

## Company Directive

### STANDARD TECHNIQUE : CA1Y/1

#### Relating to the Procedures for Making Low Voltage Mains Cable Loop Joints

This Standard Technique Document contains all the approved LV mains cable loop joints, which shall be implemented in conjunction with the appropriate General Requirements contained 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

# **ST: CA1Y PROCEDURES FOR MAKING LV MAINS CABLE LOOP JOINTS**

## **INTRODUCTION**

This Standard Technique Document contains all the approved LV mains cable loop joints, which shall be implemented in conjunction with the appropriate General Requirements contained 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: Resin encapsulated joints must not be broken down**

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

## **CONTENTS**

- 7.701 Three Core Wavecon – Three Core Wavecon
- 7.702 Three Core Wavecon – Consac
- 7.703 Three Core Wavecon – PILC
- 7.704 Four Core Wavecon – Four Core Wavecon
- 7.705 Four Core Wavecon – PILC

**ST: CA1Y/1 PROCEDURES FOR MAKING LV MAINS CABLE  
LOOP JOINTS**

**JOINTING PROCEDURE 7.701**

**THREE CORE WAVECON - THREE CORE WAVECON  
MAINS CABLE LOOP JOINT**

**This procedure is to be read in conjunction with the appropriate  
General Requirements ST: CA1C/4 Section 6 Pt 1  
of the LV Mains Jointing Manual**

## JOINTING PROCEDURE 7.701

### JOINT KIT REFERENCES

CABLE SIZE		JOINT KIT REFERENCES
FROM	TO	LOOP JOINT
95W	95W	ML 1
	185W	ML 2
	300W	ML 3
185W	185W	ML 2
	300W	ML 3
300W	300W	ML 3

**Note: - 70mm<sup>2</sup> and 120mm<sup>2</sup> Wavecon used in South Wales will be sized as 95mm<sup>2</sup> (70) and 185mm<sup>2</sup> (120).**

Key: - 95W = 95mm<sup>2</sup> Wavecon  
185W = 185mm<sup>2</sup> Wavecon  
300W = 300mm<sup>2</sup> Wavecon

## JOINTING PROCEDURE 7.701

### JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS				EARTH TAIL
	1589	1588	1587	5 litre	6.5 litre	UBR 95	UBR 185	UBR 300	BCNE 3	LVCU 1700/5
ML 1	1			2	1	3			2	1
ML 2		1		5			3		2	1
ML 3			1	8				3	2	1

### ADDITIONAL ITEMS FOR EACH JOINT

Insulation patch  
Black cotton tape  
Sealing putty  
Cable ties  
Shell support  
Tinned copper braid (15 x 1.5mm)  
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 1 of the LV Mains Jointing Manual.**

## JOINTING PROCEDURE 7.701

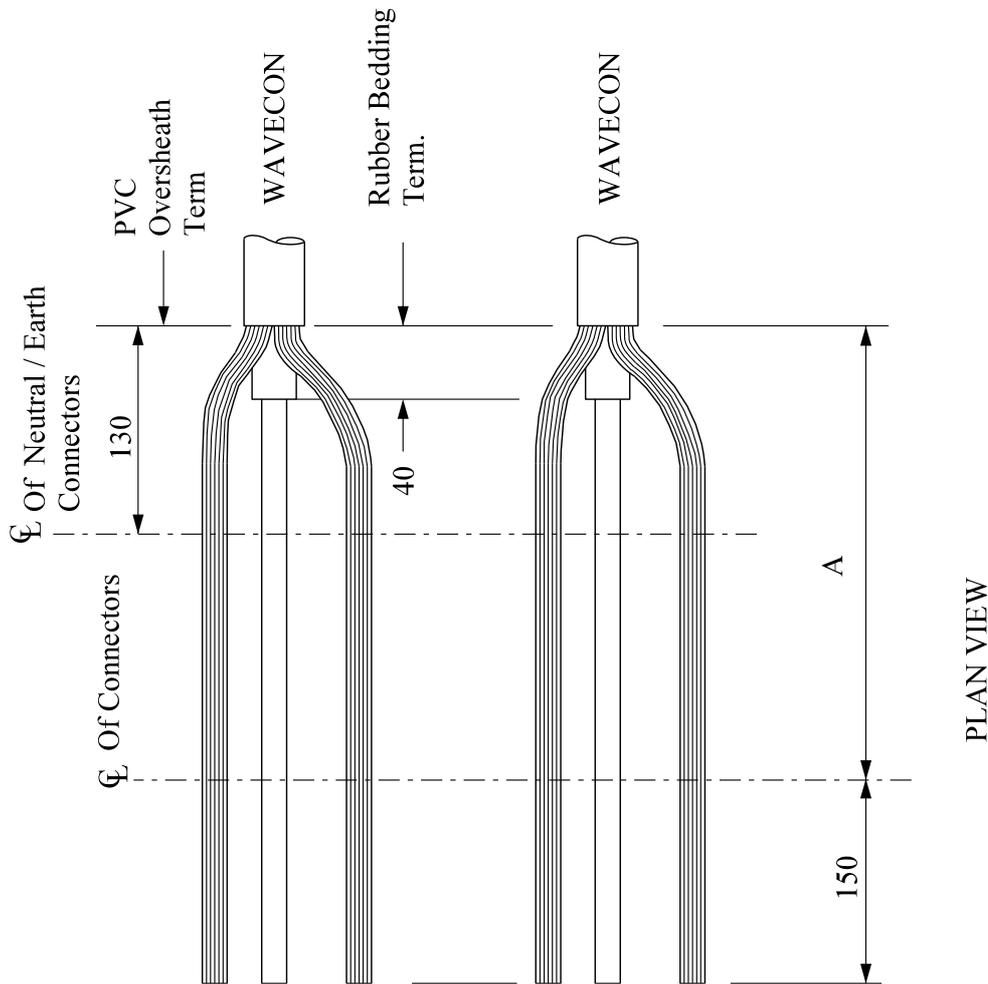
### Actions

### General Requirements (ST: CA1C/4)

Refer to Drawing **LVJ 7.701.1, 7.701.2** whilst undertaking this Jointing Procedure

1.	Set up and mark cables	4
2.	Open and cut cables	14
3.	Prepare neutral/earth wires for jointing	17
4.	Set cores in joint position	
5.	Connect neutral/earth wires including equalisation bond and copper earth tail	29
6.	Remove temporary earth connection applied in 2	--
7.	Apply temporary shrouding	21
8.	Make and insulate phase connections	29/30
9.	Remove temporary shrouding applied in 7	--
10.	Form neutral/earth wires into their final positions	--
11.	Abrade and build up oversheaths	32
12.	Thoroughly degrease the joint	35
13.	Apply mastic water block to copper earth tail	33
14.	Remove temporary binders	--
15.	Prepare and fit shell, ensuring 15mm clearance	36
16.	Mix and pour resin	37

