

Company Directive

STANDARD TECHNIQUE : CA1AA/1

Relating to Procedures for making Low Voltage Mains Cable Temporary Isolation Joints

Policy Summary

This standard Technique Document contains all the approved LV mains Temporary Isolation joints, which shall be implemented in conjunction with the appropriate general requirements in ST: CA1C/4.

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: June 2012

Approved by:



Policy Manager

Date:

1 June 2012

All references to Western Power Distribution or WPD must be read as National Grid Electricity Distribution or NGED

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ST: CA1AA - PROCEDURES FOR MAKING LV MAINS CABLE TEMPORARY ISOLATION JOINTS

INTRODUCTION

This standard Technique Document contains all the approved LV Mains Temporary Isolation joints, which shall be implemented in conjunction with the appropriate general requirements in ST: CA1C/4 including: -

1. General cleanliness and Accident Prevention.
2. General Jointing Procedures – Dead Cables.
3. General Jointing Procedures and Safety Precautions – Live Cables.

NOTE: - All PILC CONCENTRIC low voltage cables are excluded from this ST and ONLY JOINTING METHODS found in ST: CA1U/1 shall be complied with.

CLARIFICATION POINT

An isolation point or cut is deemed as temporary and shall only have the phase conductors cut, unless there is a specific requirement, for example, to allow for fault location. Should this need arise then referring to ST: CA1C/4 General Requirement 6.14 -Wavecon, GR 6.15 - Consac or GR 6.16 - PILC shall be adhered to and thereafter on completion the cut position shall form part of the closure cable length and therefore shall become part of a standard Straight Joint as per ST: CA1D/4.

The opening and cutting of phase conductors and subsequent reconnection to form a permanent straight joint on 3 core or 4 core Wavecon, Consac and PILC cables shall be carried out as detailed in the following Jointing Procedures.

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7.903	PILC
7.904	Four Core Wavecon

**ST: CA1AA - PROCEDURES FOR MAKING LV MAINS CABLE
TEMPORARY ISOLATION JOINTS**

STANDARD TECHNIQUE: 7.901

**THREE CORE WAVECON – MAINS CABLE
TEMPORARY ISOLATION JOINT
ONLY PHASE CONDUCTORS CUT***

* NOTE - If neutral conductors are to be cut, for fault location purposes, please refer to ST: CA1C/4 General Requirement 6.14 and thereafter on completion the cut position becomes part of a standard Straight Joint as per ST: CA1D/3.

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA1C Section 6 Pt 1
of the LV Mains Jointing Manual**

JOINTING PROCEDURE 7.901

JOINT KIT REFERENCES

CABLE Type / Size: - 3 core Wavecon	JOINT KIT REFERENCES
	ISOLATION JOINT
95mm²	MTI 1
185mm²	MTI 2
300mm²	MTI 3

JOINTING PROCEDURE 7.901

JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS				EARTH TAIL
	1586	1585	1584	5 litre	6.5 litre	UST 95	UST 185	UST 300	BCNE 3	LVCU 1700/5
MTI 1	1				2	3			2	1
MTI 2		1		1	2		3		2	1
MTI 3			1	3	2			3	2	1

ADDITIONAL ITEMS FOR EACH JOINT

Insulation Patch
Black cotton tape
Sealing putty
Cable ties
Shell support
Tinned copper braid (15 x 1.5)
16 swg tinned copper wire
PVC tape
De-Solvit 1000FD
Workhorse dry wipes

Note: - Individual material item numbers (SHOPS) are to be found in Section 4 – Part I of the LV Mains Jointing Manual.

JOINTING PROCEDURE 7.901

Actions

General Requirements (ST: CA1C)

Refer to Drawings **LVJ 7.901.1** and **LVJ 7.901.2** whilst undertaking this Jointing Procedure.

OPEN CABLE AND CUT PHASE CONDUCTORS

- | | | |
|----|---|----|
| 1. | Remove PVC oversheath. | 6 |
| 2. | Open neutral/earth wires. | 8 |
| 3. | Remove rubber bedding. | 9 |
| 4. | Shroud exposed neutral/earth wires and earthed metal work. | 21 |
| 5. | Using an insulated wedge splay one core approximately 25mm at the centre of the joint. | -- |
| 6. | Using an approved insulated bell punch carefully expose a small area of the core at the position it is to be cut. | -- |
| 7. | Use a test lamp connected between the exposed phase core and and neutral/earth wires to check whether the core is live or dead. | -- |

If live or dead conditions are not as expected, the supervisor must be informed before jointing work continues.

The test lamp must be proved before and after use.

- | | | |
|----|---|----|
| 8. | Using core croppers or a junior hacksaw cut the core at the required position. Care must be exercised when cutting the core to ensure that other core(s) are not damaged otherwise a flashover may occur. When a core is being cut with a hacksaw the other cores must be shielded at the cutting position by a core guard wedge or if croppers are being used the other cores may be protected by a core guard or piece of clean PVC oversheath. | -- |
| 9. | Using a test lamp check to ensure the cut core is live from either one or both ends. The test lamp should be connected between the neutral/earth wires and the cut ends of the core. | -- |

If either end of the cut core is dead (not as expected) the Supervisor should be informed.

