

# **Company Directive**

# STANDARD TECHNIQUE: CA1E/4

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

This Standard Technique Document contains all the approved LV mains cable branch joints, which shall be implemented in conjunction with the appropriate General Requirements contained in ST: CA1C.

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: Richard Summers

**Implementation Date:** June 2013

Approved by

**Policy Manager** 

Date: 28 June 2013

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Document Revision & Review Table							
Date	Comments	Author					
May 2013	Richard Summers						

# ST: CA1E/4 PROCEDURES FOR MAKING LV MAINS CABLE BRANCH JOINTS

#### INTRODUCTION

This Standard Technique Document contains all the approved LV mains cable branch joints, which shall be implemented in conjunction with the appropriate General Requirements contained in ST:CA1C, 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 an LV Mains Branch Joint configuration (i.e. non-standard) which is not covered within this Standard Technique the Policy Manager, Head Office, is to be consulted.

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# ST: CA1E/4 PROCEDURES FOR MAKING MAINS CABLE BRANCH JOINTS

## **JOINTING PROCEDURE 7.201**

# THREE CORE WAVECON - THREE CORE WAVECON MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	ABLE SIZE	JOINT KIT REFERENCES					
FROM	TO	<b>BRANCH JOINT</b>					
	95W	MB 1					
95W	185W	MB 2					
	300W	MB 3					
185W	185W	MB 2					
100 W	300W	MB 3					
300W	300W	MB 3					

Note: -  $70mm^2$  and  $120mm^2$  Wavecon used in South Wales will be sized as  $95mm^2$  (70) and  $185mm^2$  (120).

Key: -  $95W = 95mm^2$  Wavecon

 $185W = 185mm^2$  Wavecon  $300W = 300mm^2$  Wavecon

#### JOINT KIT MATERIALS

KIT	SHELL			RESIN		CONNECTORS				EARTH TAIL
REF.	1589	1588	1587	5 litre	6.5 litre	<b>UBR 95</b>	UBR 185	<b>UBR 300</b>	BCNE 3	LVCU 1700/5
MB 1	1			2	1	3			2	1
MB 2		1		5			3		2	1
MB 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 1.5)
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.

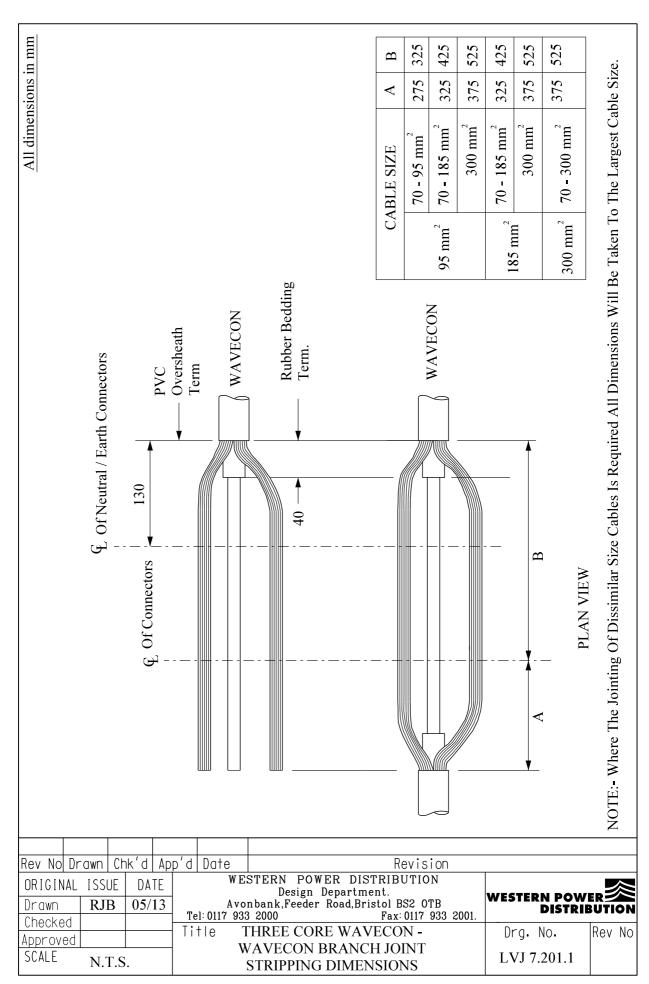
# Actions General Requirements (ST: CA1C/4)