All dimensions in mm



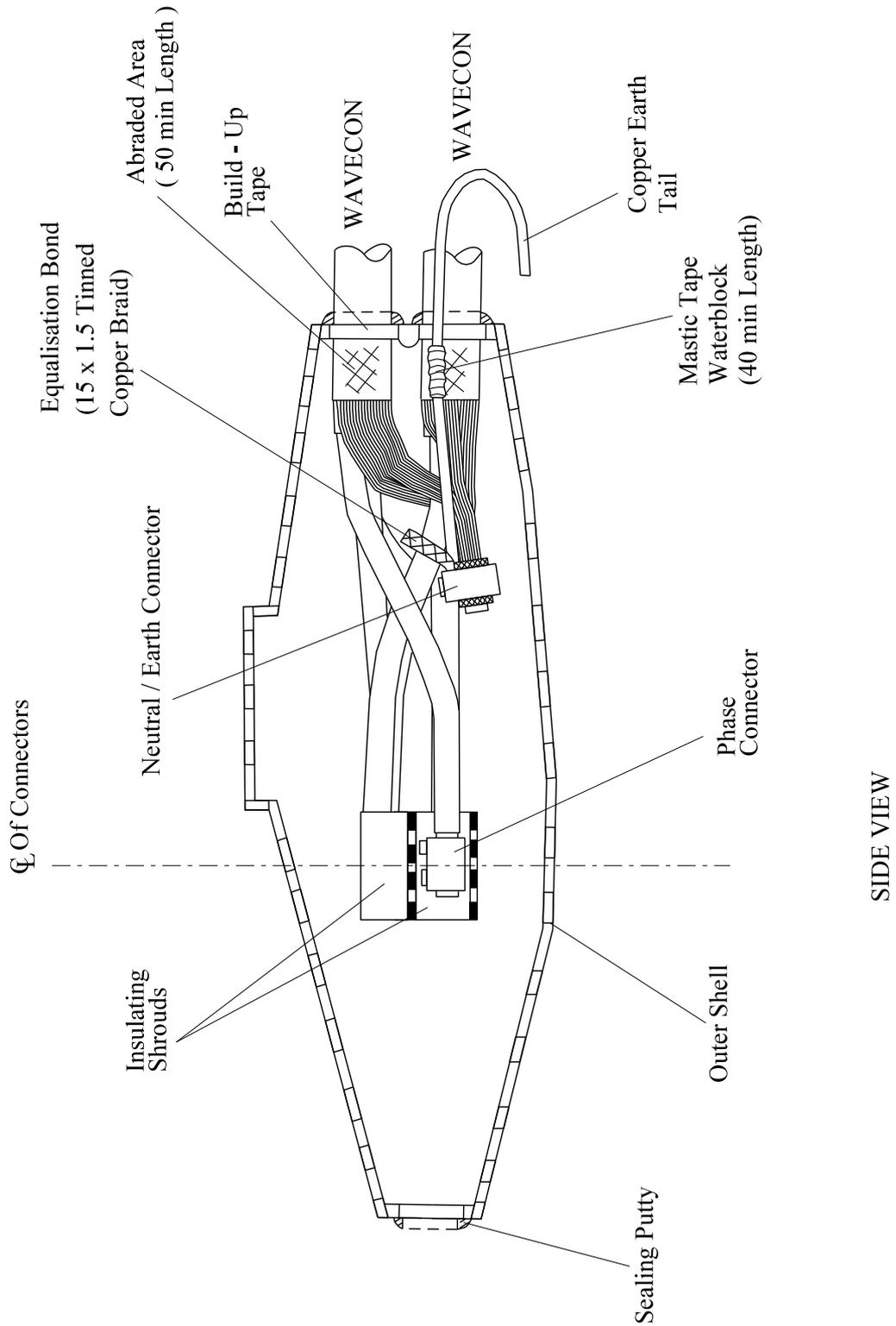
CABLE SIZE		A
95 mm <sup>2</sup>	95 mm <sup>2</sup>	325
	185 mm <sup>2</sup>	425
	300 mm <sup>2</sup>	525
185 mm <sup>2</sup>	95 - 185 mm <sup>2</sup>	425
	300 mm <sup>2</sup>	525
300 mm <sup>2</sup>	95 - 185 - 300 mm <sup>2</sup>	525

NOTE:- Where The Jointing Of Dissimilar Size Cables Is Required All Dimensions Will Be Taken To The Largest Cable Size.

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Drawn	RJB	06/12	Title			
Checked			THREE CORE WAVECON - WAVECON LOOP JOINT STRIPPING DIMENSIONS		LVJ 7.701.1	
Approved						
SCALE	N.T.S.					

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All dimensions in mm



SIDE VIEW

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Checked			THREE CORE WAVECON - WAVECON LOOP JOINT GENERAL LAYOUT		LVJ 7.701.2	
Approved						
SCALE	N.T.S.					

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**ST: CA1Y/1 PROCEDURES FOR MAKING LV MAINS CABLE  
LOOP JOINTS**

**JOINTING PROCEDURE 7.702**

**THREE CORE WAVECON – CONSAC MAINS CABLE  
LOOP JOINT**

**This procedure is to be read in conjunction with the appropriate  
General Requirements ST: CA1C/4 Section 6 Pt 1  
of the LV Mains Jointing Manual**

## JOINTING PROCEDURE 7.702

### JOINT KIT REFERENCES

CABLE SIZE		JOINT KIT REFERENCES
FROM	TO	LOOP JOINT
95C	95W	ML 4
	185W	ML 5
	300W	ML 6
185C	185W	ML 5
	300W	ML 6
240C	185W	ML 6
	300W	ML 7

Key: - 95W = 95mm<sup>2</sup> Wavecon  
95C = 95mm<sup>2</sup> Consac  
185W = 185mm<sup>2</sup> Wavecon  
185C = 185mm<sup>2</sup> Consac  
240C = 240mm<sup>2</sup> Consac  
300W = 300mm<sup>2</sup> Wavecon

**Note: - 240mm<sup>2</sup> Consac is only to be found in the Midlands Region of WPD.**

## JOINTING PROCEDURE 7.702

### JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS						EARTH TAIL
	1589	1588	1587	5 litre	6.5 litre	UBR 95	UBR 185	UBR 300	BCNE 3	TA 1	TA2	LVCU 1700/5
ML 4	1			2	1	3			1	1		1
ML 5		1		5			3		1		1	1
ML 6			1	8				3	1		1	1
ML 7			1	8				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  
 Mastic water blocking tape  
 Desolvit 1000FD  
 Desolvit 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.**