JOINTING PROCEDURE 7.901 - Continued

Actions	General Requirements (ST: CA1C)
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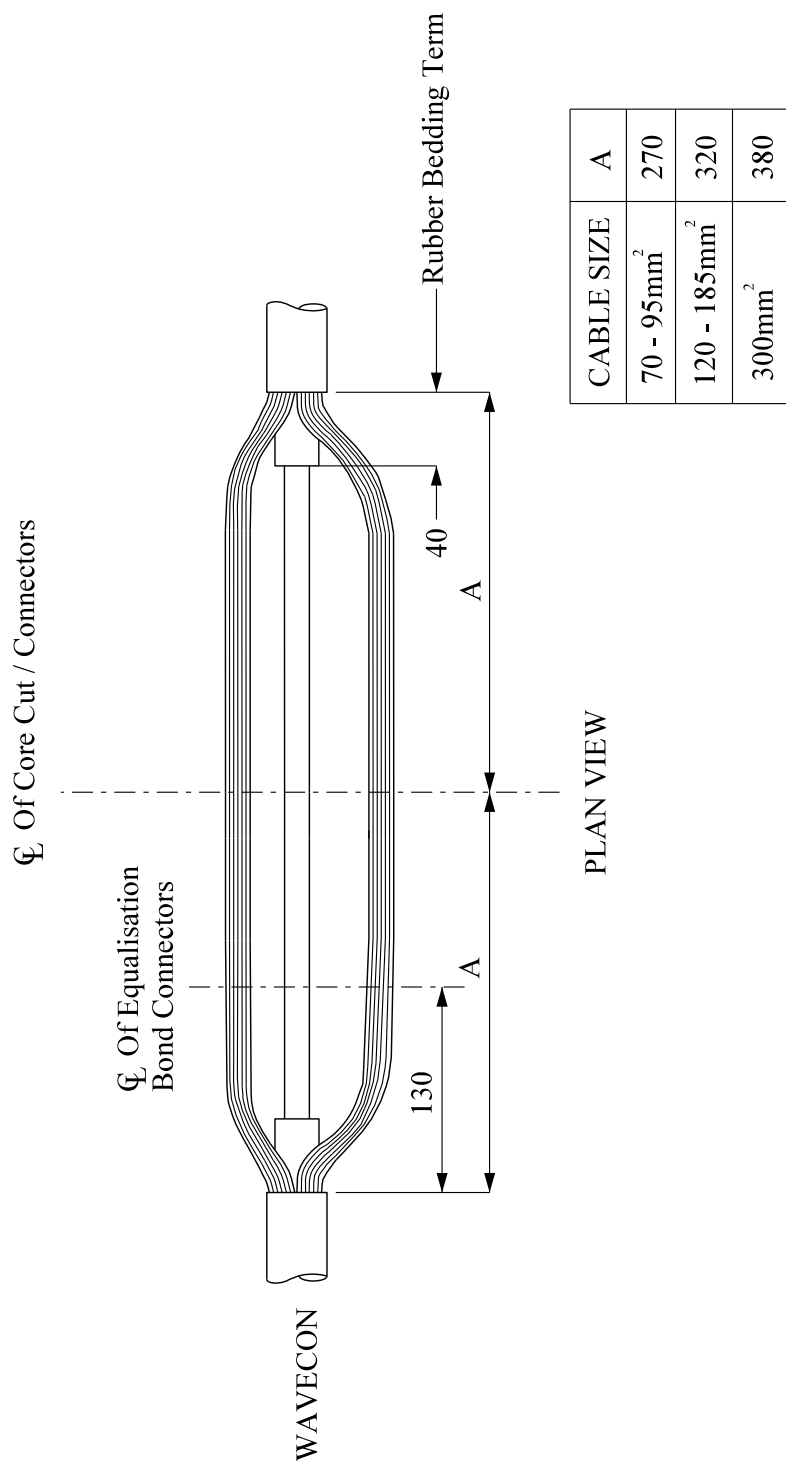
- | | |
|--|----|
| 10. Insulate both ends of the cut core, using adhesive backed rubber patches. Wrap the patch around the core, overlapping the end and pinch edges together. Trim as shown in Drawing GRD 6.14.1. The patches should not be re-used and should be disposed of, after use. | -- |
| 11. Repeat operation 6 to 10 on the remaining phase cores, taking each core in turn. | -- |


Only one core must be exposed at a time and the neutral/earth wires shall not be cut.

RECONNECTION OF PHASE CONDUCTORS/ JOINT COMPLETION

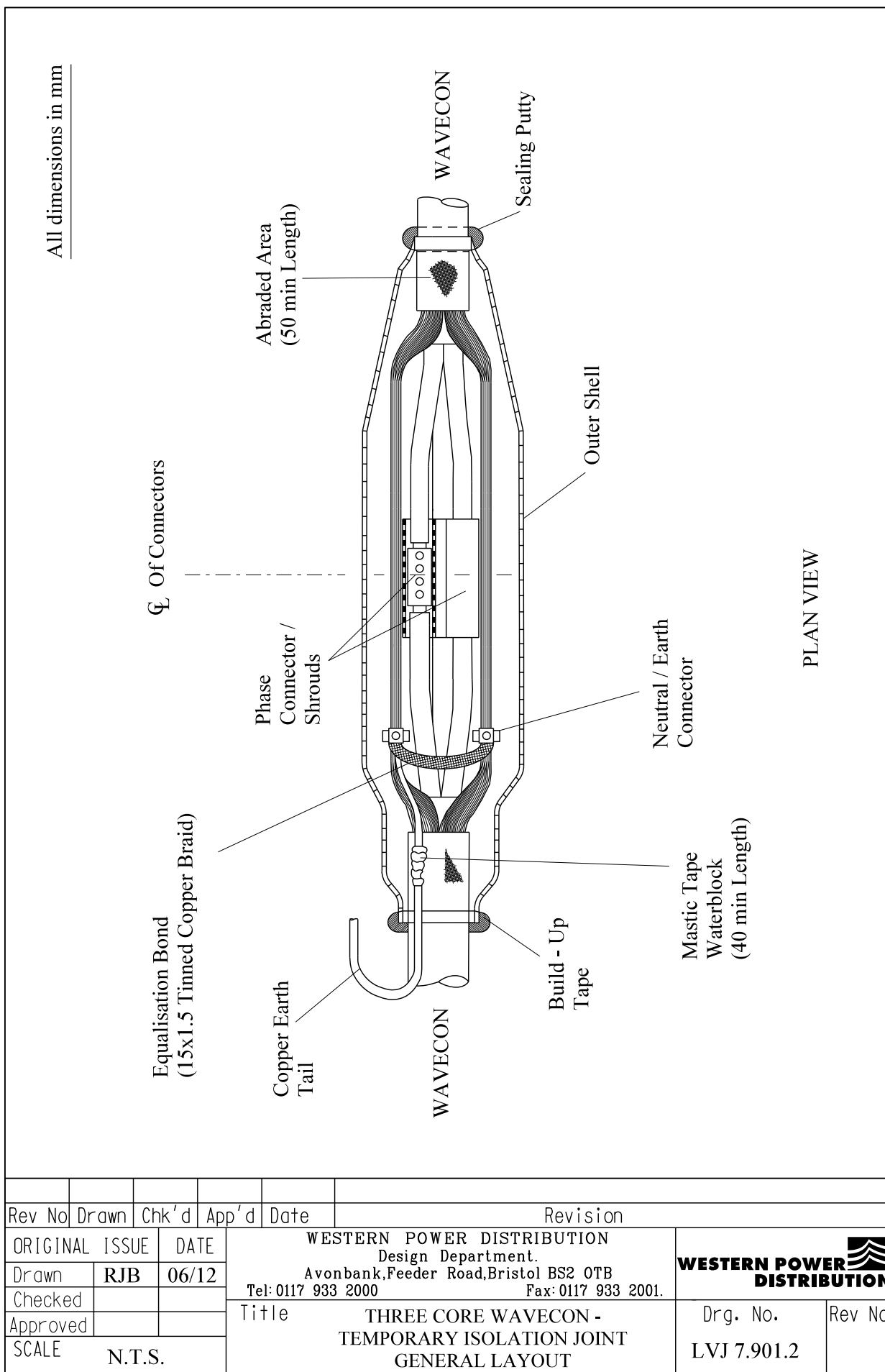
- | | |
|---|-------|
| 12. Ensure temporary shrouding is in place. | 21 |
| 13. Make and insulate phase connections. | 29/30 |
| 14. Remove shrouding applied in 4. | -- |
| 15. Connect equalisation bond and copper earth tail to neutral/earth wires. | 29 |
| 16. Form neutral/earth wires into their final position. | -- |
| 17. Abrade and build up oversheaths. | 32 |
| 18. Thoroughly degrease the joint. | 35 |
| 19. Apply mastic waterblock to copper earth tail. | 33 |
| 20. Remove temporary binders. | -- |
| 21. Prepare and fit shell ensuring 15mm clearance. | 36 |
| 22. Mix and pour resin. | 37 |

