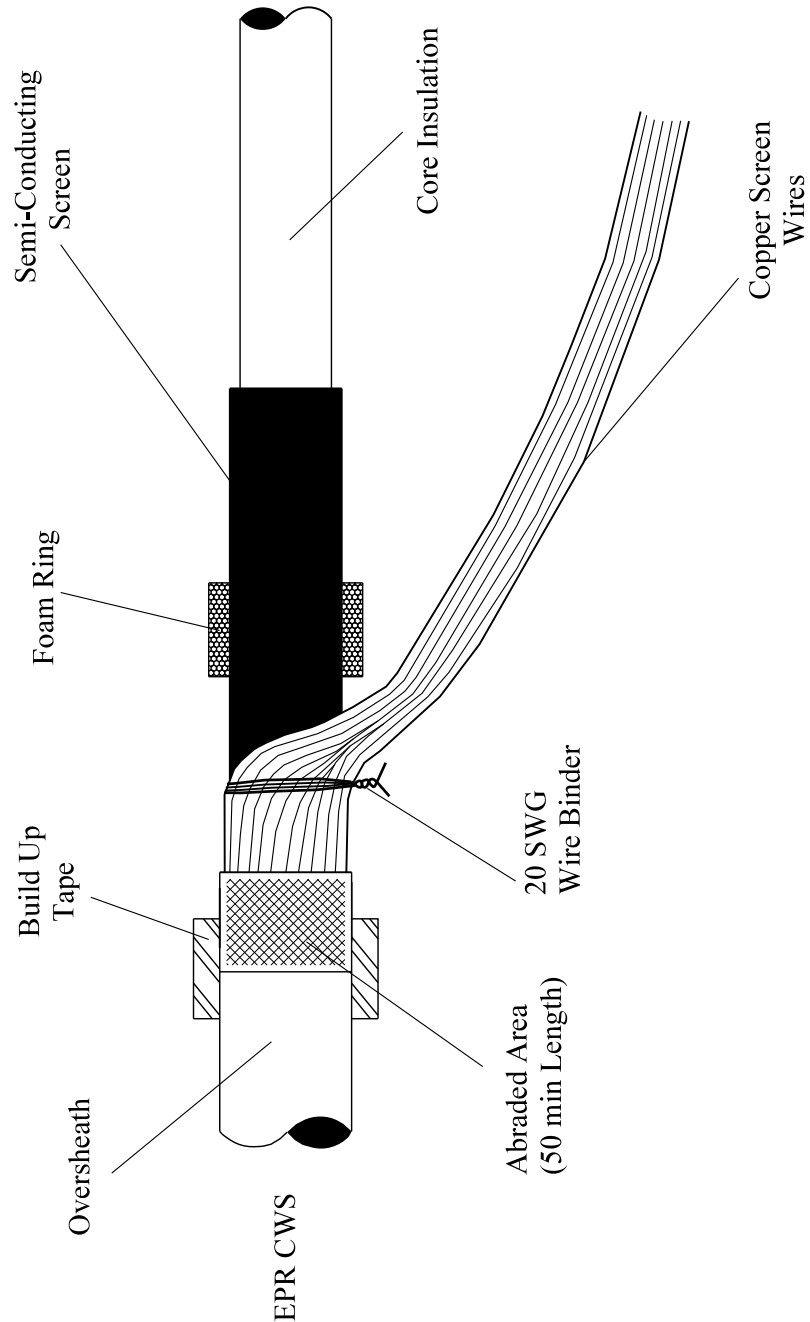
All dimensions in mm




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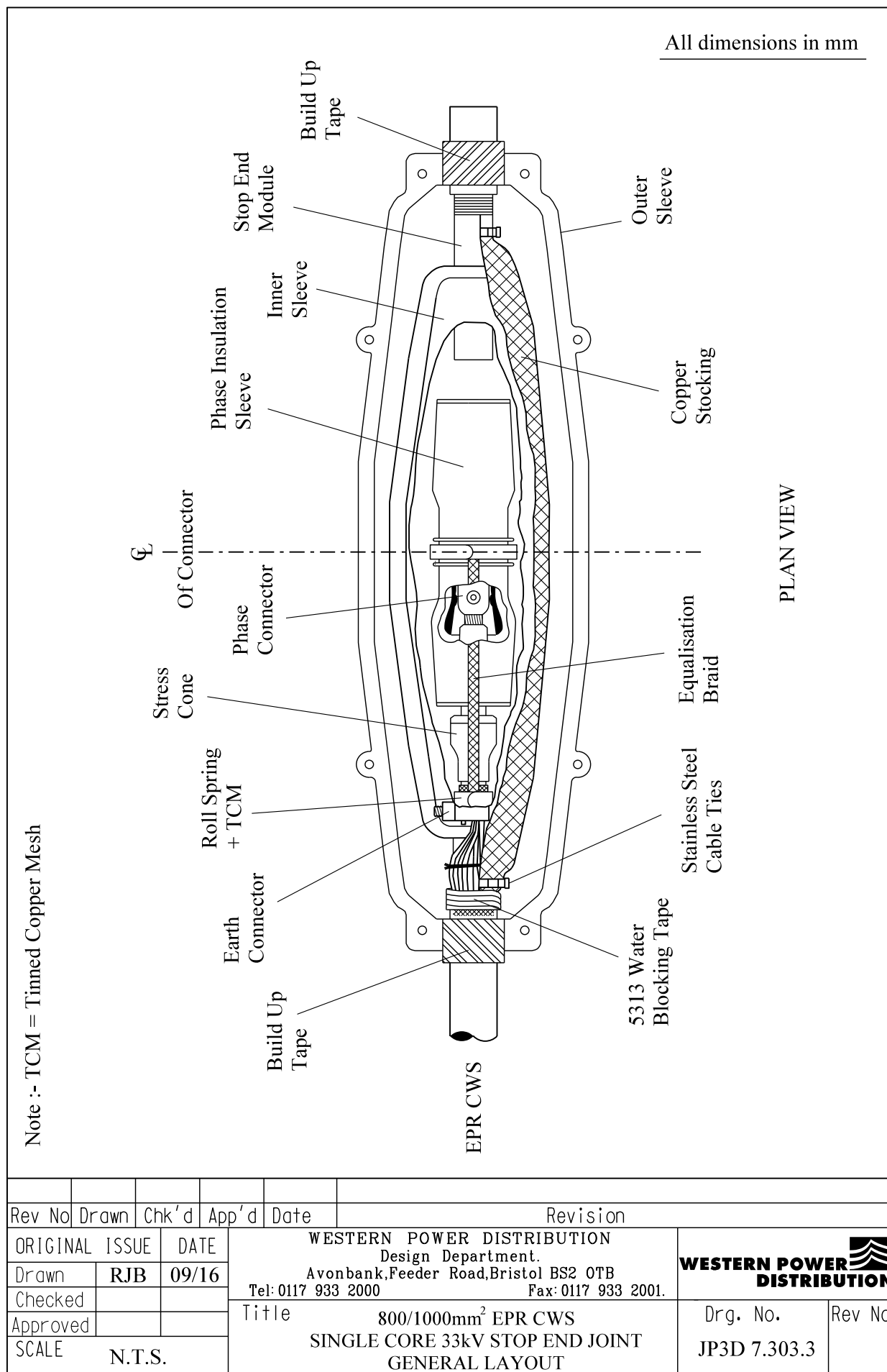
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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE STOP END CABLE JOINTS

JOINTING PROCEDURE 7.304

**185/300/400mm² XLPE Pb SHEATH SINGLE CORE 33kV STOP END
JOINT.**

(This Jointing Procedure covers cable sizes up to and including 400mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.304

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
185 XLPE	SE 3309
300 XLPE	SE 3310
400 XLPE	SE 3311

**Note: - The jointing materials for 150mm² EPR will be as for 185mm² EPR and 240mm² EPR will be as 300mm² EPR.
Any reference to EPR equally applies to XLPE.**

JOINTING PROCEDURE 7.304

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODUL E	RESIN MODULE	STOP END MODULE	CABLE DEPENDING MODULES				CONNECTORS			TUBE SET
	M85	B	SEM 85	CM MX85 EPR SCCWS185	CM MX85 EPR SCCWS30 0	CM MX85 XLPEPbCWS18 5	CM MX85 XLPEPbCWS30 0	VTPB21UT B	VTPB27UTB	VTPC28G8UTB	WCSM 90/25 x 250
SE 3309	3	3	3	3		3	-	3	-	-	3
SE 3310	3	3	3	-	3	-	3	-	3	-	3
SE 3311	3	3	3	-	3	-	3	-	-	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 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 33kV Jointing Manual.

JOINTING PROCEDURE 7.304

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.304.1, 7.304.2, and 7.304.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

XLPE CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath, clean and abrade lead sheath. 17
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 19
8. Remove semi-conducting screens ensuring insulation is free from all conductive material. 25
9. Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. 27/29

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

10. Apply semi-con tape to termination of semi-con screen. 32
11. Apply a stress cone to semi-con termination. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