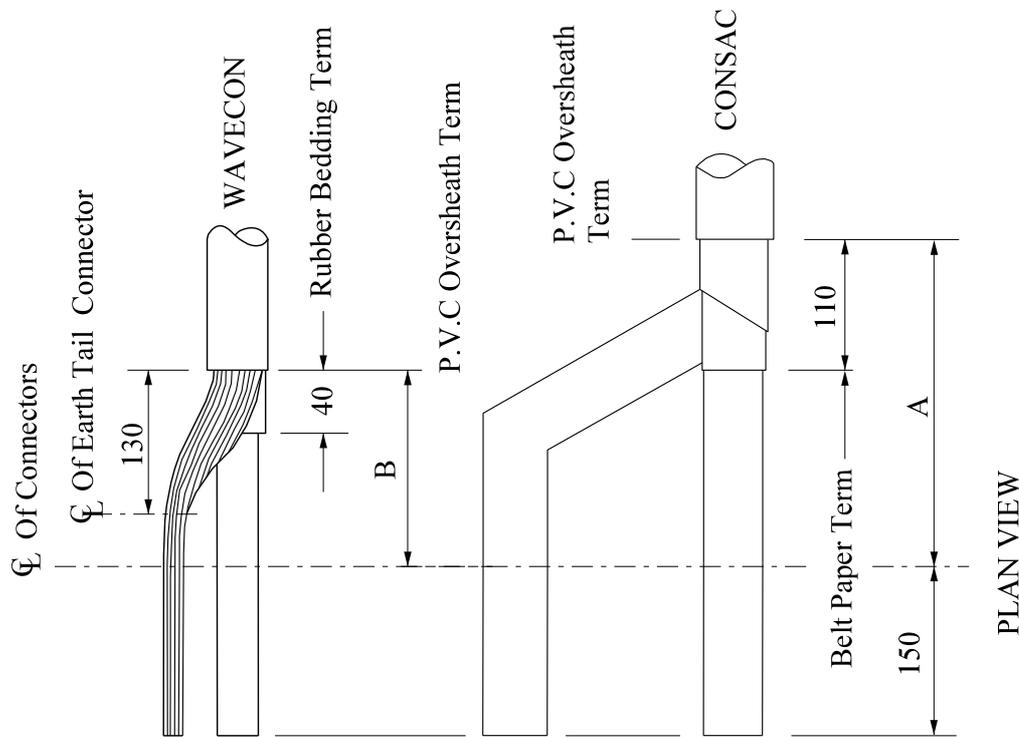
## JOINTING PROCEDURE 7.702

<b>Actions</b>	<b>General Requirements (ST: CA1C/4)</b>
Refer to Drawing <b>LVJ 7.702.1, 7.702.2</b> whilst undertaking this Jointing Procedure	
1. Set up and mark cables	4
<b>CONSAC CABLE - Preparation</b>	
2. Open and cut the cable	15
3. Prepare neutral/earth sheath for jointing	12
4. Remove belt papers and carry out moisture test	19
5. Apply core protection	25
<b>WAVECON CABLE - Preparation</b>	
6. Open and cut cable	14
7. Prepare neutral/earth wires for jointing	17
<b>COMPLETION OF JOINT</b>	
8. Set cores in joint position	27
9. Connect neutral/earth wires to the Consac neutral/earth sheath	29
10. Remove temporary earth connection applied in 2 & 6	--
11. Apply temporary shrouding	21
12. Make and insulate phase connections	29/30
13. Remove temporary shrouding applied in 11	--
14. Form neutral/earth sheath and neutral/earth wires into final position	31

## JOINTING PROCEDURE 7.702 - Continued

<b>Actions</b>	<b>General Requirements (ST: CA1C/4)</b>
15. Connect copper earth tail to neutral/earth wires	29
16. Abrade and build up oversheaths	32
17. Thoroughly degrease the joint	35
18. Apply mastic water blocks to copper earth tail and Consac PVC oversheath termination	33
19. Remove temporary binders	--
20. Prepare and fit shell, ensuring 15mm clearance	36
21. Mix and pour resin	37

All dimensions in mm



CABLE SIZE		A	B
CONSAC	WAVECON		
	95mm <sup>2</sup>	415	325
95mm <sup>2</sup>	185mm <sup>2</sup>	515	425
	300mm <sup>2</sup>	615	525
185mm <sup>2</sup>	95 - 185mm <sup>2</sup>	515	425
	300mm <sup>2</sup>	615	525
240mm <sup>2</sup>	95 - 300mm <sup>2</sup>	615	525