All dimensions in mm



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ORIGINAL ISSUE		DATE	WESTERN POWER DISTRIBUTION Design Department. Avonbank,Feeder Road,Bristol BS2 0TB Tel:0117 933 2000 Fax:0117 933 2001.			 WESTERN POWER DISTRIBUTION
Drawn	RJB	06/12	Title			
Checked			THREE CORE WAVECON TEMPORARY ISOLATION JOINT STRIPPING DIMENSIONS			Drg. No.
Approved						Rev No
SCALE		N.T.S.				LVJ 7.901.1

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**ST: CA1AA - PROCEDURES FOR MAKING LV MAINS CABLE TEMPORARY
ISOLATION JOINTS**

STANDARD TECHNIQUE: 7.902

**CONSAC – MAINS CABLE
TEMPORARY ISOLATION JOINT
ONLY PHASE CONDUCTORS CUT***

* NOTE - If neutral conductors are to be cut, for fault location purposes, please refer to ST: CA1C/4 General Requirement 6.15 and thereafter on completion the cut position becomes part of a standard Straight Joint as per ST: CA1D/4.

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA1C Section 6 Pt 1
of the LV Mains Jointing Manual**

JOINTING PROCEDURE 7.902

JOINT KIT REFERENCES

CABLE Type / Size: - Consac	JOINT KIT REFERENCES
	ISOLATION JOINT
95mm²	MTI 4
185mm²	MTI 5

JOINTING PROCEDURE 7.902

JOINT KIT MATERIALS

KIT REF.	SHELL		RESIN		CONNECTORS			EARTH TAIL
	1586	1585	5 litre	6.5 litre	UST 95	UST 185	TA3	LVCU 1700/5
MTI 4	1			2	3		1	1
MTI 5		1	1	2		3	1	1

ADDITIONAL ITEMS FOR EACH JOINT

Insulation Patch
Black cotton tape
Sealing putty
Cable ties
Shell support
16 swg tinned copper wire
Heatshrink tubing
Whipping thread
'H' metal
Abrasive metal
PVC tape
De-Solvit 1000FD
De-Solvit 1000
Workhorse dry wipes

Note: - Individual material item numbers (SHOPS) are to be found in Section 4 – Part I of the LV Mains Jointing Manual.

JOINTING PROCEDURE 7.902

Actions

General Requirements (ST: CA1C)

Refer to Drawings **LVJ 7.902.1** and **LVJ 7.902.2** whilst undertaking this Jointing Procedure.

OPEN CABLE AND CUT PHASE CONDUCTORS

- | | | |
|----|---|----|
| 1. | Remove PVC oversheath. | 6 |
| 2. | Open prepare neutral/earth sheath. | 12 |
| 3. | Shroud exposed neutral/earth sheath and earthed metalwork. | 21 |
| 4. | Tie off the belt papers each end of the joint with hemp string;
Remove the belt papers by unwrapping and tearing off against the tie. | -- |
| 5. | Using an insulated wedge splay one core approximately 25mm at the centre of the joint. | -- |
| 6. | Tie off the core papers with hemp string binder 5mm either side of the position at which the splayed core is to cut, this being determined by the joint to be made. | -- |
| 7. | Carry out moisture test. | 19 |
| 8. | Using an approved insulated bell punch carefully expose a small area of the core at the position it is to be cut. | -- |
| 9. | Use a test lamp connected between the exposed phase core and neutral/earth sheath to check whether the core is live or dead. | -- |

If live or dead conditions are not as expected, the supervisor must be informed before jointing work continues.

The test lamp must be proved before and after use.

- | | | |
|-----|--|----|
| 10. | Using core croppers or a junior hacksaw, cut the core at the required position. Care must be exercised when cutting the core to ensure that other core(s) are not damaged otherwise a flashover may occur. When a core is being cut with a hacksaw the other cores must be shielded at the cutting position by a core guard wedge or if croppers are being used the other cores may be protected by a core guard or piece of clean PVC oversheath. | -- |
|-----|--|----|