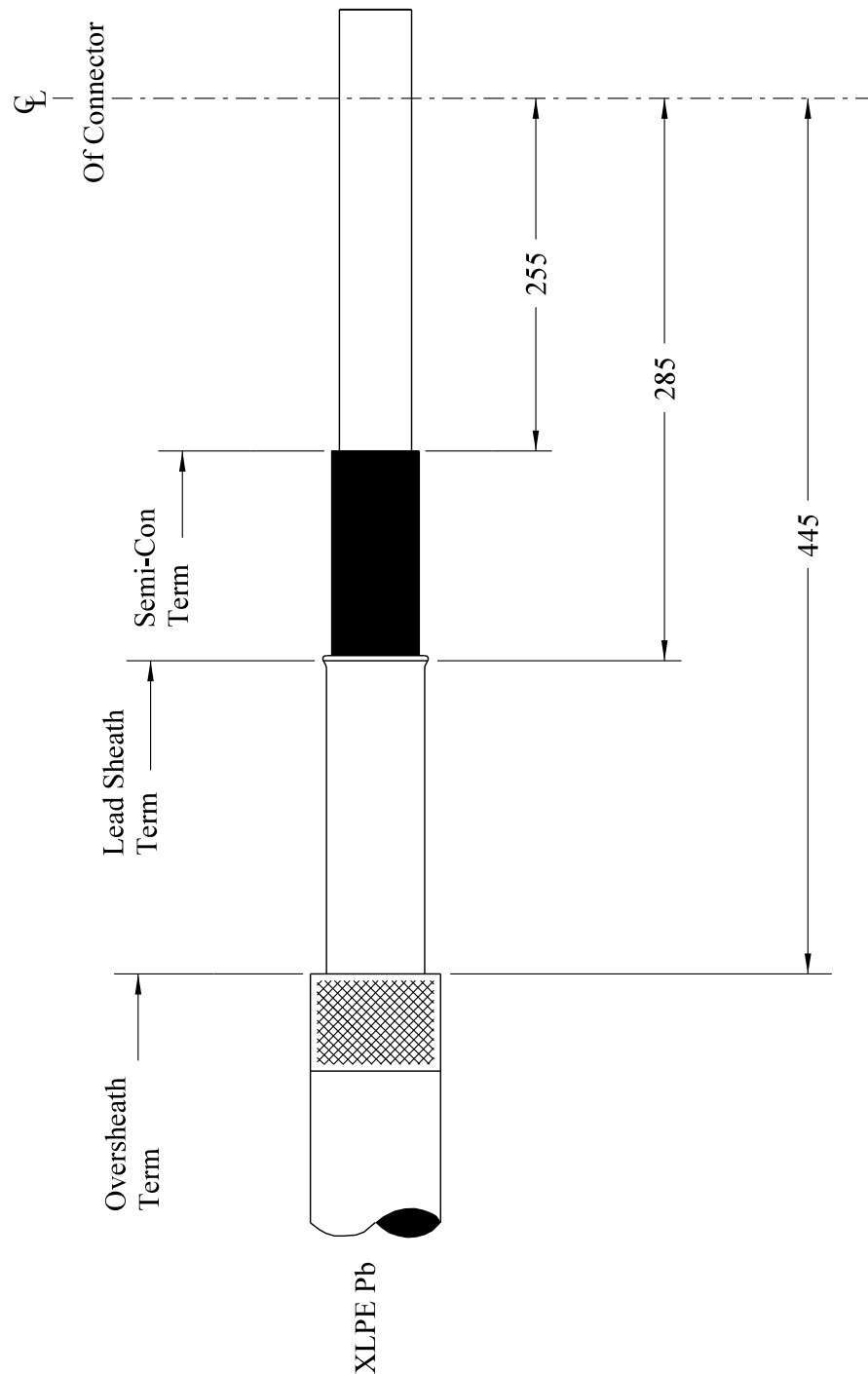
12. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.304 – Continued

Actions	General Requirements (ST: CA3C/2)
13. Fit foam ring to polymer stop end module.	31
14. Fit a copper equalisation braid onto centre of insulation sleeve.	32
15. Fit insulation sleeve at connector centre.	32
16. Connect copper earth braid from insulation sleeve to semi-con screen.	32
17. Fit inner joint sleeve to cable and polymer stop end module.	36
Note:- Ensure the stop end module is fitted with foam rings and positioned correctly within the inner sleeve entry - opposite to the cable entry.	
18. Ensure joint is level and fill with Lovisil.	38
19. Clean and degrease inner joint sleeve.	40
20. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
21. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
22. Apply 5313 black mastic water blocking tape over cable oversheath end onto the lead sheath for 40mm.	42
23. Build-up oversheath and stop end polymer rod.	34
24. Fit and support joint shell ensuring 15mm clearance.	43
25. Mix and pour resin.	44

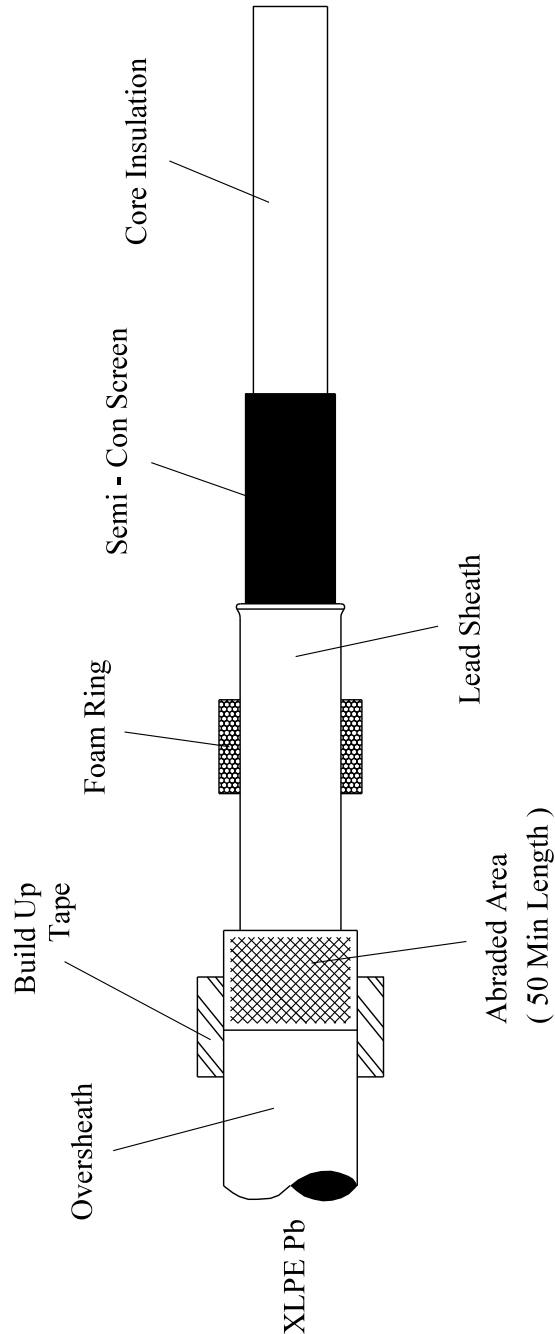
All dimensions in mm



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Drawn	RJB	12/16				
Checked						
Approved						
SCALE N.T.S.			Title 185/300/400mm ² XLPE Pb SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS			Drg. No. JP3D 7.304.1
						Rev No

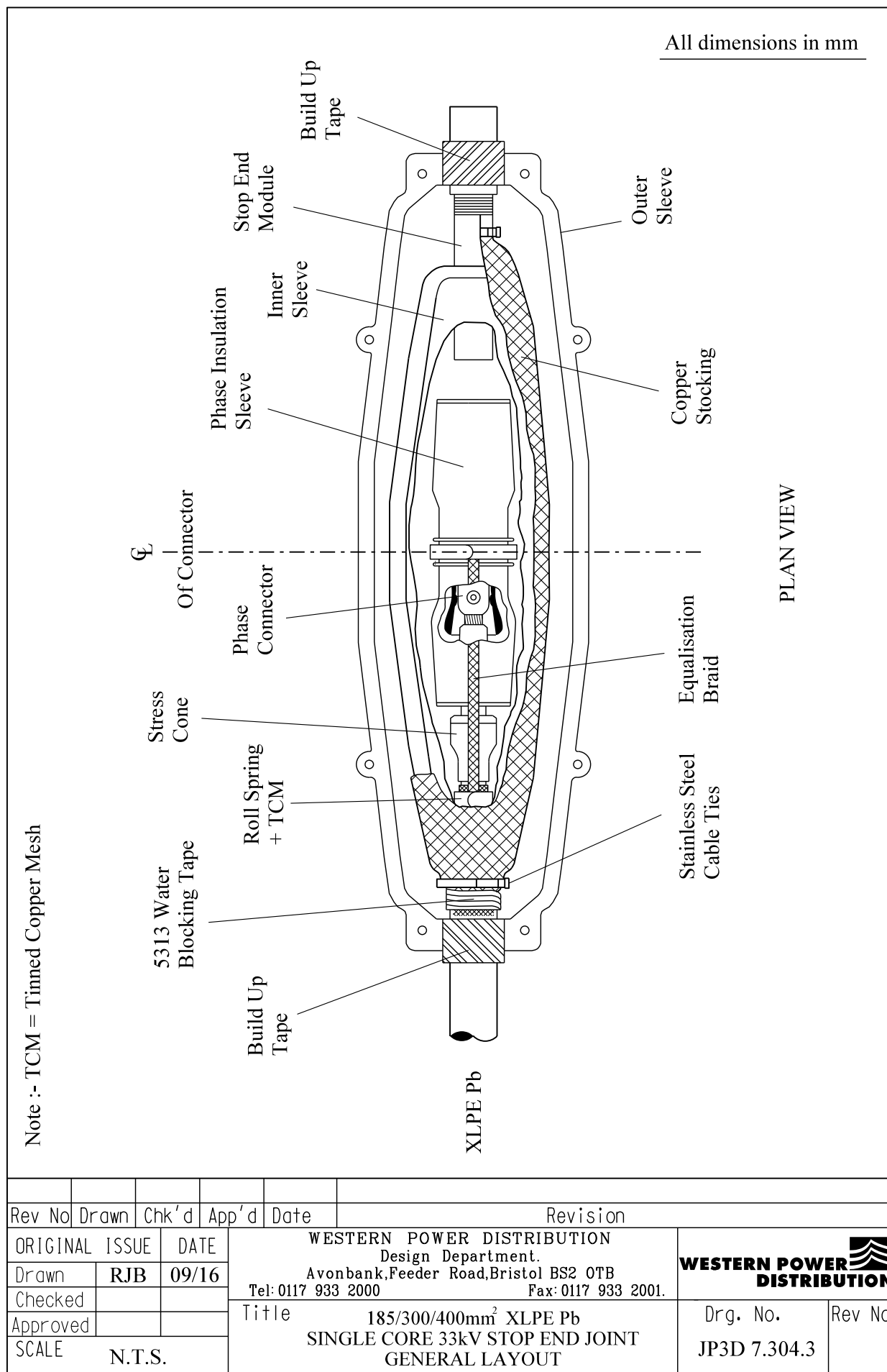
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All dimensions in mm



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Drawn	RJB	09/16	Title PREPARATION OF XLPE Pb		
Checked					
Approved			Drg. No. JP3D 7.304.2		
SCALE	N.T.S.		Rev No		

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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.305

500/630mm² XLPE Pb SHEATH SINGLE CORE 33kV STOP END JOINT.