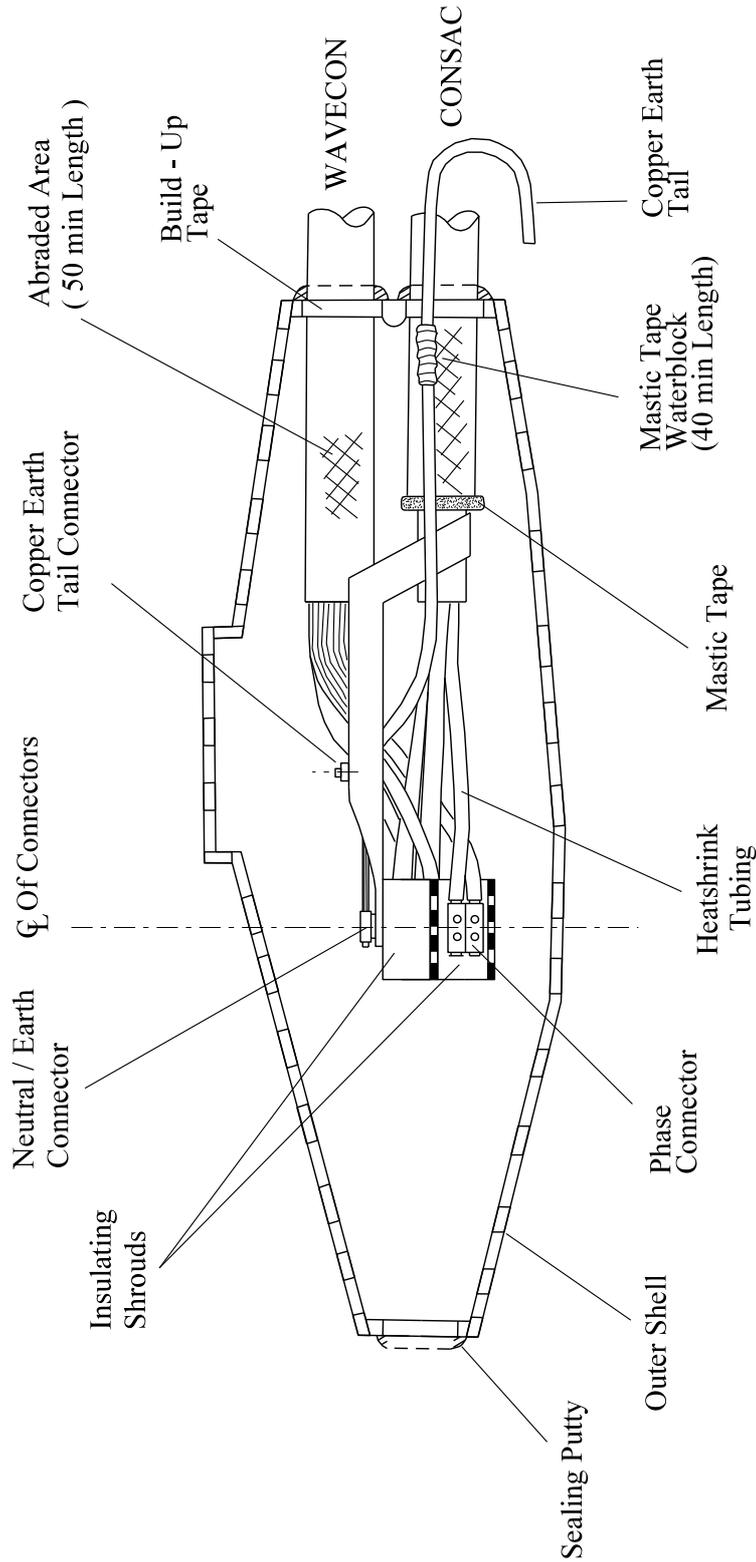
PLAN VIEW

NOTE:- Where The Jointing Of Dissimilar Size Cables Is Required All Dimensions Will Be Taken To The Largest Cable Size.

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Drawn	RJB	06/12	Title			
Checked			THREE CORE WAVECON - CONSAC LOOP JOINT STRIPPING DIMENSIONS		LVJ 7.702.1	
Approved						
SCALE	N.T.S.					

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All dimensions in mm



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Drawn	RJB	06/12	Title			
Checked			THREE CORE WAVECON - CONSAC LOOP JOINT		LVJ 7.702.2	
Approved			GENERAL LAYOUT			
SCALE	N.T.S.					

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**ST: CA1Y/1 PROCEDURES FOR MAKING LV MAINS CABLE  
LOOP JOINTS**

**JOINTING PROCEDURE 7.703**

**THREE CORE WAVECON - PILC  
MAINS CABLE LOOP JOINT**

**This procedure is to be read in conjunction with the appropriate  
General Requirements ST: CA1C/4 Section 6 Pt 1  
of the LV Mains Jointing Manual**

## JOINTING PROCEDURE 7.703

### JOINT KIT REFERENCES

CABLE SIZE		JOINT KIT REFERENCES
FROM	TO	LOOP JOINT
95W	Up to 95 PILC	ML 8
	Up to 185 PILC	ML 9
	Up to 300 PILC	ML 10
185W	Up to 185 PILC	ML 9
	Up to 300 PILC	ML 10
300W	Up to 300 PILC	ML 10

Key: - 95W = 95mm<sup>2</sup> Wavecon  
185W = 185mm<sup>2</sup> Wavecon  
300W = 300mm<sup>2</sup> Wavecon

## JOINTING PROCEDURE 7.703

### JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS			EARTH BOND	EARTH TAIL
	1589	1588	1587	5 litre	6.5 litre	UBR 95	UBR 185	UBR 300	LVEB 08	LVCU 1700/5
ML 8	1			2	1	4			1	1
ML 9		1		5			4		1	1
ML 10			1	8				4	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  
 PVC tape  
 35mm<sup>2</sup> 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.**

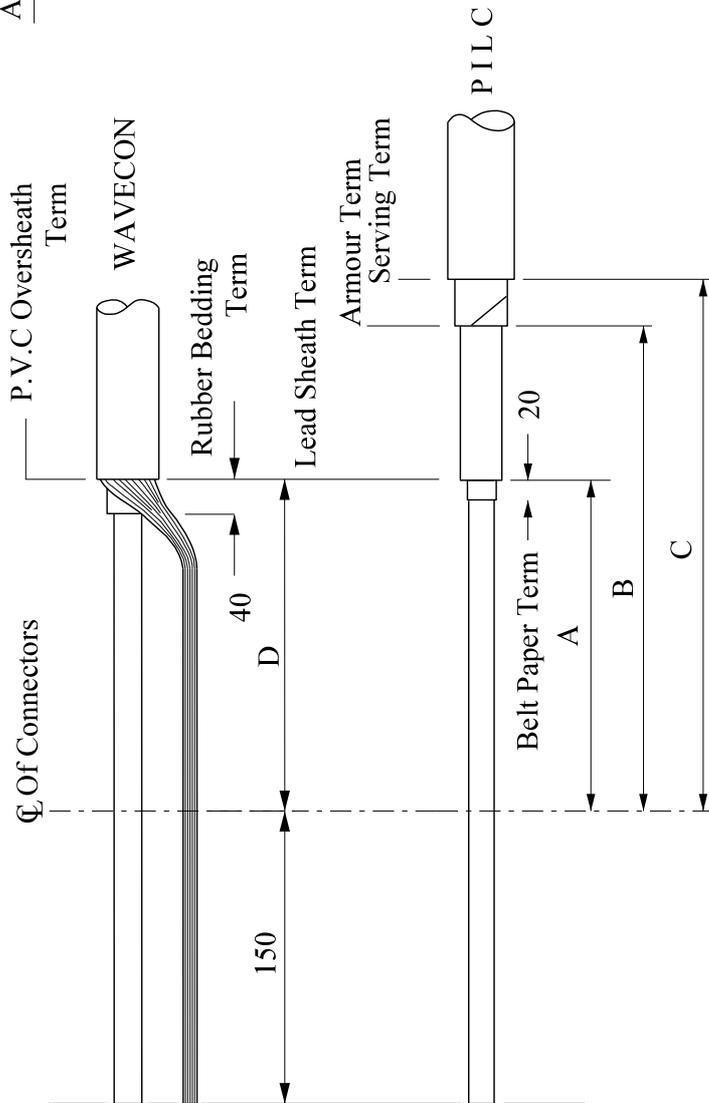
## JOINTING PROCEDURE 7.703

<b>Actions</b>	<b>General Requirements (ST: CA1C/4)</b>
Refer to Drawing <b>LVJ 7.703.1, 7.703.2</b> whilst undertaking this Jointing Procedure	
1. Set up and mark cables	4
<b>PILC CABLE - Preparation</b>	
2. Open and cut cable	16
3. Carry out moisture test	
4. Apply core protection	25
5. Apply armour bond	22
6. Apply lead sheath bond	23
7. Connect a 35mm <sup>2</sup> neutral/earth bond to lead sheath bond including copper earth tail	--
<b>WAVECON CABLE - Preparation</b>	
8. Open and cut cable	14
9. Prepare neutral/sheath wires for jointing	17
<b>COMPLETION OF JOINT</b>	
10. Set cores in joint position	27
11. Connect and insulate neutral/earth wires to neutral core including the neutral/earth bond	29
12. Remove temporary earth connection applied in 8	--
13. Apply temporary shrouding	21
14. Make and insulate phase connections	29/30