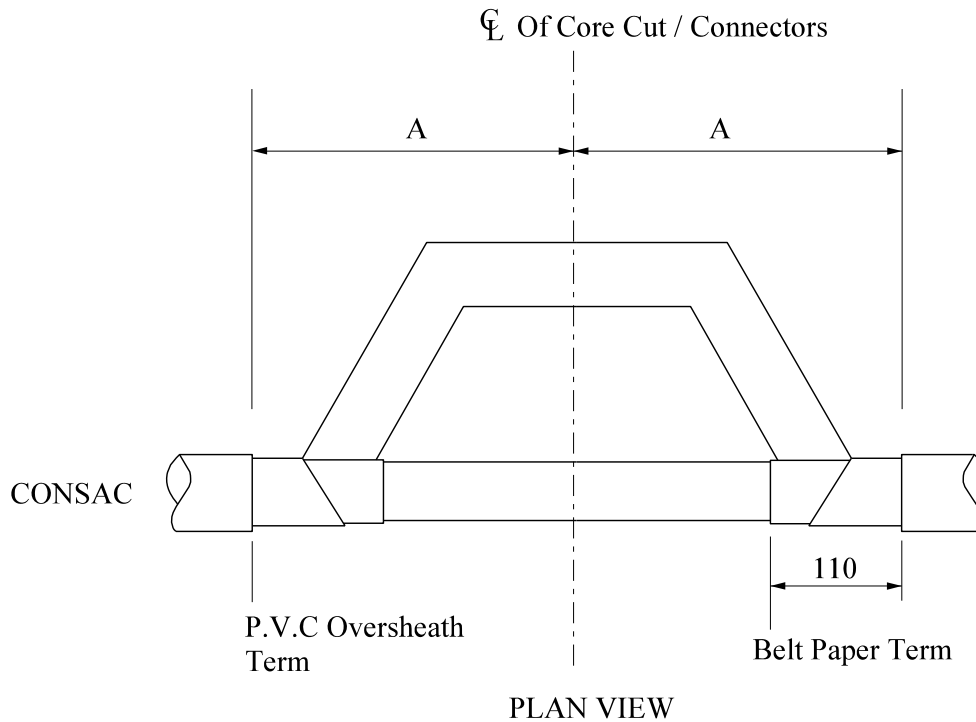
JOINTING PROCEDURE 7.902 - Continued

Actions	General Requirements (ST: CA1C)
11. Using a test lamp check to ensure the cut core is live from either one or both ends. The test lamp should be connected between neutral/earth sheath and the cut ends of the core.	--
If either end of the cut core is dead (not as expected) the Supervisor should be informed.	
12. Apply core protection.	19
14. Insulate both ends of the cut core, using adhesive backed rubber patches. Wrap the patch around the core, overlapping the end and pinch edges together. Trim as shown in Drawing GRD 6.14.1. The patches should not be re-used and should be disposed of, after use.	--
15. Repeat operation 6 to 13 on the remaining phase cores, taking each core in turn.	--
Only one core must be exposed at a time and the neutral/earth sheath is not to be cut.	

RECONNECTION OF PHASE CONDUCTORS/ JOINT COMPLETION

16. Ensure temporary shrouding is in place.	21
17. Make and insulate phase connections.	29/30
18. Remove shrouding applied in 4.	--
19. Connect copper earth tail to neutral/earth sheath.	29
20. Form neutral/earth sheath into its final position.	--
21. Abrade and build up oversheaths.	32
22. Thoroughly degrease the joint.	35
23. Apply mastic waterblock to copper earth tail.	33
24. Prepare and fit shell ensuring 15mm clearance.	36
25. Mix and pour resin.	37

All dimensions in mm

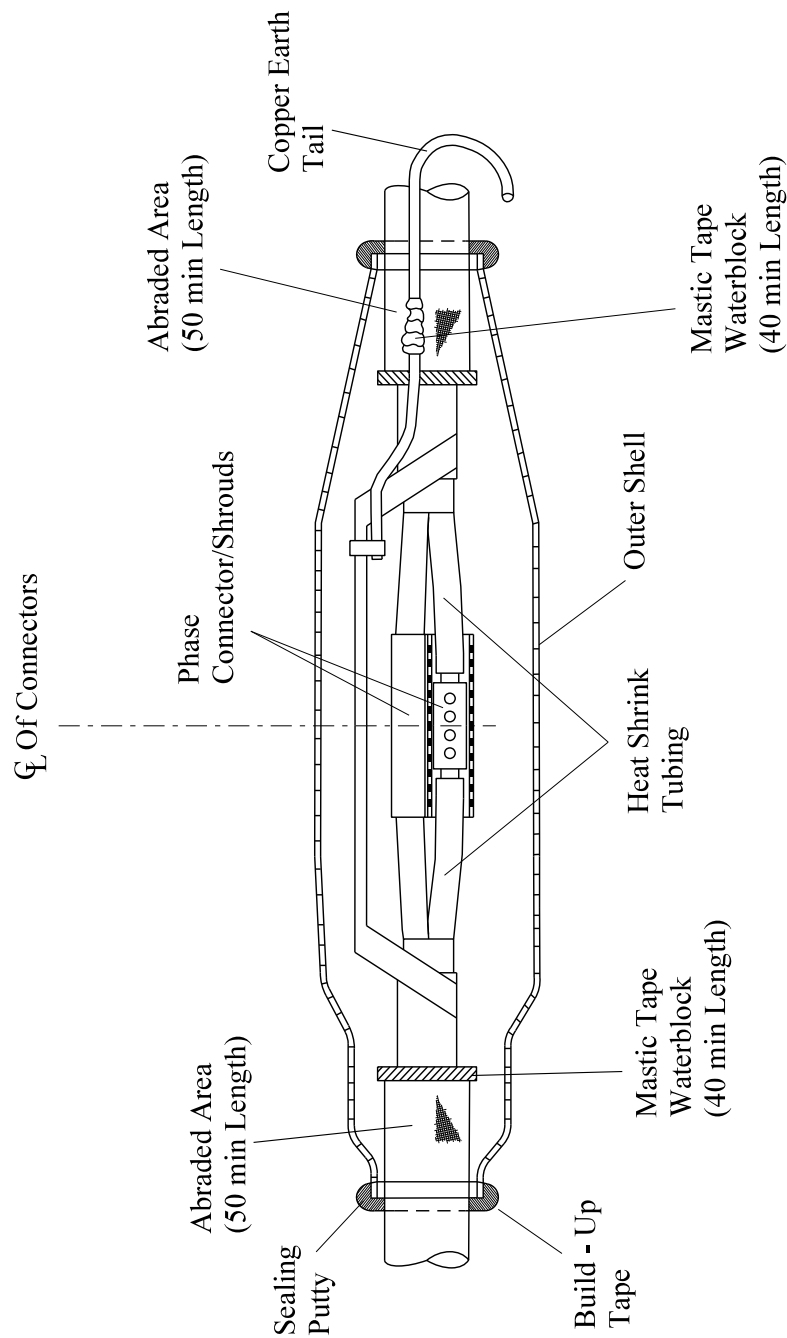


CABLE SIZE	A
95mm ²	260
185mm ²	330


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SCALE		N.T.S.		Title	
				CONSAC TEMORARY ISOLATION JOINT STRIPPING DIMENSIONS	
				Drg. No. LVJ 7.902.1	
				Rev No	

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All dimensions in mm



PLAN VIEW

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SCALE		N.T.S.		<div>Title</div> <div>CONSAC - TEMPORARY ISOLATION JOINT GENERAL LAYOUT</div> <div>Drg. No. LVJ 7.902.2</div> <div>Rev No</div>	

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**ST: CA1AA PROCEDURES FOR MAKING LV MAINS CABLE
TEMPORARY ISOLATION JOINTS**

STANDARD TECHNIQUE: 7.903

**PILC – MAINS CABLE TEMPORARY ISOLATION JOINT
ONLY PHASE CONDUCTORS CUT***

* NOTE - If neutral conductors are to be cut, for fault location purposes, please refer to ST: CA1C/4 General Requirement 6.16 and thereafter on completion the cut position becomes part of a standard Straight Joint as per ST: CA1D/3.