(This Jointing Procedure covers cable sizes up to and including 630mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.305

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
500 XLPE	SE3312
630 XLPE	SE 3313

JOINTING PROCEDURE 7.305

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE		STOP END MODULE	CABLE DEPENDING MODULES		CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MX105 XLPE Pb 630	CM MX105 XLPE Pb 630	VTPC36UTB	WCSM 90/25 x 250
SE 3312	3	3	3	3	3	-	3	3
SE 3313	3	3	3	3	-	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.305

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.305.1, 7.305.2, and 7.305.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

XLPE CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath, clean and abrade lead sheath. 17
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 19
8. Remove semi-conducting screens ensuring insulation is free from all conductive material. 25
9. Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. 27/29

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

10. Apply semi-con tape to termination of semi-con screen. 32
11. Apply a stress cone to semi-con termination. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

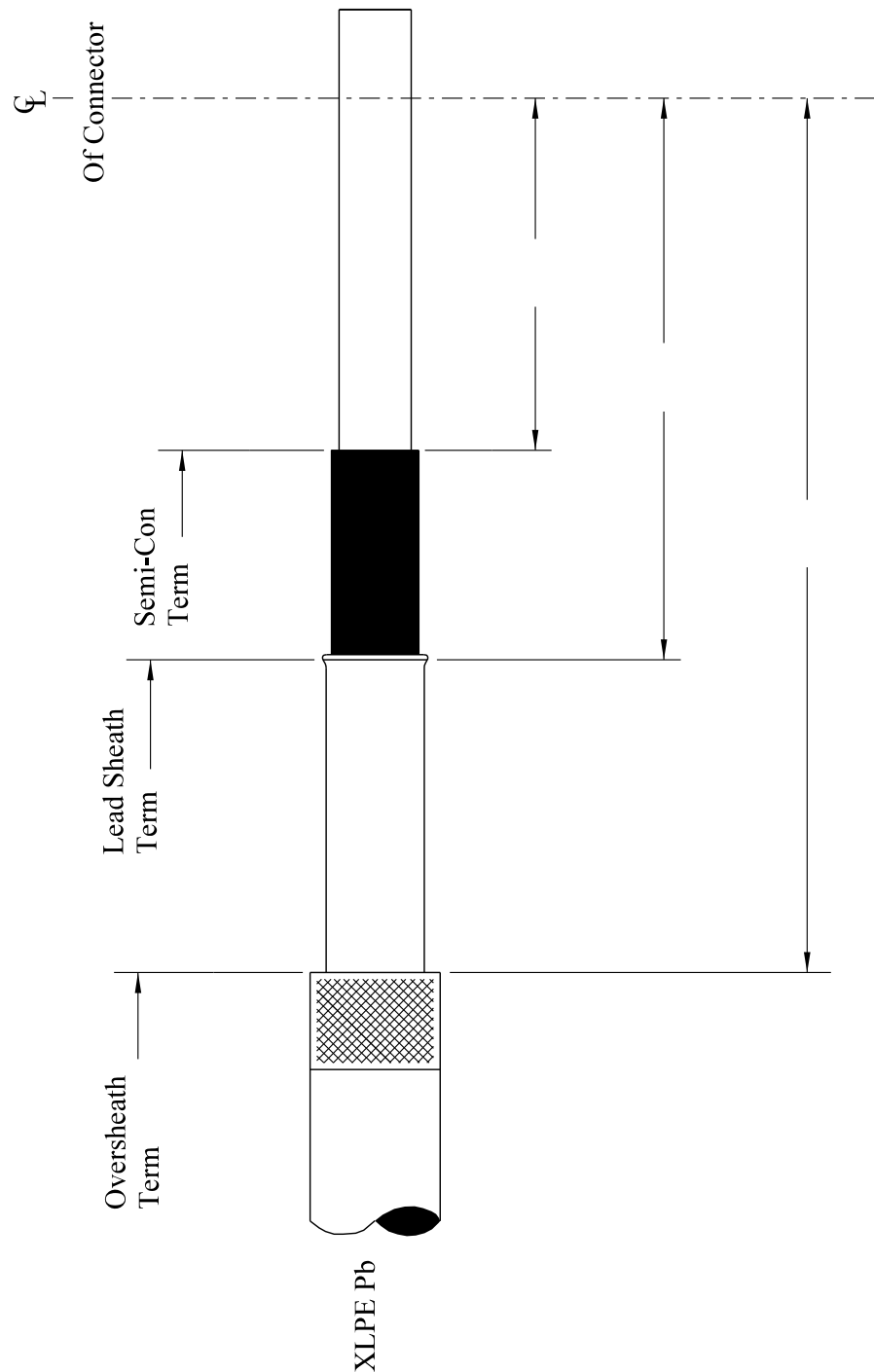
12. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.305 – Continued

Actions	General Requirements (ST: CA3C/2)
13. Fit foam ring to polymer stop end module.	31
14. Fit a copper equalisation braid onto centre of insulation sleeve.	32
15. Fit insulation sleeve at connector centre.	32
16. Connect copper earth braid from insulation sleeve to semi-con screen.	32
17. Fit inner joint sleeve to cable and polymer stop end module.	36
Note:- Ensure the stop end module is fitted with foam rings and positioned correctly within the inner sleeve entry - opposite to the cable entry.	
18. Ensure joint is level and fill with Lovisil.	38
19. Clean and degrease inner joint sleeve.	40
20. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
21. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
22. Apply 5313 black mastic water blocking tape over cable oversheath end onto the lead sheath for 40mm.	42
23. Build-up oversheath and stop end polymer rod.	34
24. Fit and support joint shell ensuring 15mm clearance.	43
25. Mix and pour resin.	44

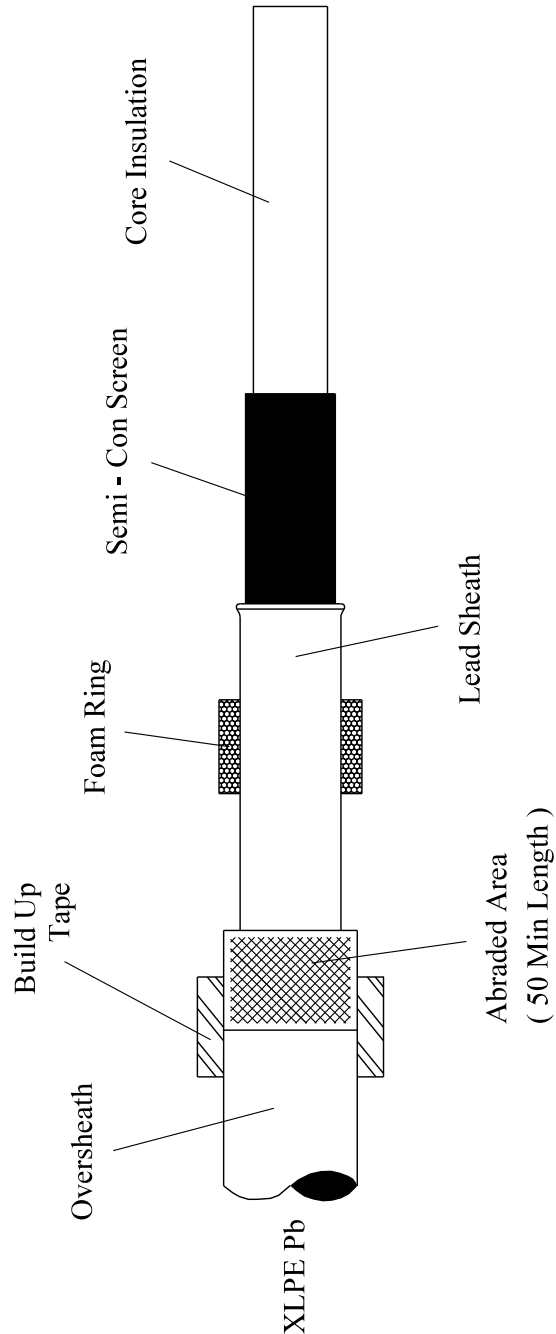
All dimensions in mm



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SCALE N.T.S.			Title 500/630mm ² XLPE Pb SHEATH SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS			Drg. No. JP3D 7.305.1 Rev No

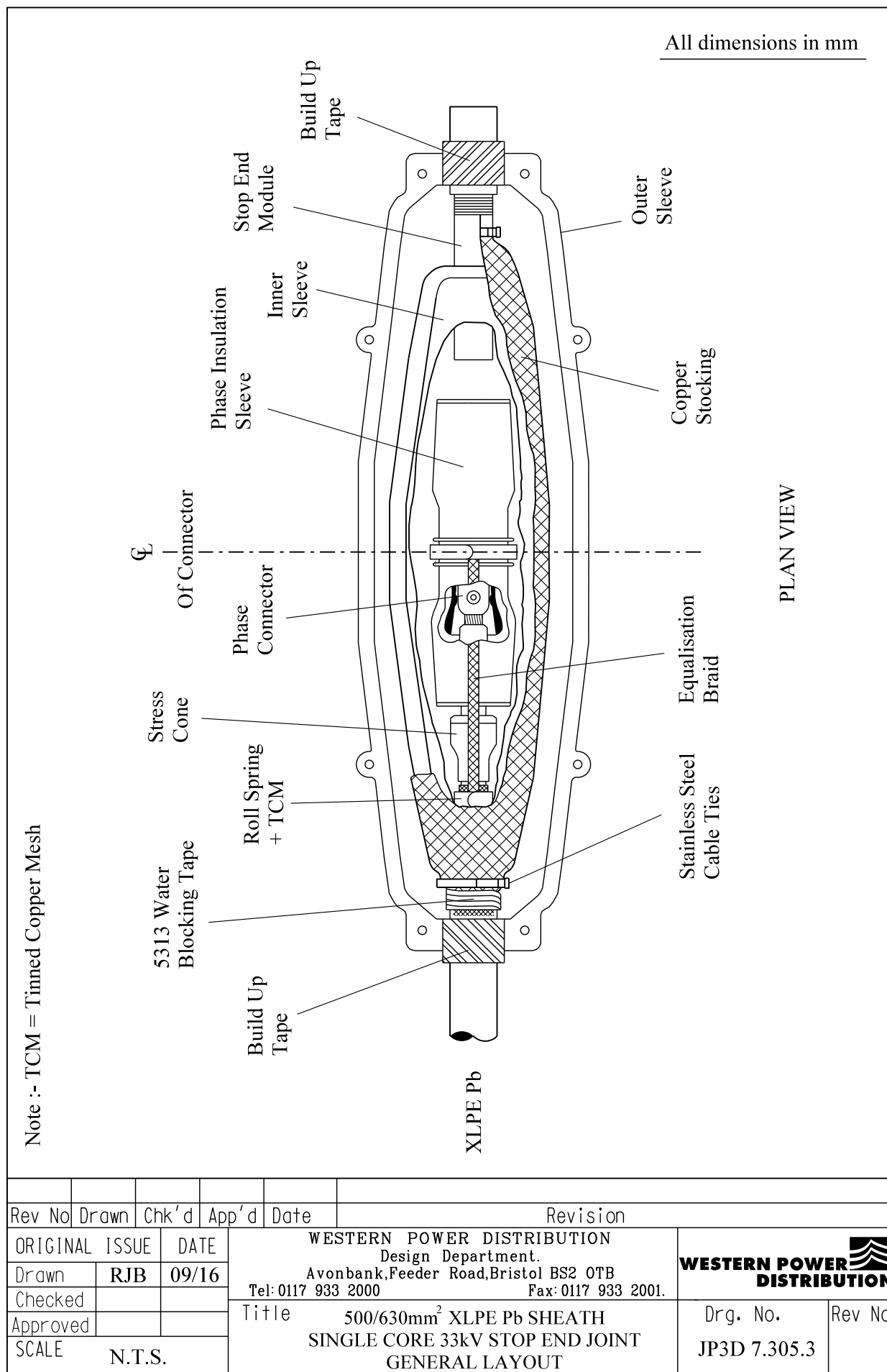
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All dimensions in mm