## JOINTING PROCEDURE 7.703 - Continued

Actions	General Requirements (ST: CA1C/4)
15. Remove temporary shrouding applied in 1	--
16. Abrade and build up oversheaths	32
17. Thoroughly degrease the joint	35
18. Apply mastic water blocks to lead sheath and copper earth tail	33
19. Remove temporary binders	--
20. Prepare and fit shell, ensuring 15mm clearance	36
21. Mix and pour resin	37

All dimensions in mm



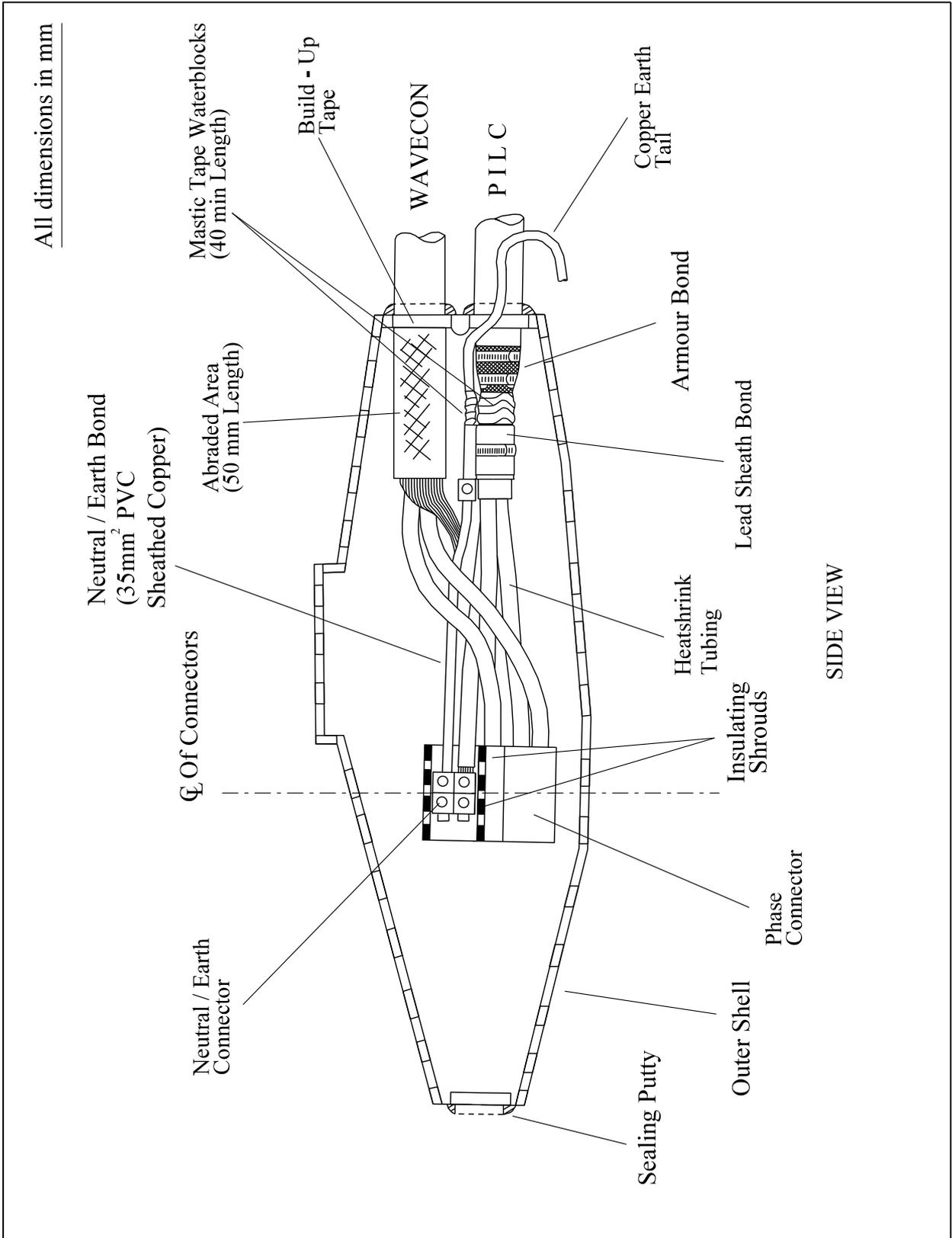
CABLE SIZE		A	B	C	D
PILC	WAVECON				
50 - 95mm <sup>2</sup>	95mm <sup>2</sup>	325	445	485	325
	185mm <sup>2</sup>	425	545	585	425
	300mm <sup>2</sup>	525	645	685	525
120 - 185mm <sup>2</sup>	95-185 mm <sup>2</sup>	425	545	585	425
	300 mm <sup>2</sup>	525	645	685	525
240 - 300 mm <sup>2</sup>	95 - 185 - 300 mm <sup>2</sup>	525	645	685	525

PLAN VIEW

NOTE:- Where The Jointing Of Dissimilar Size Cables Is Required All Dimensions Will Be Taken To The Largest Cable Size.

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Drawn	RJB	06/12	Title				
Checked			THREE CORE WAVECON - PILC LOOP JOINT			Drg. No.	Rev No
Approved			STRIPPING DIMENSIONS			LVJ 7.703.1	
SCALE	N.T.S.						

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All dimensions in mm

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Drawn	RJB 06/12	Title				
Checked		THREE CORE WAVECON - P I L C LOOP JOINT GENERAL LAYOUT			LVJ 7.703.2	
Approved						
SCALE	N.T.S.					

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**ST: CA1Y/1 PROCEDURES FOR MAKING LV MAINS CABLE  
LOOP JOINTS**

**JOINTING PROCEDURE 7.704**

**FOUR CORE WAVECON – FOUR CORE WAVECON  
MAINS CABLE LOOP JOINT**

**This procedure is to be read in conjunction with the appropriate  
General Requirements ST: CA1C/4 Section 6 Pt 1  
of the LV Mains Jointing Manual**

## JOINTING PROCEDURE 7.704

### JOINT KIT REFERENCES

CABLE SIZE		JOINT KIT REFERENCES
FROM	TO	LOOP JOINT
95W	95W	ML 10
	185W	ML 11
	300W	ML 12
185W	185W	ML 11
	300W	ML 12
300W	300W	ML 12

Key: - 95W = 95mm<sup>2</sup> Wavecon  
185W = 185mm<sup>2</sup> Wavecon  
300W = 300mm<sup>2</sup> Wavecon

## JOINTING PROCEDURE 7.704

### JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS				EARTH TAIL
	1589	1588	1587	5 litre	6.5 litre	UBR 95	UBR 185	UBR 300	BCNE 3	LVCU 1700/5
ML 10	1			2	1	4			2	1
ML 11		1		5			4		2	1
ML 12			1	8				4	2	1

#### ADDITIONAL ITEMS FOR EACH JOINT

Insulation patch  
Black cotton tape  
Sealing putty  
Cable ties  
Shell support  
Tinned copper braid (15 x 1.5mm)  
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 7.704