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA1C Section 6 Pt 1
of the LV Mains Jointing Manual**

JOINTING PROCEDURE 7.903

JOINT KIT REFERENCES

CABLE Type / Size: – PILC	JOINT KIT REFERENCES
	ISOLATION JOINT
50 to 95mm²	MTI 7
120 to 185mm²	MTI 8
240 to 300mm²	MTI 9

JOINTING PROCEDURE 7.903

JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS			EARTH BOND	EARTH TAIL
	1586	1585	1584	5 litre	6.5 litre	UST 95	UST 185	UST 300	LVEB 08	LVCU 1700/5
MTI 7	1				2	3			2	1
MTI 8		1		1	2		3		2	1
MTI 9			1	3	2			3	2	1

ADDITIONAL ITEMS FOR EACH JOINT

Insulation Patch
 Black cotton tape
 Sealing putty
 Cable ties
 Shell support
 16 swg tinned copper wire
 Heat shrink tubing
 Whipping thread
 PVC tape
 35mm² PVC sheathed (green/yellow) copper
 De-Solvit 1000FD
 De-Solvit 1000
 Workhorse dry wipes

Note: - Individual material item numbers (SHOPS) are to be found in Section 4 – Part I of the LV Mains Jointing Manual.

JOINTING PROCEDURE 7.903

Actions

General Requirements (ST: CA1C)

Refer to Drawings **LVJ 7.903.1** and **LVJ 7.903.2** whilst undertaking this Jointing Procedure.

OPEN CABLE AND CUT PHASE CONDUCTORS

- | | | |
|----|---|----|
| 1. | Remove serving, armour, bedding and thoroughly clean the lead sheath. | 10 |
| 2. | Place a temporary earth continuity bond across the joint area. | 11 |

Note this temporary earth continuity bond is to be left securely in position for the duration of the isolation.

- | | | |
|-----|---|----|
| 3. | Mark the lead sheath appropriate to the joint to be made and remove the lead sheath. | 13 |
| 4. | Shroud exposed lead sheath and earthed metalwork. | 21 |
| 5. | Tie off the belt papers approximately 20mm from each end of the joint with hemp string. Remove the belt papers by unwrapping and tearing off against the tie. | -- |
| 6. | Carry out moisture test | 19 |
| 7. | Carefully ease out each filler using an insulated wedge and cut off, outwards, close to the ends of the belt papers. | -- |
| 8. | Using an insulated wedge splay one phase core approximately 25mm at the centre of the joint. | -- |
| 9. | Tie off the core papers with a hemp string binder 5mm either side the position at which the splayed core is to be cut, this being determined by the joint to be made. | -- |
| 10. | Using an approved insulated bell punch carefully expose a small area of the core at the position it is to be cut. | -- |
| 11. | Use a test lamp connected between the exposed phase core and the lead sheath to check whether the core is live or dead. | -- |

If live or dead conditions are not as expected, the supervisor must be informed before jointing work continues. It is essential that the core to be cut is identified as a phase core as the neutral core if required must be cut last.

JOINTING PROCEDURE 7.903 – Continued

Actions

General Requirements (ST: CA1C)

The test lamp must be proved before and after use.

- | | | |
|-----|---|----|
| 12. | Using core croppers or a junior hacksaw cut the core at the required position. Care must be exercised when cutting the core to ensure that the other core(s) are not damaged otherwise a flashover may occur. When a core is being cut with a hacksaw the other cores must be shielded, at the cutting position, by a core guard wedge or if croppers are being used the other cores may be protected by a core guard or a piece of clean PVC oversheath. | -- |
| 13. | Using a test lamp check to ensure the cut core is live from either one or both ends. The test lamp should be connected between the lead sheath and cut ends of the core. | -- |

If either end of the cut core is dead (not as expected) the Supervisor should be informed.

- | | | |
|-----|--|----|
| 14. | Apply core protection. | 25 |
| 15. | Insulate both ends of the cut core, using adhesive backed rubber patches. Wrap the patch around the core, overlapping the end and pinch edges together. Trim as shown in Drawing GRD 6.16.1. The patches should not be re-used and should be disposed of, after use. | -- |
| 16. | Repeat operations 9 to 17 on the remaining phase cores, taking each core in turn. | -- |

Only one core must be exposed at a time and the neutral core is not to be cut.