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Approved				Drg. No.	
SCALE		N.T.S.		JP3D 7.305.2	
				Rev No	

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**ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE
CABLE STOP END JOINTS**

JOINTING PROCEDURE 7.306

**800/1000mm² XLPE Pb SHEATH SINGLE CORE 33kV STOP END
JOINT.**

(This Jointing Procedure covers cable sizes up to and including 1000mm²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.306

JOINT KIT REFERENCES

CABLE SIZE	JOINT KIT REFERENCES
To	Stop End
800 XLPE	SE 3314
1000 XLPE	SE 3315

JOINTING PROCEDURE 7.306

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE		STOP END MODULE	CABLE DEPENDING MODULES		CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MX105 XLPE Pb 800	CM MX105 XLPE Pb 1000	VTPC44UTB	WCSM 90/25 x 250
SE 3314	3	3	3	3	3	-	3	3
SE 3315	3	3	3	3	-	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.306

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.306.1, 7.306.2, and 7.306.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

XLPE CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath, clean and abrade lead sheath. 17
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 19
8. Remove semi-conducting screens ensuring insulation is free from all conductive material. 25
9. Cut core, remove core insulation depth of connector plus 5 mm and apply chamfer. 27/29

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

10. Apply semi-con tape to termination of semi-con screen. 32
11. Apply a stress cone to semi-con termination. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

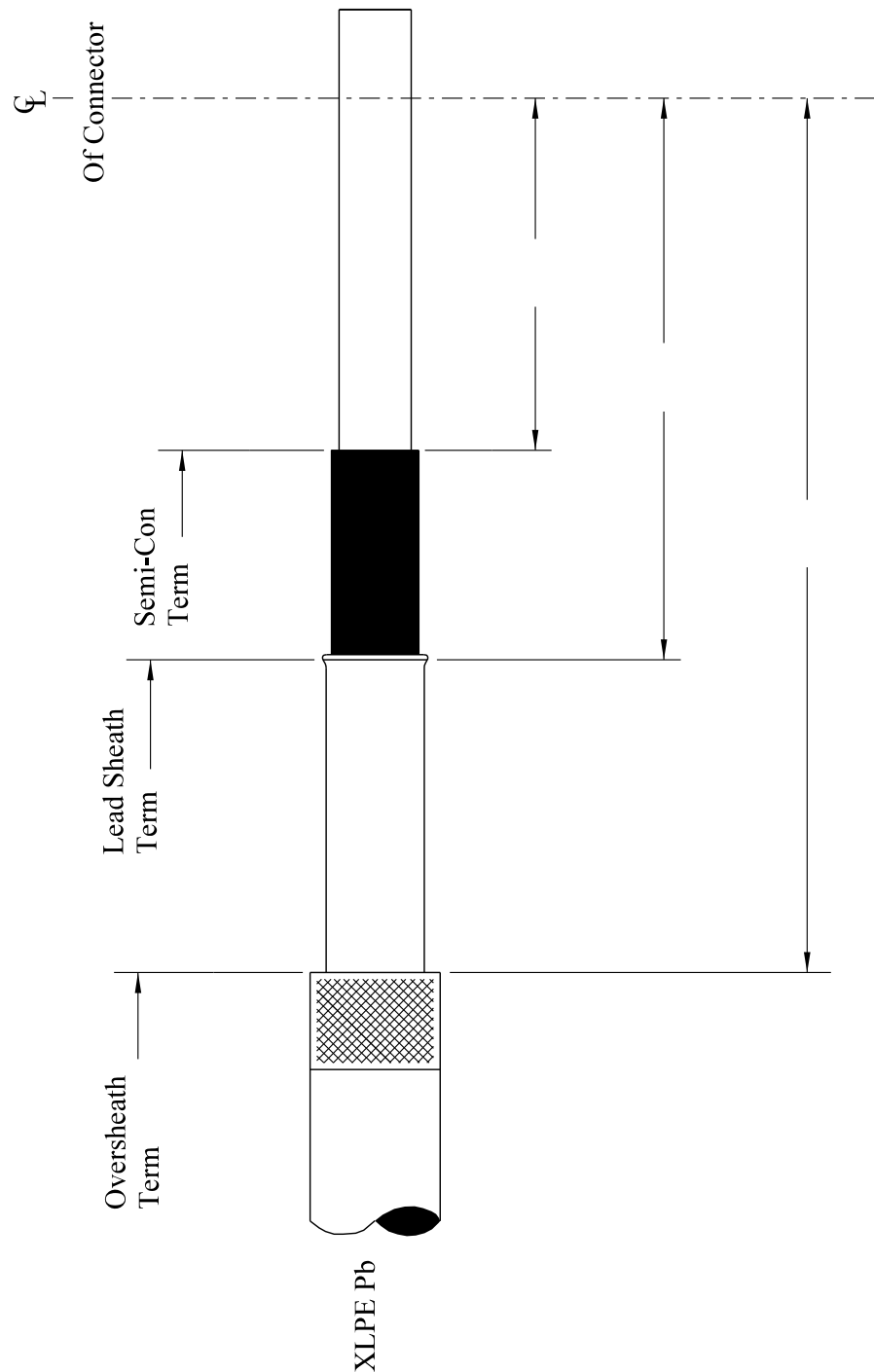
12. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.306 – Continued

Actions	General Requirements (ST: CA3C/2)
13. Fit foam ring to polymer stop end module.	31
14. Fit a copper equalisation braid onto centre of insulation sleeve.	32
15. Fit insulation sleeve at connector centre.	32
16. Connect copper earth braid from insulation sleeve to semi-con screen.	32
17. Fit inner joint sleeve to cable and polymer stop end module.	36
Note:- Ensure the stop end module is fitted with foam rings and positioned correctly within the inner sleeve entry - opposite to the cable entry.	
18. Ensure joint is level and fill with Lovisil.	38
19. Clean and degrease inner joint sleeve.	40
20. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
21. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
22. Apply 5313 black mastic water blocking tape over cable oversheath end onto the lead sheath for 40mm.	42
23. Build-up oversheath and stop end polymer rod.	34
24. Fit and support joint shell ensuring 15mm clearance.	43
25. Mix and pour resin.	44

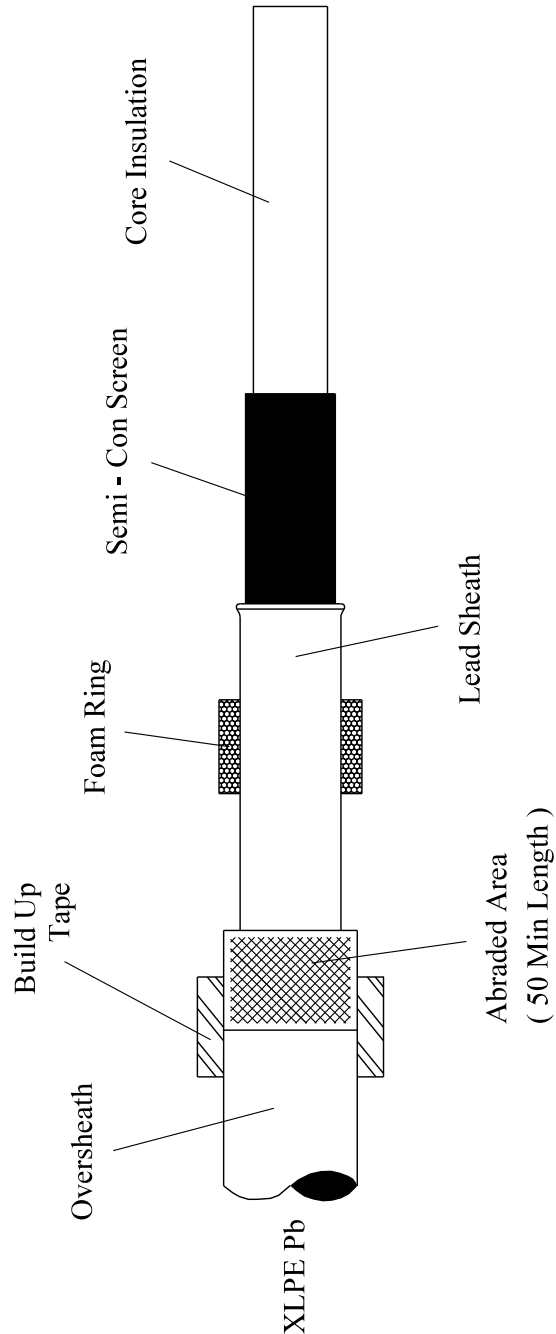
All dimensions in mm




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SCALE			N.T.S.	Title		800/1000mm ² XLPE Pb SHEATH SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS	Drg. No. JP3D 7.306.1	Rev No

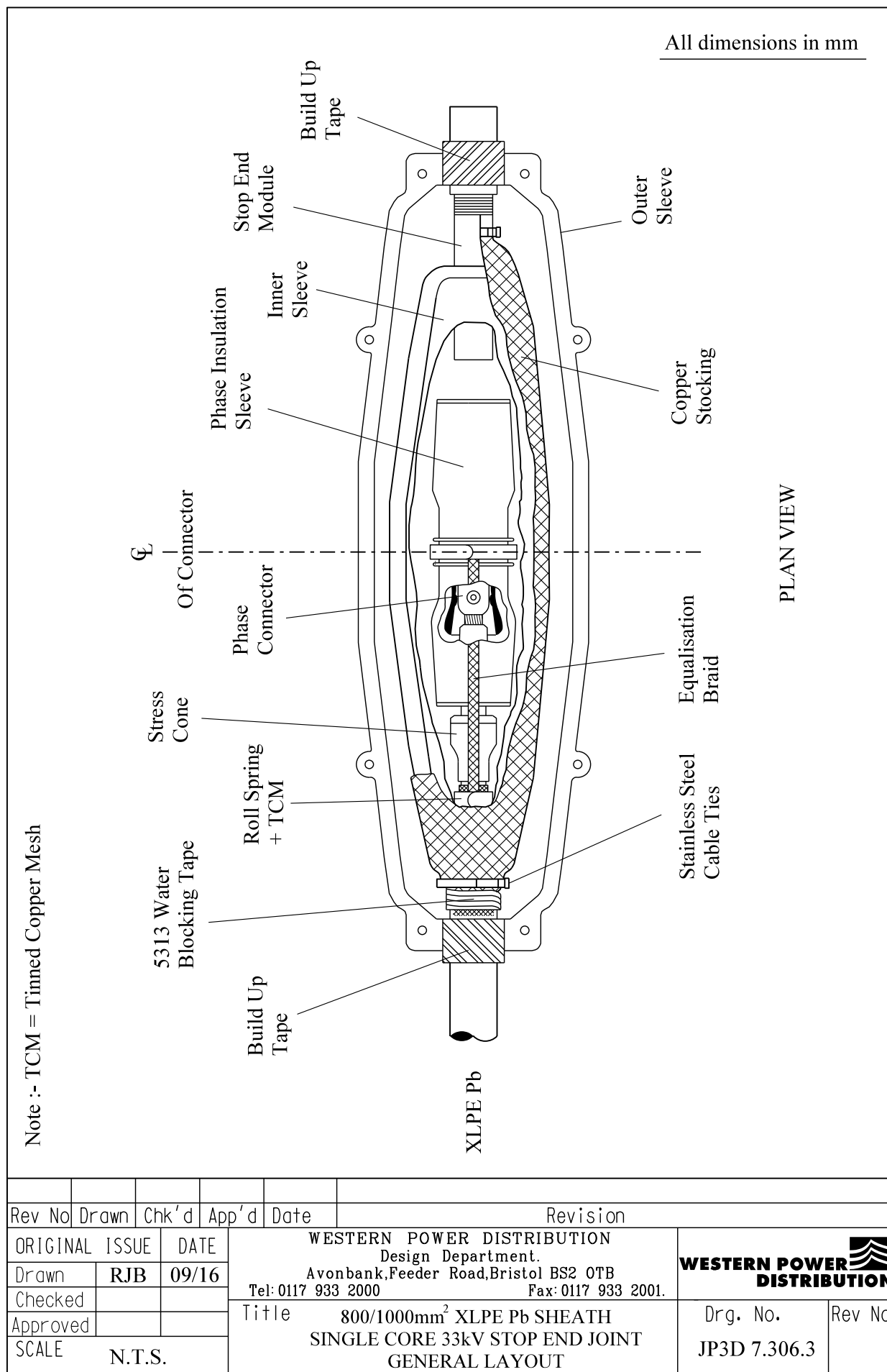
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All dimensions in mm