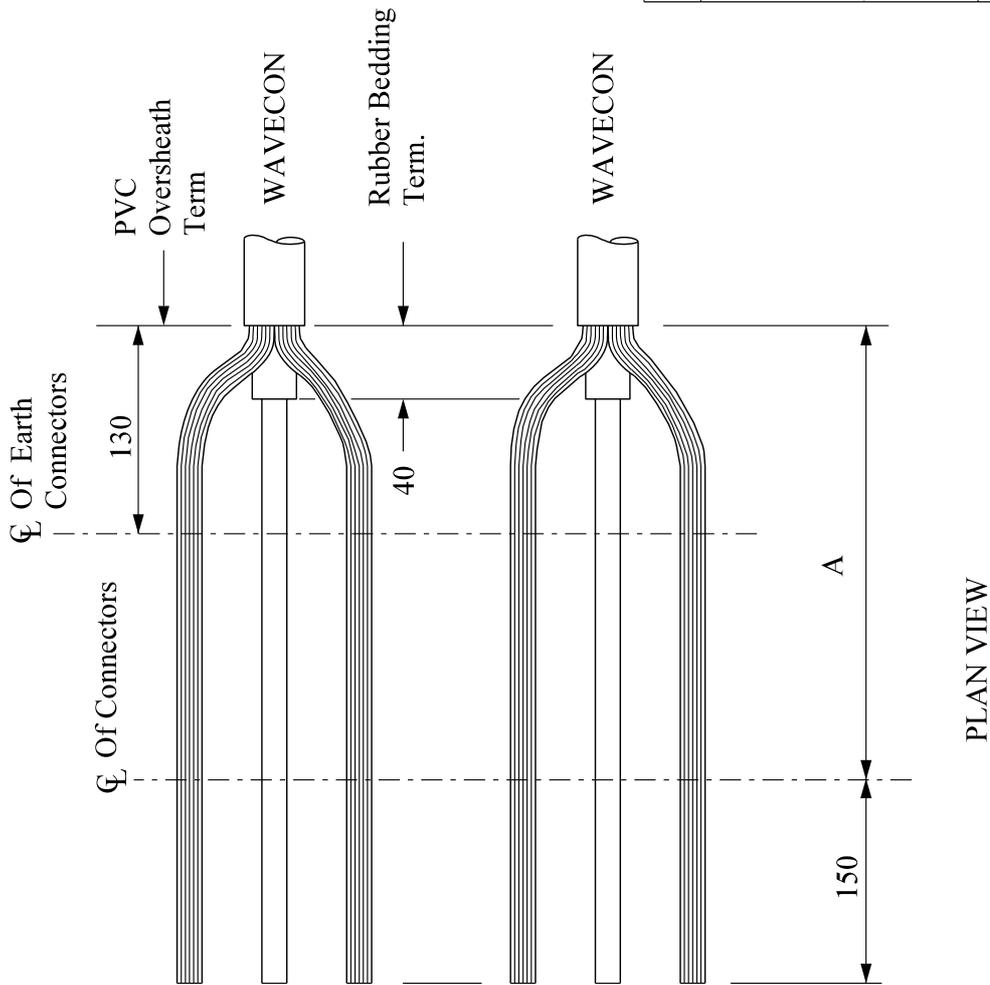
### Actions

### General Requirements (ST: CA1C/4)

Refer to Drawing **LVJ 7.704.1, 7.704.2** whilst undertaking this Jointing Procedure

1.	Set up and mark cables	4
2.	Open and cut cable(s)	14
3.	Prepare earth wires for jointing	17
4.	Set cores in joint position	27
5.	Connect earth wires including a equalisation bond and copper earth tail	29
6.	Apply temporary shrouding	21
7.	Make and insulate neutral connection	29
8.	Make and insulate phase connections	29
9.	Remove temporary shrouding applied in 6	--
10.	Form earth wires into their final positions	--
11.	Abrade and build up oversheaths	32
12.	Thoroughly degrease the joint	35
13.	Apply mastic waterblock to copper earth tail	33
14.	Remove temporary binders	--
15.	Prepare and fit shell, ensuring 15mm clearance	36
16.	Mix and pour resin	37