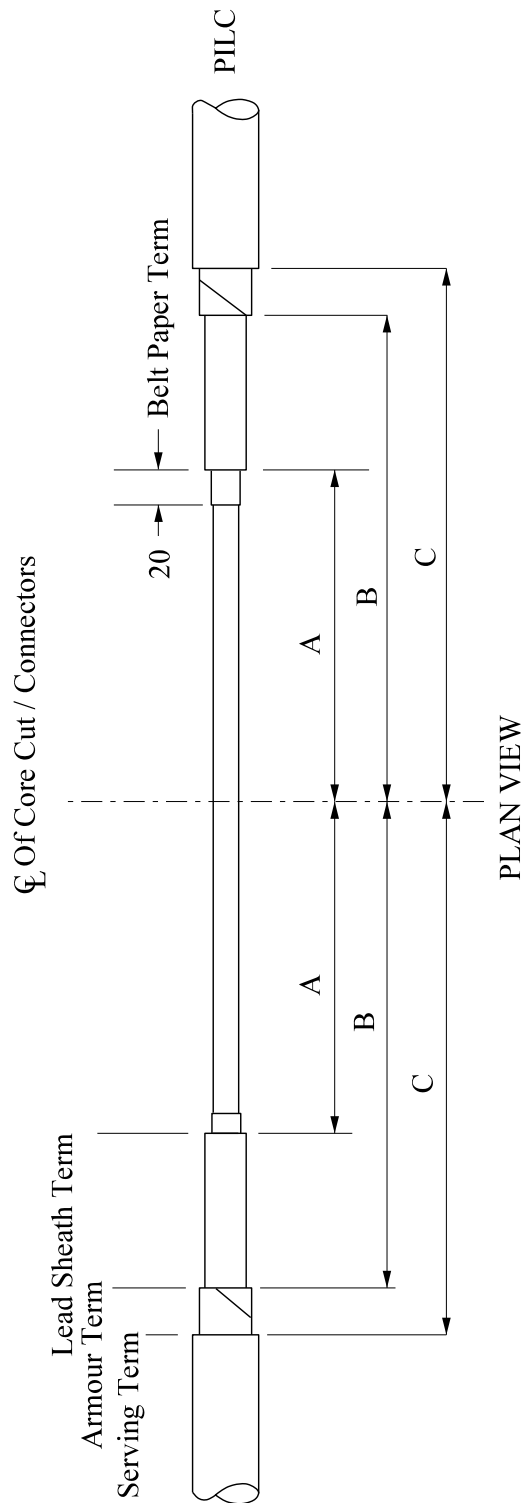
RECONNECTION OF PHASE CONDUCTORS /JOINT COMPLETION

- | | | |
|-----|---|------|
| 17. | Ensure temporary shrouding is in place. | 21 |
| 18. | Make and insulate phase connections. | 9/30 |
| 19. | Remove shrouding applied in 6. | -- |
| 20. | Apply armour bond. | 22 |

JOINTING PROCEDURE 7.903 – Continued

Actions	General Requirements (ST: CA1C)
21. Apply lead sheath bond.	23
22. Connect 35mm ² earth bond to lead sheath bonds including copper earth tail.	23
23. Remove temporary earth continuity bond applied in 4.	--
24. Build up oversheaths.	32
25. Thoroughly degrease the joint.	35
26. Apply mastic water blocks to lead sheath and copper earth tail.	33
27. Prepare and fit shell ensuring 15mm clearance.	36
28. Mix and pour resin.	37

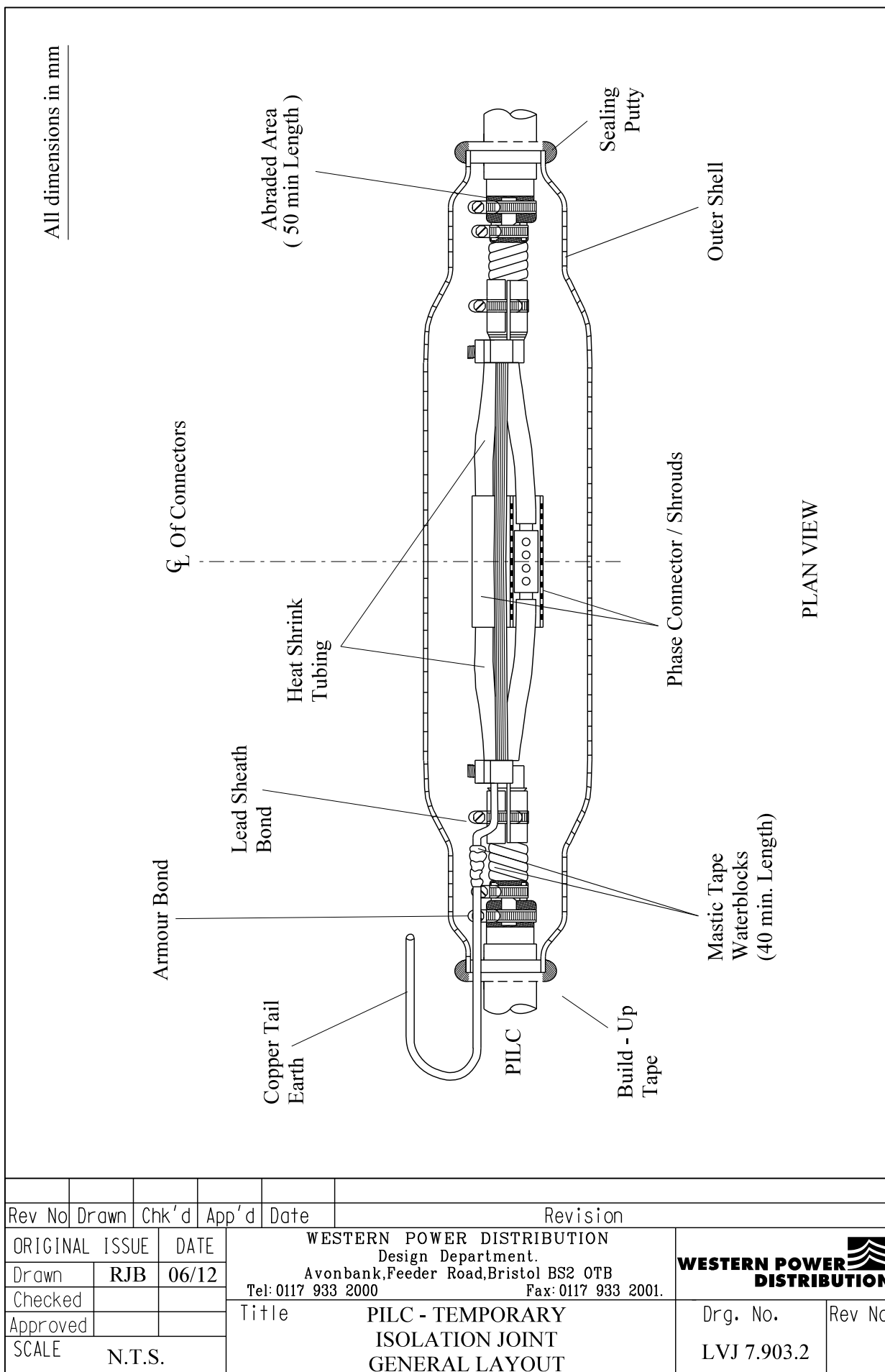
All dimensions in mm



CABLE SIZE	A	B	C
50 - 95	220	340	380
120 - 185	270	390	430
240 - 300	320	440	480

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Checked				<div>Title PILC TEMPORARY ISOLATION JOINT STRIPPING DIMENSIONS</div> <div>Drg. No. LVJ 7.903.1</div>	
Approved					
SCALE N.T.S.					

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**ST: CA1AA PROCEDURES FOR MAKING LV MAINS CABLE
TEMPORARY ISOLATION JOINTS**

STANDARD TECHNIQUE: 7.904

**FOUR CORE WAVECON - MAINS CABLE
TEMPORARY ISOLATION JOINT
ONLY PHASE CONDUCTORS CUT***

* NOTE: - If neutral conductors are to be cut, for fault location purposes, please refer to ST: CA1C/4 General Requirement 6.14 and thereafter on completion the cut position becomes part of a standard Straight Joint as per ST: CA1D/4.