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SCALE		N.T.S.		Title		Drg. No.	Rev No
				PREPARATION OF XLPE Pb		JP3D 7.306.2	

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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.307

**0.1/0.2/0.3/0.4/0.5/0.6in² PILC SINGLE CORE 33kV
STOP END JOINT.**

(This Jointing Procedure covers cable sizes up to and including 0.6in²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.307

JOINT KIT REFERENCES

JOINT KIT REFERENCES	
To	Stop End
0.1 PILC	SE 3316
0.15 PILC	SE 3317
0.2 PILC	SE 3318
0.3 PILC	SE 3319
0.4 PILC	SE 3320
0.5 PILC	SE 3321
0.6 PILC	SE 3322

JOINTING PROCEDURE 7.307

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE	STOP END MODULE	CABLE DEPENDING MODULES							CONNECTORS			TUBE SET
	M85	B	SEM M85	CM MG85 PILC 0.1in ²	CM MG85 PILC 0.15in ²	CM MG85 PILC 0.2in ²	CM MG85 PILC 0.3in ²	CM MG85 PILC 0.4in ²	CM MG85 PILC 0.5in ²	CM MG85 PILC 0.6in ²	VTPB21 UTB	VTPB27U TB	VTPC28G8 UTB	WCSM 90/25 x 250
SE 3316	3	3	3	3	-	-	-	-	-	-	3	-	-	3
SE 3317	3	3	3	-	3	-	-	-	-	-	3	-	-	3
SE 3318	3	3	3	-	-	3	-	-	-	-	3	-	-	3
SE 3319	3	3	3	-	-	-	3	-	-	-	-	3	-	3
SE 3320	3	3	3	-	-	-	-	3	-	-	-	3	-	3
SE 3321	3	3	3	-	-	-	-	-	3	-	-	-	3	3
SE 3322	3	3	3	-	-	-	-	-	-	3	-	-	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 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 33kV Jointing Manual.

JOINTING PROCEDURE 7.307

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.307.1, 7.307.2, and 7.307.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

PILC CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath or hessian serving, clean and abrade lead sheath. 12
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 18
8. Carry out moisture test. 9
9. Remove metallic screen, carbon paper and two conductor papers. 24
10. Cut core, remove core insulation to depth of connector plus 5 mm. and apply chamfer. 27

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

11. Apply semi-con tape to termination of metallic screen. 32
12. Apply a stress cone to termination of metallic screen. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

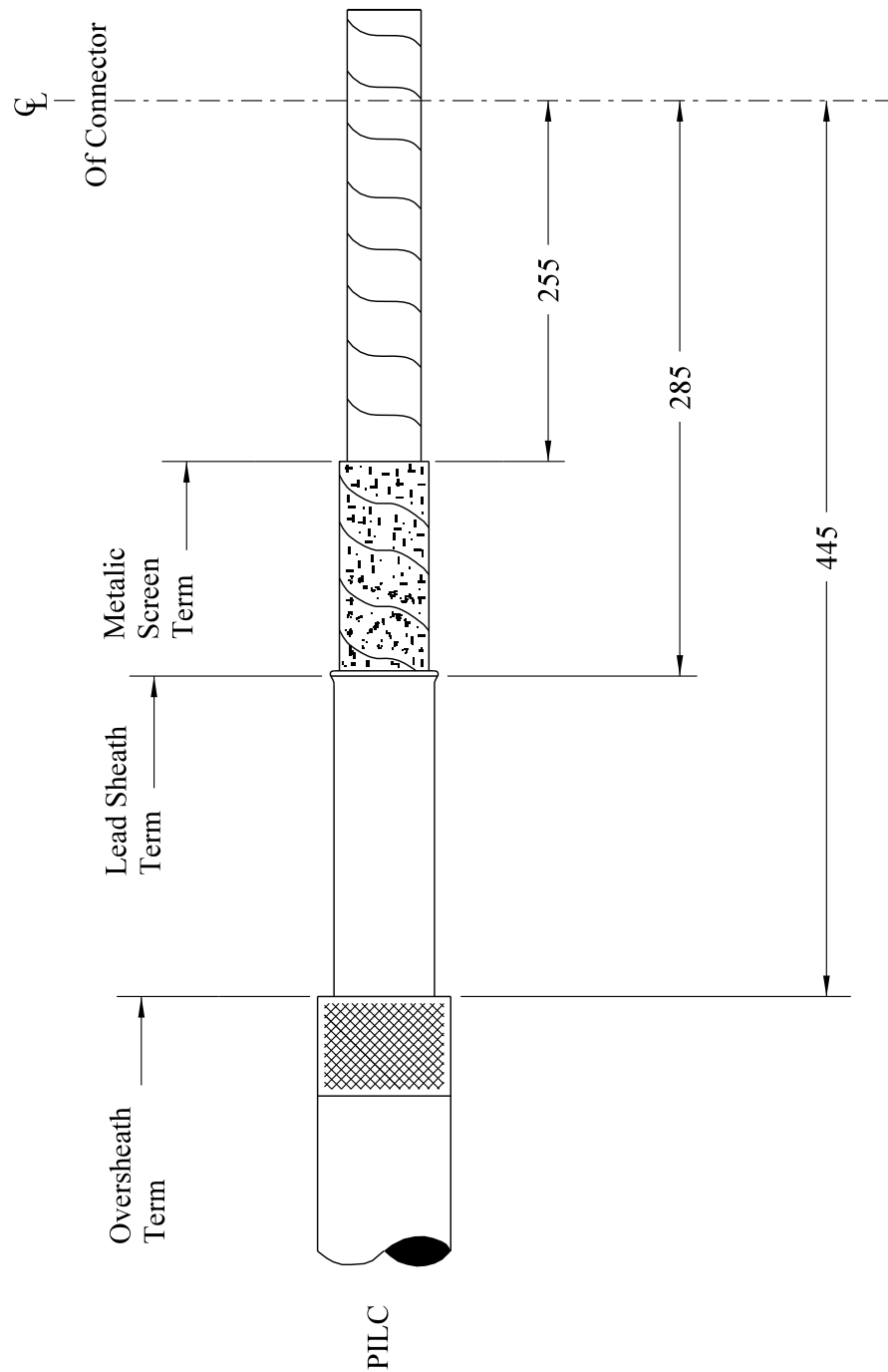
13. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.307 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Fit foam ring to polymer stop end module.	--
15. Fit polymer stop end module to connector.	35
16. Fit a copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve at connector centre.	32
18. Fit inner joint sleeve to cable and polymer stop end module.	38
Note: - Ensure the stop end module is fitted with a foam ring and positioned correctly within the inner joint sleeve entry - opposite to the cable entry.	
19. Ensure joint is level and fill with Lovisil.	38
20. Clean and degrease inner sleeve.	40
21. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
22. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
23. Apply 5313 black mastic water blocking tape over oversheath end onto the lead sheath for 40mm.	42
24. Build-up cable oversheath and stop end rod.	29
25. Fit and support outer joint sleeve ensuring 15mm clearance.	43
26. Mix and pour resin.	44

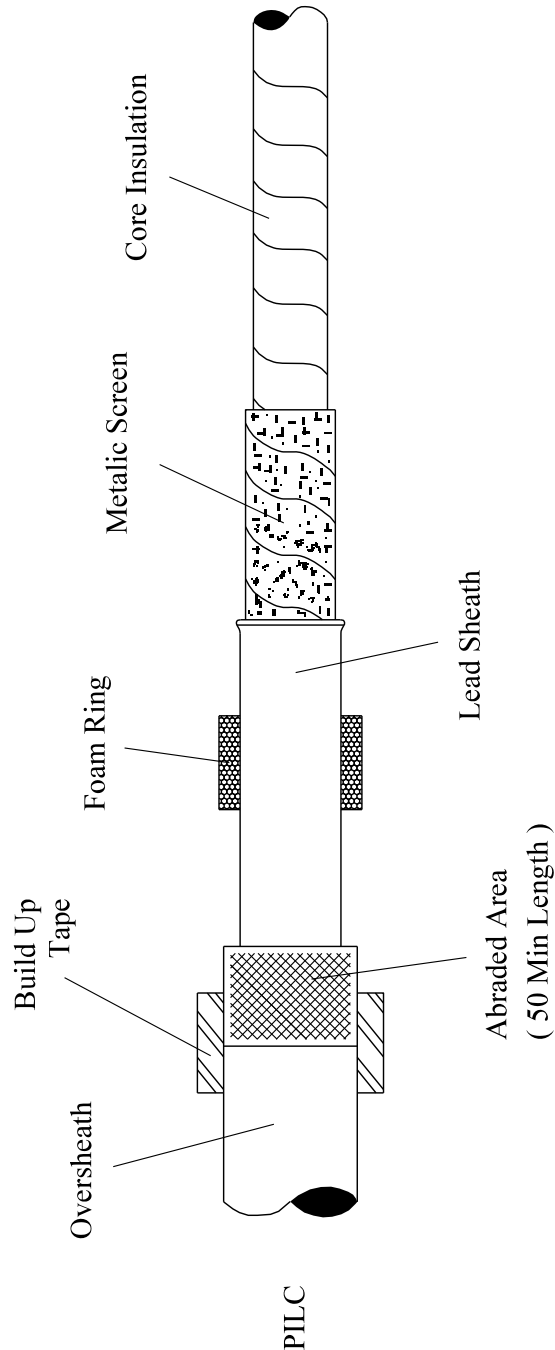
All dimensions in mm




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Drawn	RJB	12/16						
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SCALE		N.T.S.		Title			Drg. No.	Rev No
				0.1/0.2/0.3/0.4/0.5/0.6in ² PILC SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS			JP3D 7.307.1	