All dimensions in mm

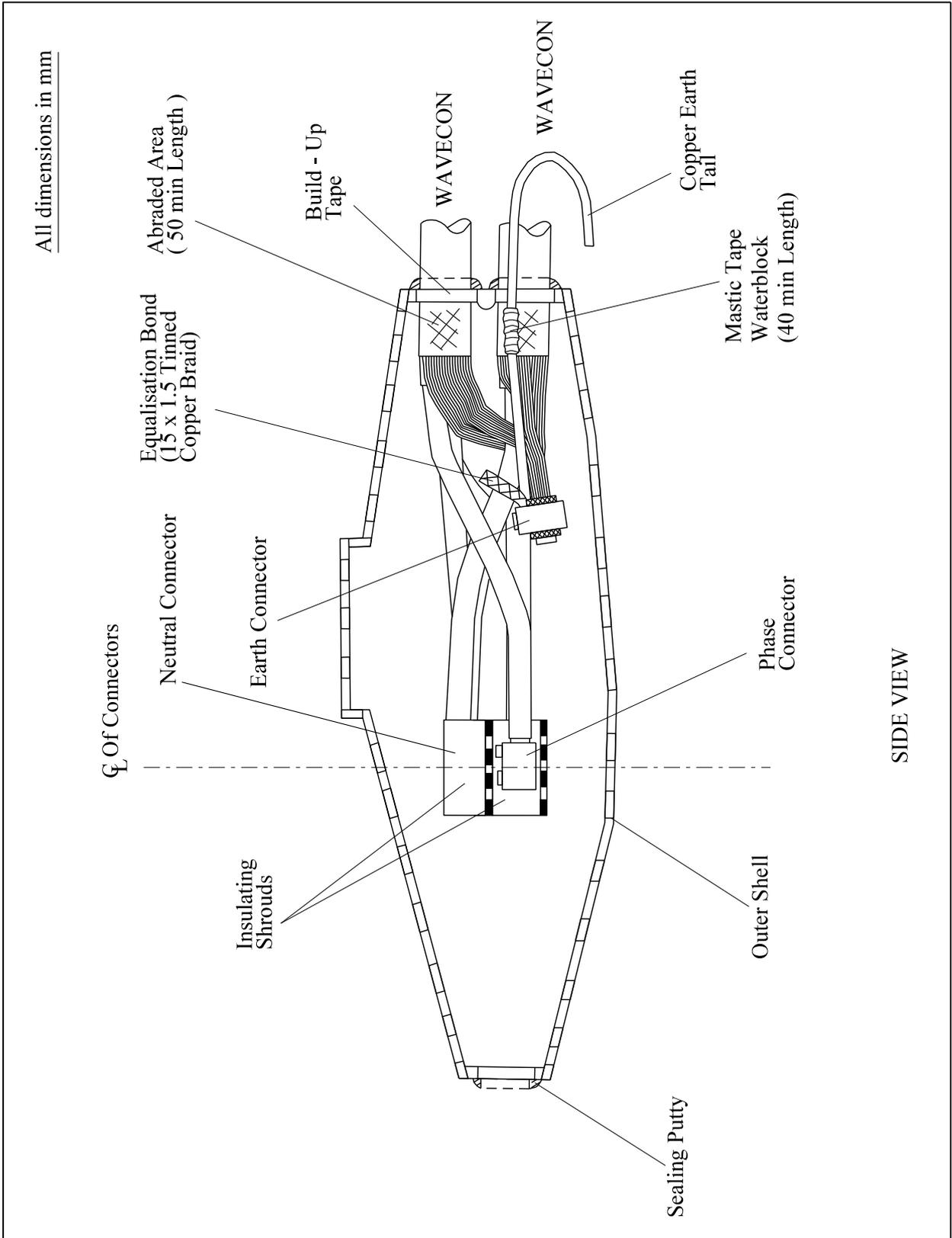


CABLE SIZE		A
95 mm <sup>2</sup>	95 mm <sup>2</sup>	325
185 mm <sup>2</sup>	185 mm <sup>2</sup>	425
300 mm <sup>2</sup>	300 mm <sup>2</sup>	525
185 mm <sup>2</sup>	95 - 185 mm <sup>2</sup>	425
300 mm <sup>2</sup>	300 mm <sup>2</sup>	525
300 mm <sup>2</sup>	95 - 185 - 300 mm <sup>2</sup>	525

NOTE:- Where The Jointing Of Dissimilar Size Cables Is Required All Dimensions Will Be Taken To The Largest Cable Size.

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Checked			FOUR CORE WAVECON - WAVECON LOOP JOINT STRIPPING DIMENSIONS		LVJ 7.704.1	
Approved			SCALE		N.T.S.	

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Checked			FOUR CORE WAVECON - WAVECON LOOP JOINT GENERAL LAYOUT		LVJ 7.704.2	
Approved						
SCALE	N.T.S.					

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**ST: CA1Y/1 PROCEDURES FOR MAKING LV MAINS CABLE  
LOOP JOINTS**

**JOINTING PROCEDURE 7.705**

**FOUR CORE WAVECON - PILC MAINS CABLE  
LOOP JOINT**

**This procedure is to be read in conjunction with the appropriate  
General Requirements ST: CA1C/4 Section 6 Pt 1  
of the LV Mains Jointing Manual**

## JOINTING PROCEDURE 7.705

### JOINT KIT REFERENCES

CABLE SIZE		JOINT KIT REFERENCES
FROM	TO	LOOP JOINT
95W	Up to 95 PILC	ML 13
	Up to 185 PILC	ML 14
	Up to 300 PILC	ML 15
185W	Up to 185 PILC	ML 14
	Up to 300 PILC	ML 15
300W	Up to 300 PILC	ML 15

Key: - 95W = 95mm<sup>2</sup> Wavecon  
185W = 185mm<sup>2</sup> Wavecon  
300W = 300mm<sup>2</sup> Wavecon

## JOINTING PROCEDURE 7.705

### JOINT KIT MATERIALS

KIT REF.	SHELL			RESIN		CONNECTORS				EARTH BOND	EARTH TAIL
	1589	1588	1587	5 litre	6.5 litre	UBR 95	UBR 185	UBR 300	BCNE 3	LVEB 08	LVCU 1700/5
ML 13	1			2	1	4			1	1	1
ML 14		1		5			4		1	1	1
ML 15			1	8				4	1	1	1

#### ADDITIONAL ITEM FOR EACH JOINT

Insulation patch  
 Black cotton tape  
 Sealing putty  
 Cable ties  
 Shell support  
 16 swg tinned copper wire  
 Heatshrink tubing  
 Whipping thread  
 PVC tape  
 35mm<sup>2</sup> 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 1 – Part 4 of the LV Mains Jointing Manual.**

## JOINTING PROCEDURE 7.705

### Actions

### General Requirements (ST: CA1C/4)

Refer to Drawing **LVJ 7.705.1, 7.705.2** whilst undertaking this Jointing Procedure

1. Set up and mark cables 4

#### **PILC CABLE - Preparation**

2. Open and cut cable 16
3. Carry out moisture test 19
4. Apply core protection 25
5. Apply armour bond 22
6. Apply lead sheath bond 23
7. Connect a 35mm<sup>2</sup> earth wire to lead sheath bond including copper earth tail --

#### **WAVECON CABLE – Preparation**

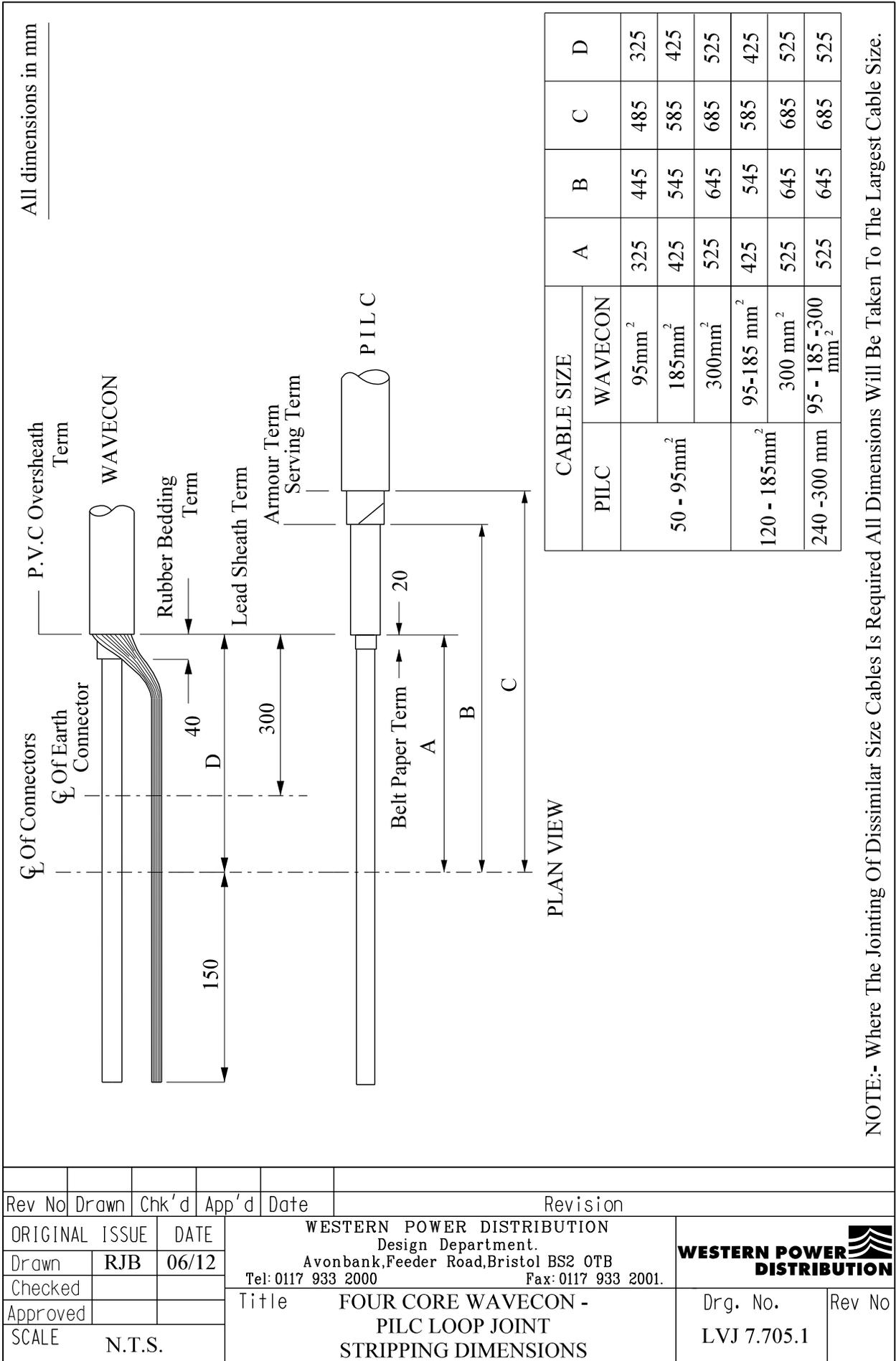
8. Open and cut cable 14
9. Prepare earth wires for jointing 17