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA1C Section 6 Pt 1
of the LV Mains Jointing Manual**

JOINTING PROCEDURE 7.904

JOINT KIT REFERENCES

CABLE Type / Size: - 4 core Wavecon	JOINT KIT REFERENCES
	ISOLATION JOINT
95mm²	MTI 10
185mm²	MTI 11
300mm²	MTI 12

JOINTING PROCEDURE 7.904

JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS				EARTH TAIL
	1586	1585	1584	5 litre	6.5 litre	UST 95	UST 185	UST 300	BCNE3	LVCU 1700/5
MTI 10	1				2	3			2	1
MTI 11		1		1	2		3		2	1
MTI 12			1	3	2			3	2	1

ADDITIONAL ITEMS FOR EACH JOINT

Insulation Patch
Black cotton tape
Sealing putty
Cable ties
Shell support
Tinned copper braid (15 x 1.5)
16 swg tinned copper wire
PVC tape
De-Solvit 1000FD
Workhorse dry wipes

Note: - Individual material item numbers (SHOPS) are to be found in Section 4 – Part I of the LV Jointing Manual.

JOINTING PROCEDURE 7.904

Actions

General Requirements (ST: CA1C)

Refer to Drawings **LVJ 7.904.1** and **LVJ 7.904.2** whilst undertaking this Jointing Procedure.

OPEN CABLE AND CUT PHASE CONDUCTORS

- | | | |
|----|---|----|
| 1. | Remove PVC oversheath. | 6 |
| 2. | Open neutral/earth wires. | 8 |
| 3. | Remove rubber bedding. | 9 |
| 4. | Shroud exposed earth wires and earthed metal work. | 21 |
| 5. | Using an insulated wedge splay one core approximately 25mm at the centre of the joint. | -- |
| 6. | Using an approved insulated bell punch carefully expose a small area of the core at the position it is to be cut. | -- |
| 7. | Use a test lamp connected between the exposed phase core and earth wires to check whether the core is live or dead. | -- |

If live or dead conditions are not as expected, the supervisor must be informed before jointing work continues.

The test lamp must be proved before and after use.

- | | | |
|----|--|----|
| 8. | Using core croppers or a junior hacksaw, cut the core at the required position. Care must be exercised when cutting the core to ensure that other core(s) are not damaged otherwise a flashover may occur. When a core is being cut with a hacksaw the other cores must be shielded at the cutting position by a core guard wedge or if croppers are being used the other cores may be protected by a core guard or piece of clean PVC oversheath. | -- |
| 9. | Using a test lamp check to ensure the cut core is live from either one or both ends. The test lamp should be connected between earth wires and the cut ends of the core. | -- |

If either end of the cut core is dead (not as expected) the Supervisor should be informed.

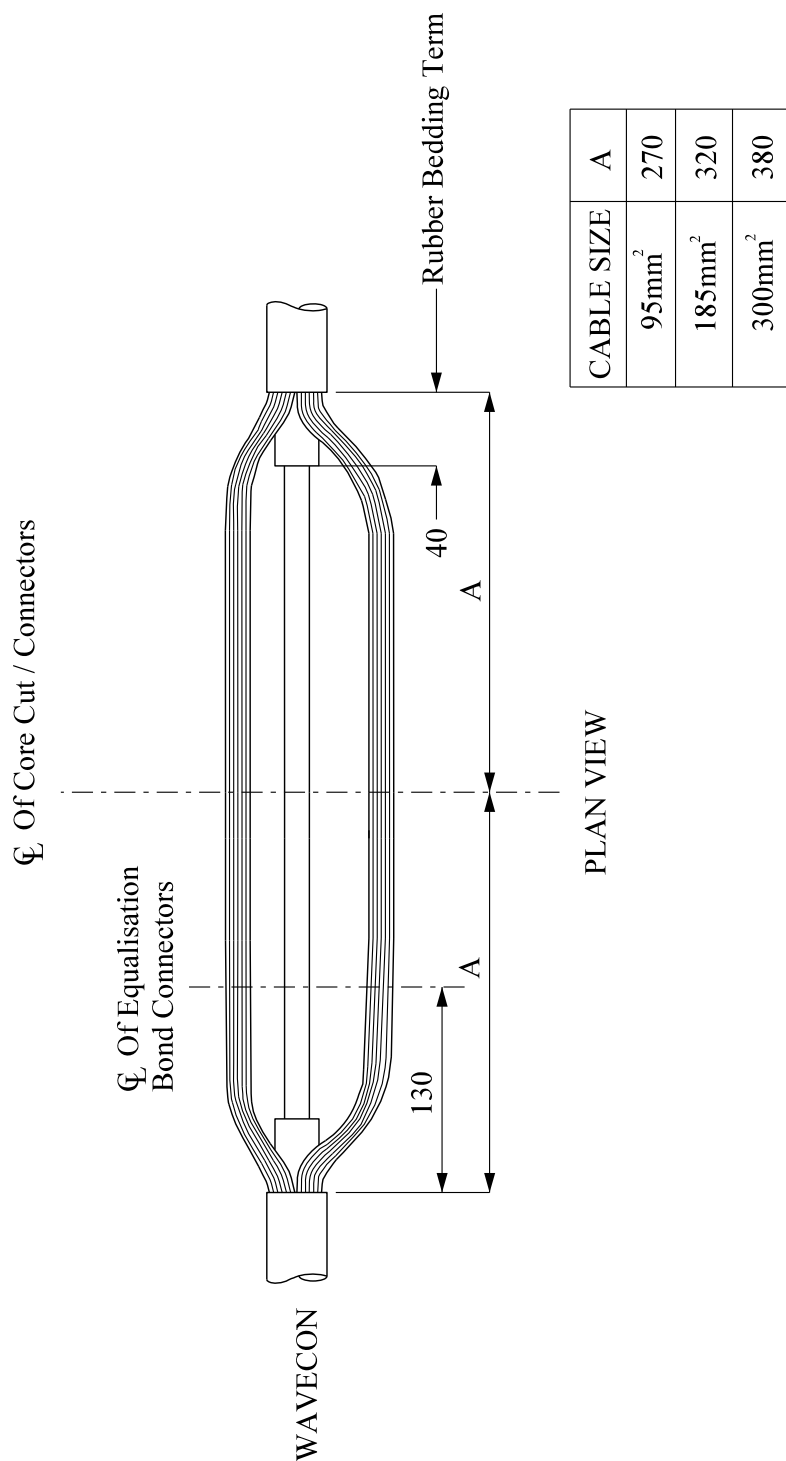
JOINTING PROCEDURE 7.904 – Continued


Actions	General Requirements (ST: CA1C)
10. Insulate both ends of the cut core, using adhesive backed rubber patches. Wrap the patch around the core, overlapping the end and pinch edges together. Trim as shown in Drawing GRD 6.14.1. The patches should not be re-used and should be disposed of, after use.	--
11. Repeat operation 6 to 10 on the remaining phase cores, taking each -- core in turn.	--
Only one core must be exposed at a time and the neutral and earth wires are not to be cut.	