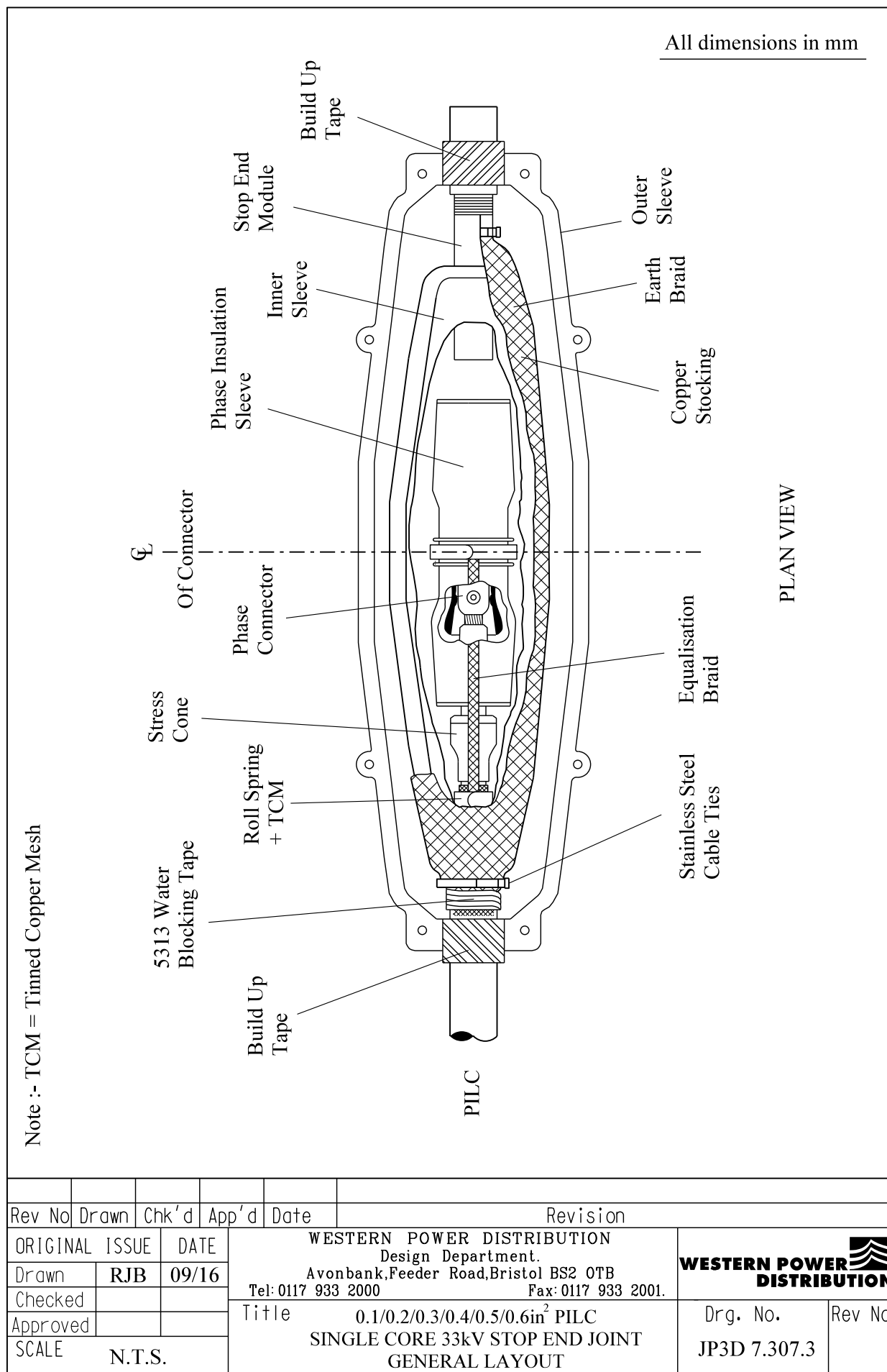
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All dimensions in mm



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Approved			PREPARATION OF PILC		
SCALE	N.T.S.				
					 Drg. No. JP3D 7.307.2 Rev No

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**ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE
CABLE STOP END JOINTS**

JOINTING PROCEDURE 7.308

**0.75/1.0in² PILC SINGLE CORE 33kV
STOP END JOINT.**

(This Jointing Procedure covers cable sizes up to and including 1.0in²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.308

JOINT KIT REFERENCES

JOINT KIT REFERENCES	
To	Stop End
0.75 PILC	SE 3323
1.0 PILC	SE 3324

JOINTING PROCEDURE 7.308

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE		STOP END MODULE	CABLE DEPENDING MODULES		CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MG105 PILC 0.75in ²	CM MG105 PILC 1.0in ²	VTPC36UTB	WCSM 90/25 x 250
SE 3316	3	3	3	3	3	-	3	3
SE 3317	3	3	3	3	-	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
 Scotch 70
 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 33kV Jointing Manual.

JOINTING PROCEDURE 7.308

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.308.1, 7.308.2, and 7.308.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

PILC CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath or hessian serving, clean and abrade lead sheath. 12
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 18
8. Carry out moisture test. 9
9. Remove metallic screen, carbon paper and two conductor papers. 24
10. Cut core, remove core insulation to depth of connector plus 5 mm. and apply chamfer. 27

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

11. Apply semi-con tape to termination of metallic screen. 32
12. Apply a stress cone to termination of metallic screen. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

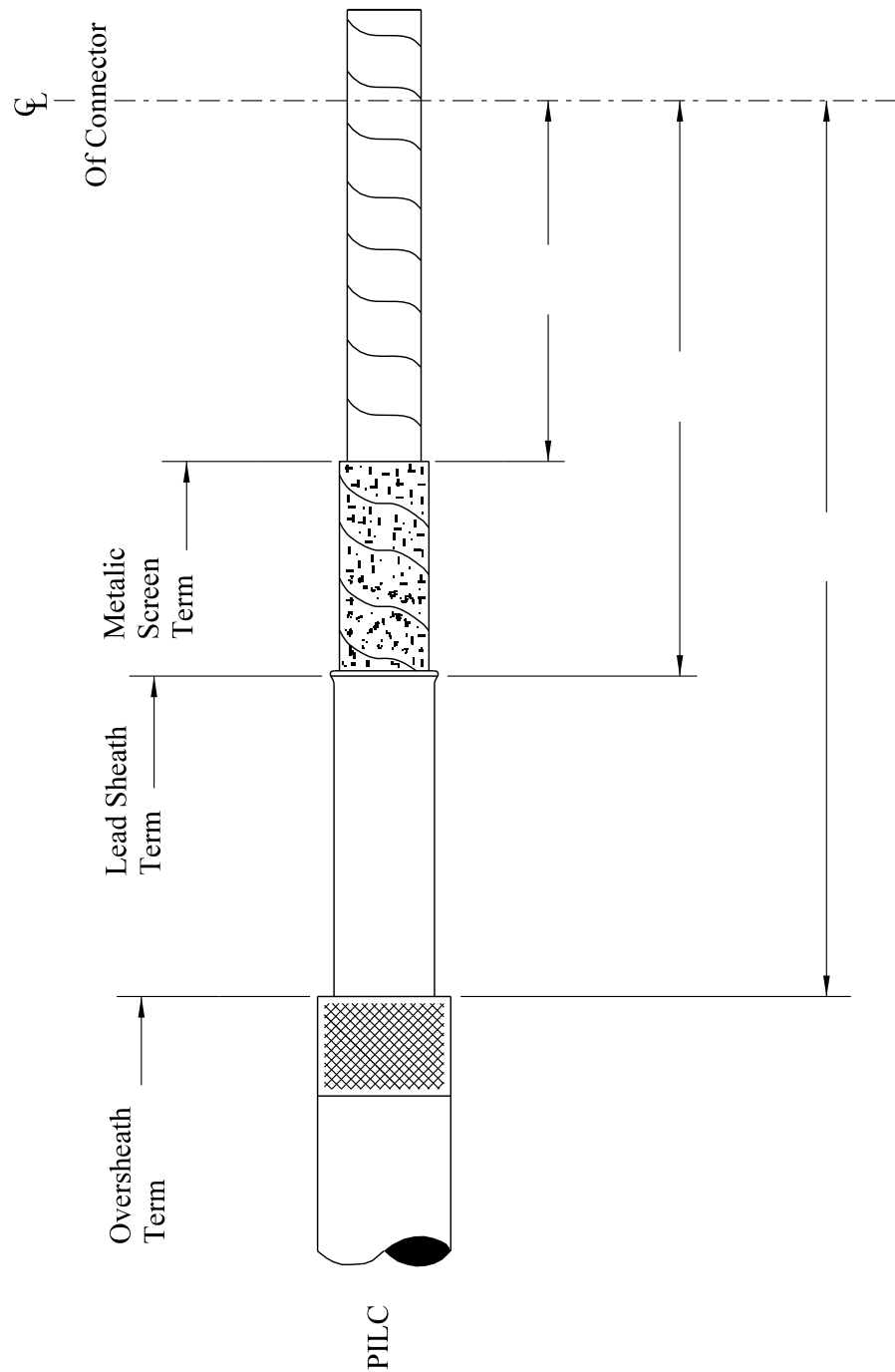
13. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.308 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Fit foam ring to polymer stop end module.	--
15. Fit polymer stop end module to connector.	35
16. Fit a copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve at connector centre.	32
18. Fit inner joint sleeve to cable and polymer stop end module.	38
Note: - Ensure the stop end module is fitted with a foam ring and positioned correctly within the inner joint sleeve entry - opposite to the cable entry.	
19. Ensure joint is level and fill with Lovisil.	38
20. Clean and degrease inner sleeve.	40
21. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
22. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
23. Apply 5313 black mastic water blocking tape over oversheath end onto the lead sheath for 40mm.	42
24. Build-up cable oversheath and stop end rod.	29
25. Fit and support outer joint sleeve ensuring 15mm clearance.	43
26. Mix and pour resin.	44