#### **COMPLETION OF JOINT**

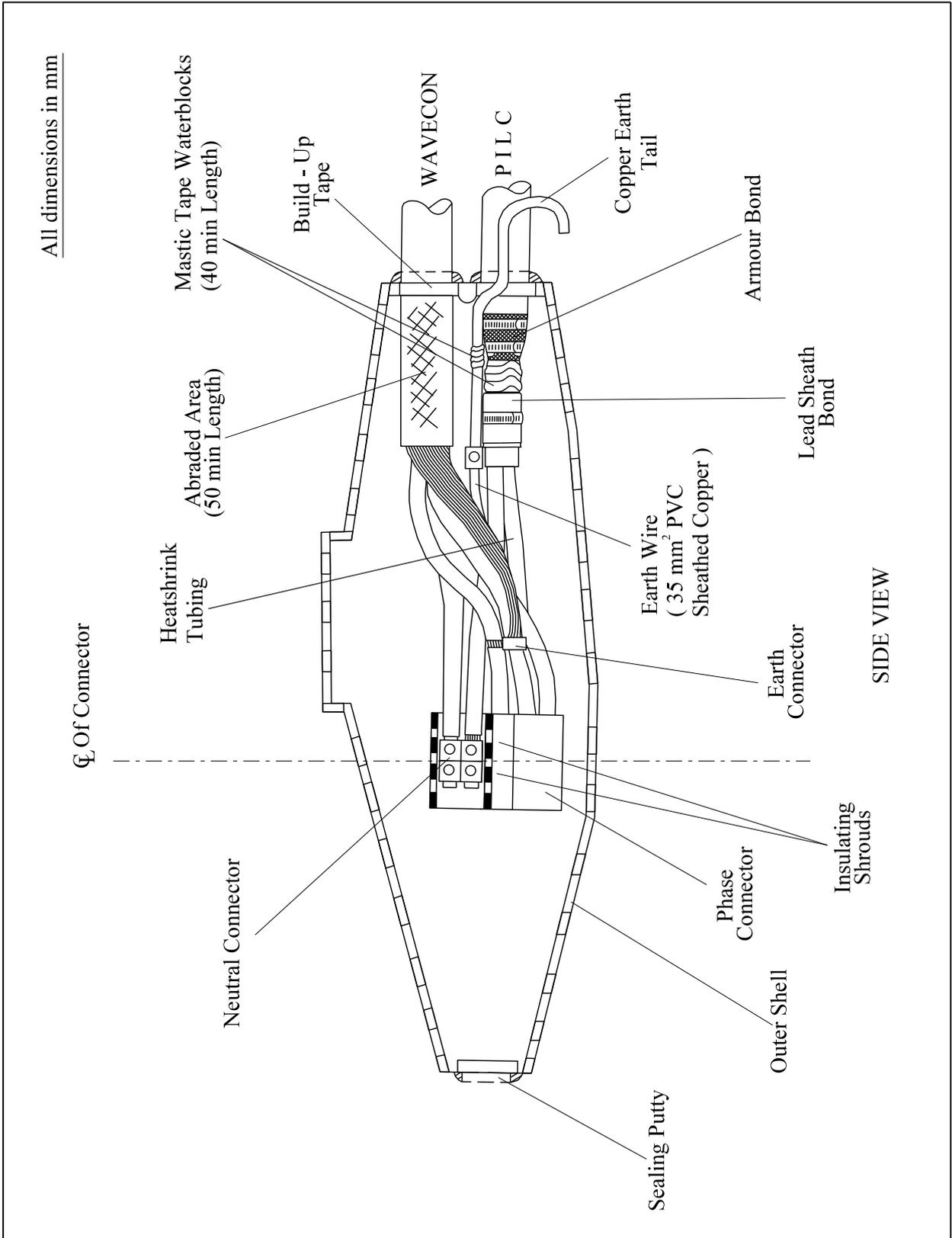
10. Set cores in joint position 27
11. Connect earth wires to 35mm<sup>2</sup> earth wire 29
12. Apply temporary shrouding 21
13. Make and insulate neutral connection 29/30
14. Make and insulate phase connections 29/30

## JOINTING PROCEDURE 7.705 – Continued

Actions	General Requirements (ST: CA1C/4)
15. Remove temporary shrouding applied in 12	--
16. Abrade and build up oversheaths	32
17. Thoroughly degrease the joint	35
18. Apply mastic water blocks to lead sheath and copper earth tail	33
19. Remove temporary binders	--
20. Prepare and fit shell, ensuring 15mm clearance	36
21. Mix and pour resin	37



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Approved						
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## **APPENDIX A**

### **SUPERSEDED DOCUMENTATION**

This document supersedes ST:CA1Y dated October 2001 which should now be withdrawn.

## **APPENDIX B**

### **ASSOCIATED DOCUMENTATION**

ST: CA1A, ST: CA1C/5, ST: CA1 D, ST: CA1E, ST: CA1F, ST: CA1G, ST: CA1H, ST: CA1I, ST: CA1U, ST: CA1W, ST: CA1X, 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**

LV Mains Loop joints.

## **APPENDIX F**

### **DOCUMENT LAST REVIEWED**

June 2012