RECONNECTION OF PHASE CONDUCTORS/ JOINT COMPLETION

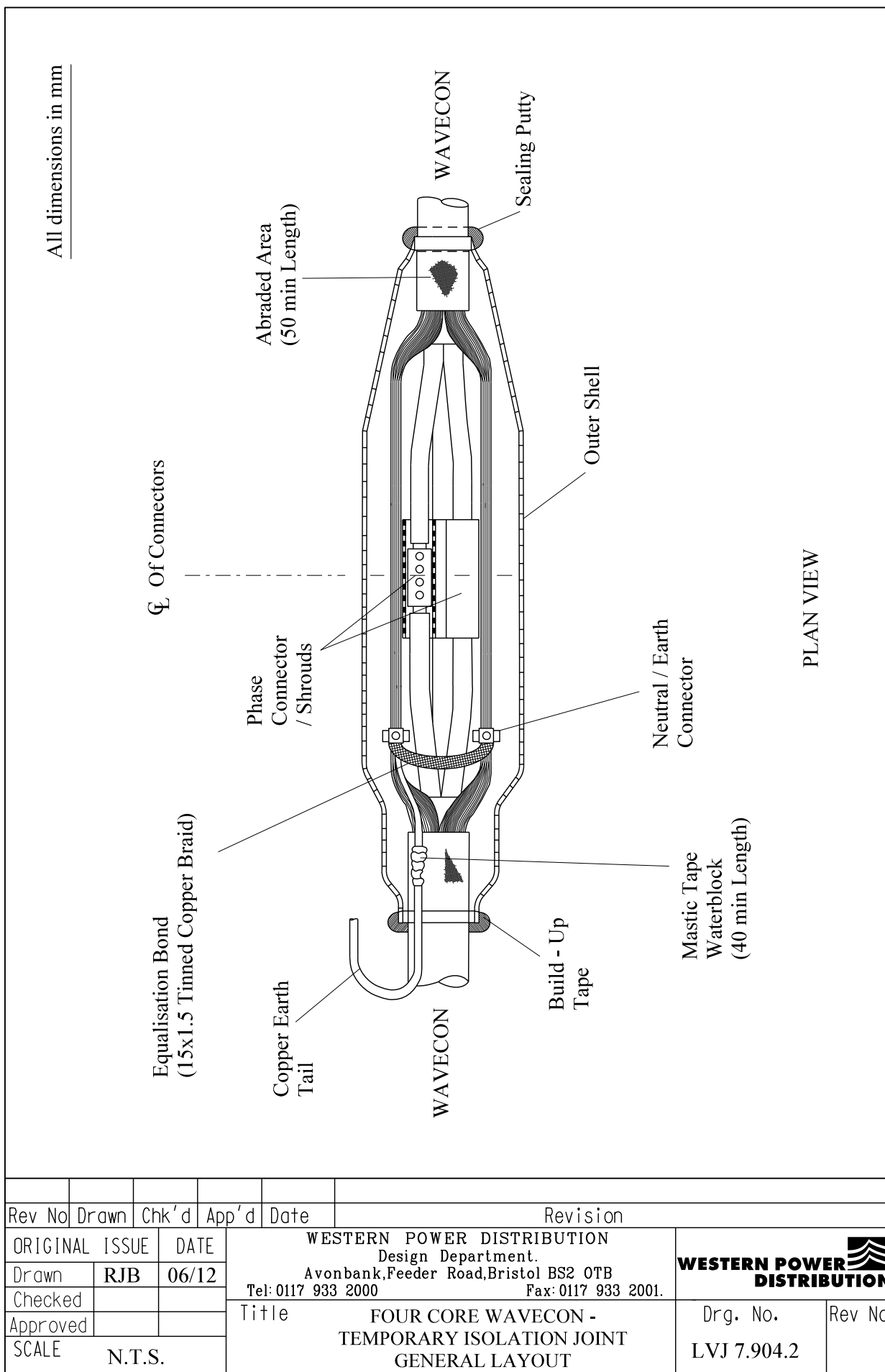
12. Ensure temporary shrouding is in place	21
13. Make and insulate phase connections	29/30
14. Remove shrouding applied in 4	--
15. Connect equalisation bond and copper earth tail to earth wires	29
16. Form earth wires into their final position	--
17. Abrade and build up oversheaths	32
18. Thoroughly degrease the joint	35
19. Apply mastic waterblock to copper earth tail	33
20. Remove temporary binders	--
21. Prepare and fit shell ensuring 15mm clearance	36
22. Mix and pour resin	37

All dimensions in mm



Rev No	Drawn	Chk'd	App'd	Date	Revision	
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SCALE	N.T.S.		Title FOUR CORE WAVECON TEMPORARY ISOLATION JOINT STRIPPING DIMENSIONS			Drg. No. LVJ 7.904.1
						Rev No

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APPENDIX A

SUPERSEDED DOCUMENTATION

This Standard Technique supersedes ST:CA1AA dated October 2010 which should now be withdrawn.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST: CA1B, ST: CA1C/5, ST: CA1 D, ST: CA1E, ST: CA1F, ST: CA1G, ST: CA1H, ST: CA1I, ST: CA1U, ST: CA1W, ST: CA1X, ST: CA1Y, ST: CA1Z, ST: CA1AA, ST: CA1AB, ST: CA7A, ST: CA7B, ST: CA7C, ST: CA7D.

APPENDIX C

IMPACT ON COMPANY POLICY

None, as this document has just been updated to incorporate the latest ST: HS8H and other minor changes.

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.

APPENDIX E

KEY WORDS

Jointing Procedures for making Low Voltage Mains Cable Temporary Isolation Joints.

APPENDIX F

DOCUMENT LAST REVIEWED

June 2012