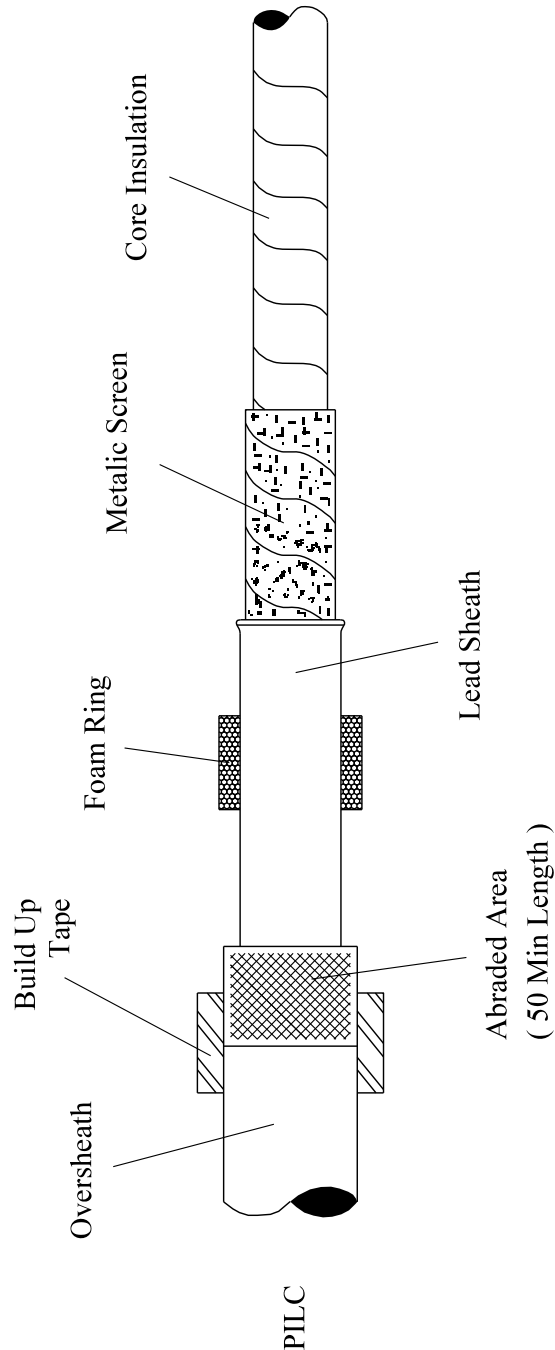
All dimensions in mm




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Approved						
SCALE N.T.S.			Title 0.75/1.0in ² PILC SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS			Drg. No. JP3D 7.308.1
						Rev No

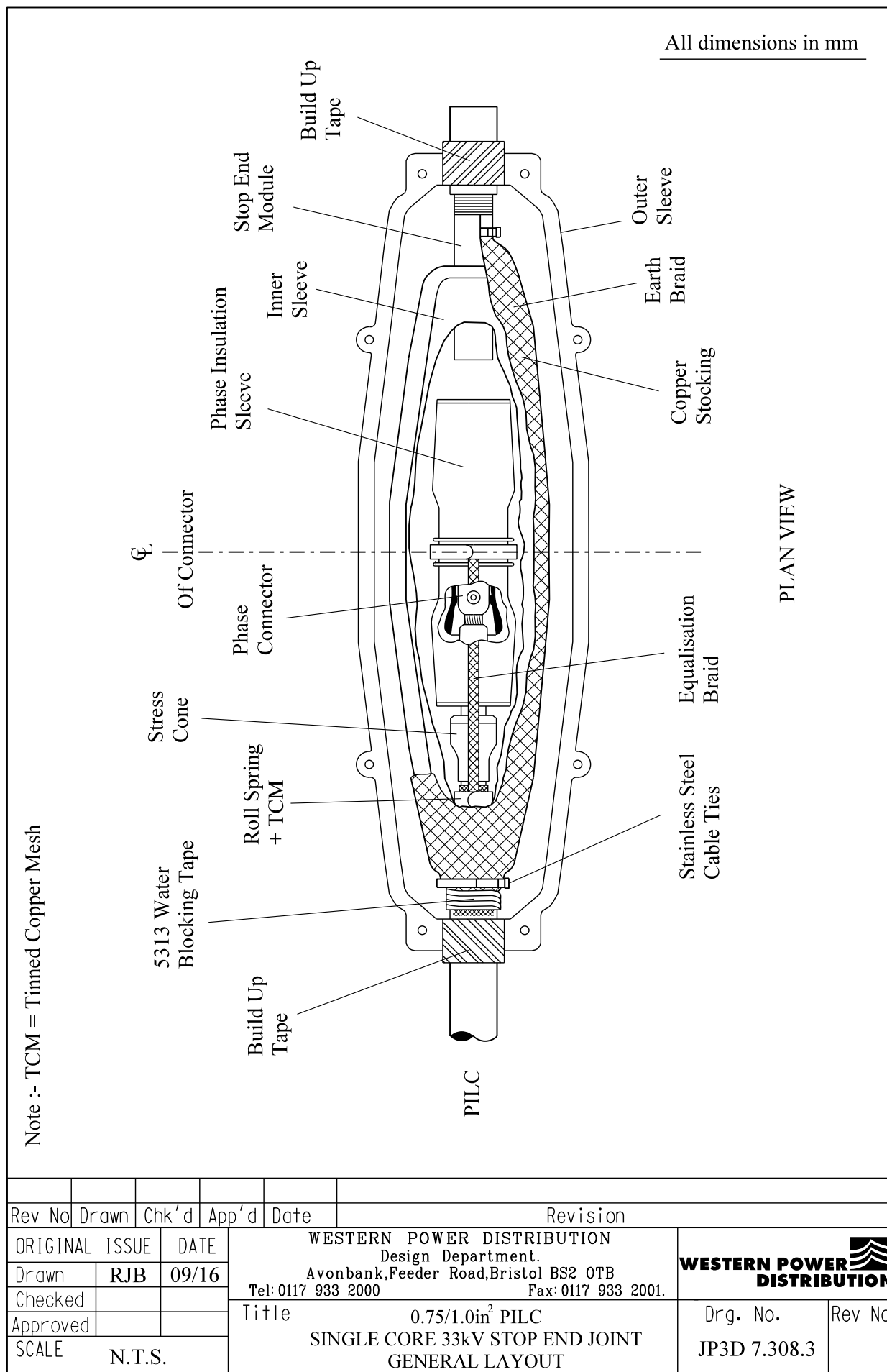
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All dimensions in mm



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ST CA3N/2 PROCEDURES FOR MAKING 33kV SINGLE CORE CABLE STOP END JOINTS

JOINTING PROCEDURE 7.309

1.25/1.5in² PILC SINGLE CORE 33kV STOP END JOINT.

(This Jointing Procedure covers cable sizes up to and including 1.5in²)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA3C/2 Section 6
of the 33kV Jointing Manual**

JOINTING PROCEDURE 7.309

JOINT KIT REFERENCES

JOINT KIT REFERENCES	
To	Stop End
1.25 PILC	SE 3325
1.5 PILC	SE 3326

JOINTING PROCEDURE 7.307

JOINT KIT MATERIALS (for a three phase joint)

KIT REF	BASE MODULE	RESIN MODULE		STOP END MODULE	CABLE DEPENDING MODULES	CONNECTORS	TUBE SET
	M105	B	C	SEM M105	CM MG105 PILC 0.1in ²	VTPC44UTB	WCSM 90/25 x 250
SE 3325	3	3	3	3	3	3	3
SE 3326	3	3	3	3	3	3	3

ADDITIONAL ITEMS FOR EACH JOINT

PVC tape
Scotch 70
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 33kV Jointing Manual.

JOINTING PROCEDURE 7.309

Actions

General Requirements (ST: CA3C/2)

Refer to Drawings **JP3D 7.309.1, 7.309.2, and 7.309.3** whilst undertaking this Jointing Procedure.

1. Set and mark cables. 5/6

PILC CABLE – PREPARATION

2. Clean oversheath for a distance of 2m. --
3. Apply a temporary earth continuity bond clear of joint position. 11
4. Park a mastic lined heat shrink tube next to temporary earth continuity bond. --
5. Remove oversheath or hessian serving, clean and abrade lead sheath. 12
6. Park foam ring over lead sheath close to oversheath term. 31
7. Remove lead sheath. 18
8. Carry out moisture test. 9
9. Remove metallic screen, carbon paper and two conductor papers. 24
10. Cut core, remove core insulation to depth of connector plus 5 mm. and apply chamfer. 27

Note: - Ensure to allow for solid centre block of split connector when cutting core from centre line mark.

COMPLETION OF JOINT

11. Apply semi-con tape to termination of metallic screen. 32
12. Apply a stress cone to termination of metallic screen. 32

Note: - Ensure the flared end of the cone is facing towards the joint centre - open end of applicator.

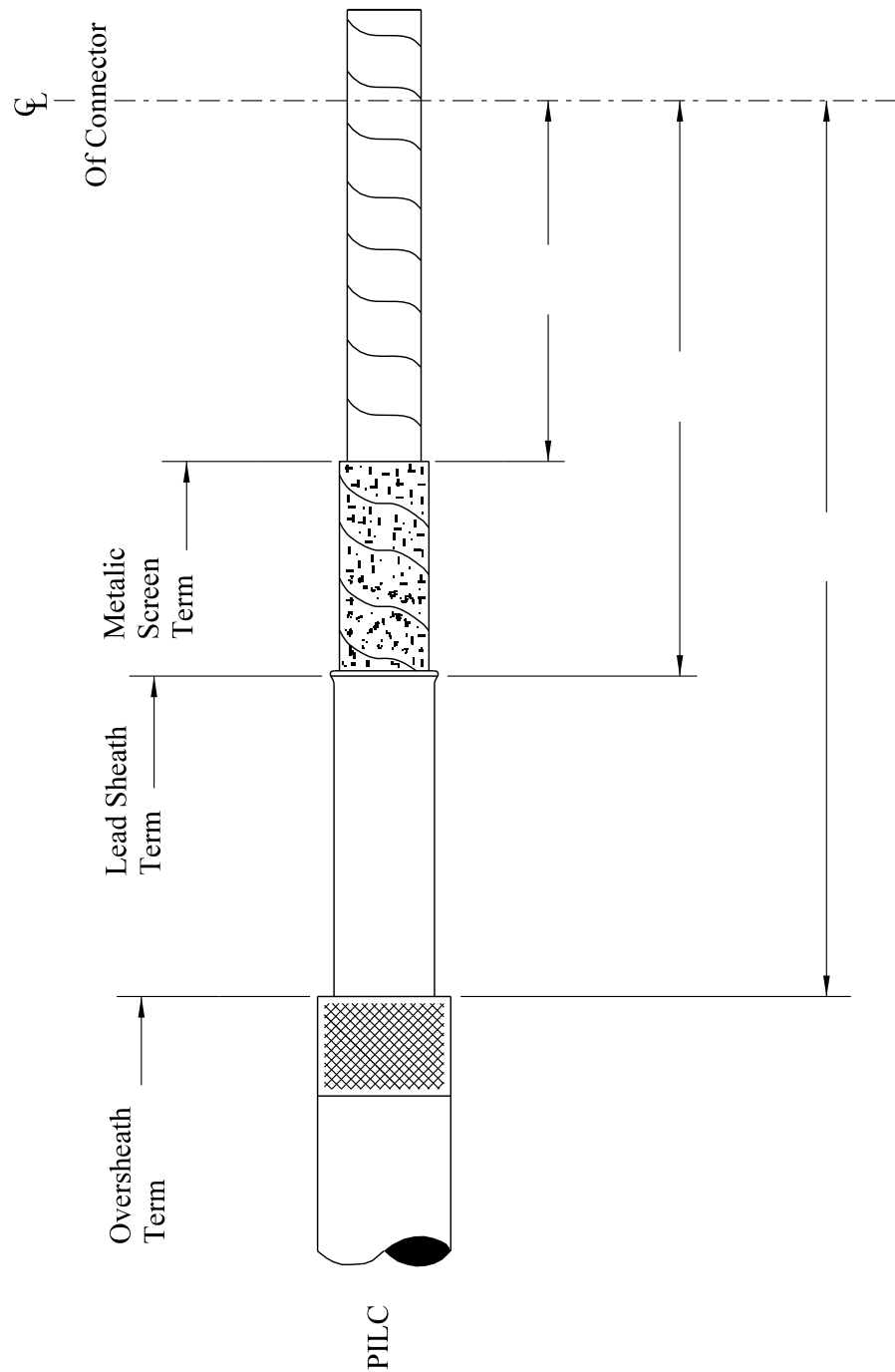
13. Connect phase connector to core end. 33


Note: - The connector conductor bolts and centre bolt are to be sheared off, the remaining two bolts of the connector are to be discarded.

JOINTING PROCEDURE 7.309 – Continued

Actions	General Requirements (ST: CA3C/2)
14. Fit foam ring to polymer stop end module.	--
15. Fit polymer stop end module to connector.	35
16. Fit a copper equalisation braid onto centre of insulation sleeve.	32
17. Fit insulation sleeve at connector centre.	32
18. Fit inner joint sleeve to cable and polymer stop end module.	38
Note: - Ensure the stop end module is fitted with a foam ring and positioned correctly within the inner joint sleeve entry - opposite to the cable entry.	
19. Ensure joint is level and fill with Lovisil.	38
20. Clean and degrease inner sleeve.	40
21. Remove temporary earth conductor applied in 3 and reseal oversheath.	11/45
22. Attach and configure copper stocking across joint and connect to lead sheath and polymer stop end rod.	41
23. Apply 5313 black mastic water blocking tape over oversheath end onto the lead sheath for 40mm.	42
24. Build-up cable oversheath and stop end rod.	29
25. Fit and support outer joint sleeve ensuring 15mm clearance.	43
26. Mix and pour resin.	44

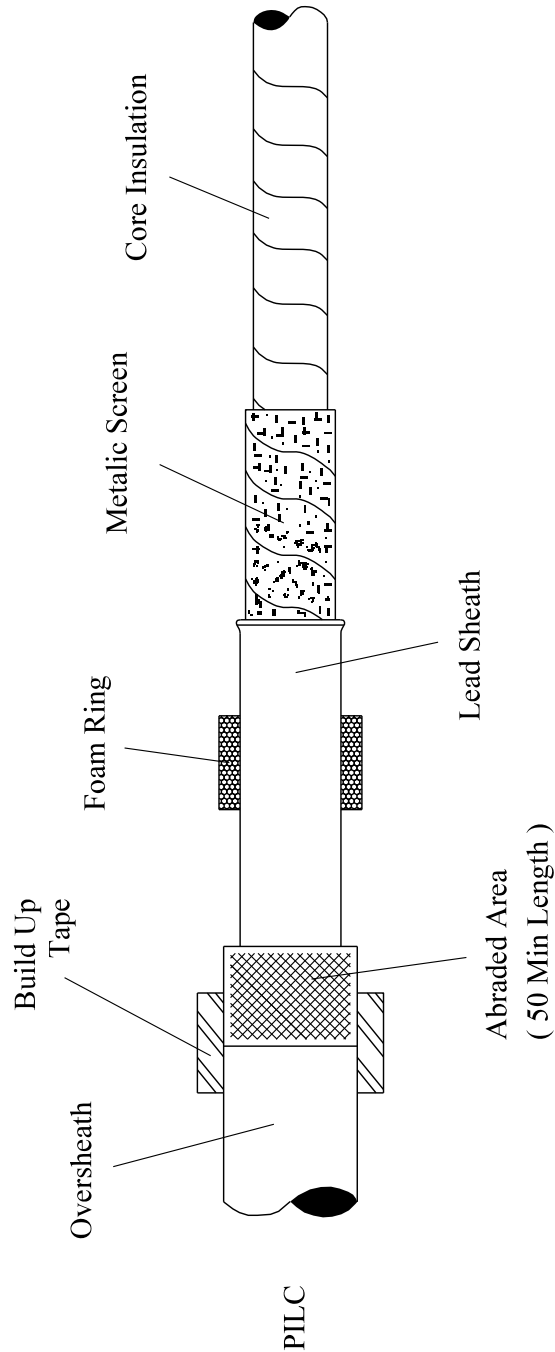
All dimensions in mm




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SCALE		N.T.S.		Title		Drg. No.	Rev No
				1.25/1.5in ² PILC SINGLE CORE 33kV STOP END JOINT STRIPPING DIMENSIONS		JP3D 7.309.1	

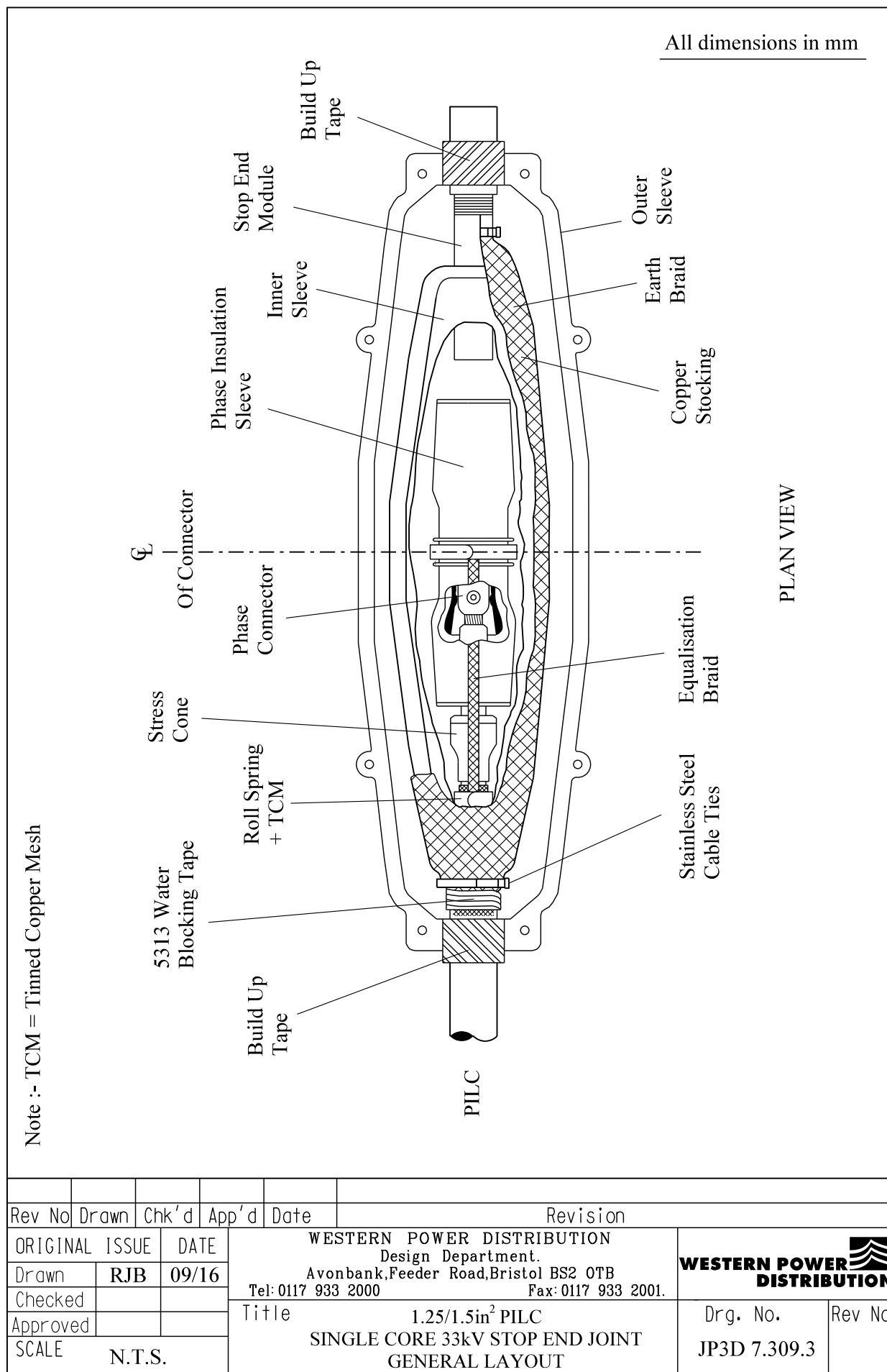
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APPENDIX A

SUPERSEDED DOCUMENTATION

This Standard Technique document ST: CA3N/2 supersedes ST: CA3N/1 dated July 2001 which should now be withdrawn.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST: CA3A, ST: CA3C/2, ST: CA3M/2, ST: CA3N/2, ST: CA3O, ST: CA3S, ST: CA3V, ST: CA7D.

APPENDIX C

IMPACT ON COMPANY POLICY

Change from heat shrink and cold shrink technology jointing to cold applied jointing technology. All existing 33kV Jointers will require re-training to the cold shrink techniques.

APPENDIX D

IMPLEMENTATION OF POLICY

This Standard Technique shall be communicated to all relevant WPD engineers and site staff at the next Team Briefing by the Team Manager. All existing 33kV Jointers will require re-training to the cold applied techniques once trained then they will be able to use the new cold applied jointing system.

Independent Connection Providers (ICPs) shall follow the requirements of ST: CA2N/1 or of this document (ST: CA2N/2) for a period of up to 3 months from the issue of this document. After this date, all jointing works shall comply with ST: CA2N/2.

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

Stop end jointing procedures for the 33kV jointing manual.