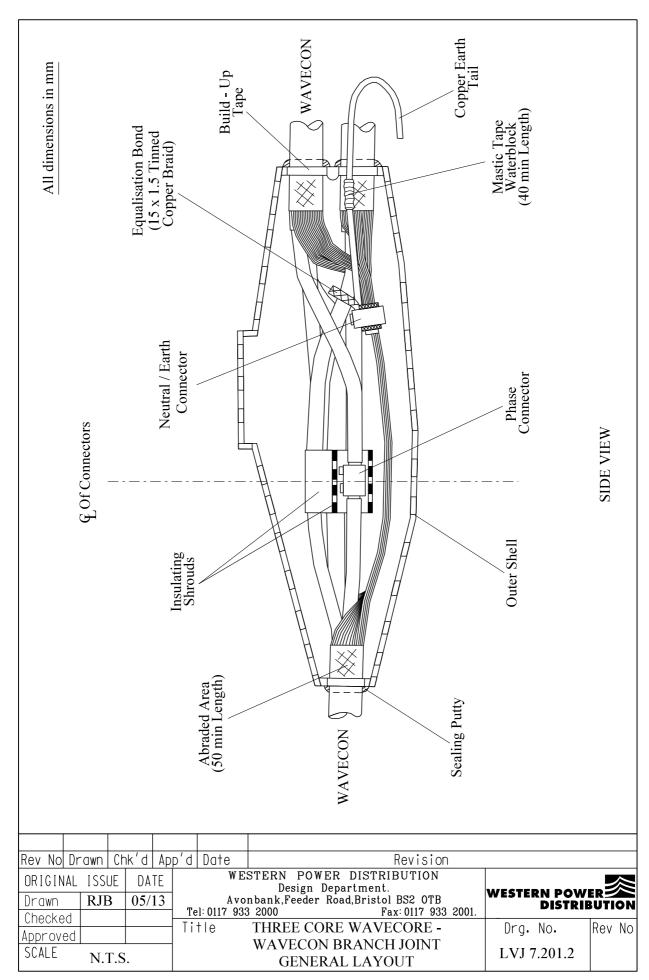
Refer to Drawing LVJ 7.201.1, 7.201.2 whilst undertaking this Jointing Procedure

1	Set up and mark cables	4
	BRANCH CABLE - Preparation	
2	Open and cut cable	14
3	Prepare the neutral/earth wires for jointing	8
	MAIN CABLE - Preparation	
4.	Remove PVC oversheath	6
5.	Prepare the neutral/earth wires for jointing	8
6.	Remove rubber bedding	9
	COMPLETION OF JOINT	
7.	Set cores in joint position	27
8.	Connect the neutral/earth wires including a equalisation bond and copper earth tail	29
9.	Remove temporary earth connection applied in 2	
10.	Apply temporary shrouding	21
11.	Make and insulate phase connections	29/30
12.	Remove temporary shrouding applied in 10	
13.	Form neutral/earth wires into their final positions	
14.	Abrade and build-up oversheaths	32
15.	Thoroughly degrease the joint	35
16.	Apply mastic water block to copper earth tail	33
17.	Remove temporary binders	

# **JOINTING PROCEDURE 7.201 – Continued**

Acti	ions	General Requirements (ST: CA1C/4)
18.	Prepare and fit shell, ensuring 15mm clearance	36
19.	Mix and pour resin	37







# ST: CA1E/4 PROCEDURES FOR MAKING MAINS CABLE BRANCH JOINTS

## **JOINTING PROCEDURE 7.202**

# CONSAC - THREE CORE WAVECON MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	ABLE SIZE	JOINT KIT REFERENCES					
FROM	ТО	BRANCH JOINT					
	95W	MB 4					
95C	185W	MB 5					
	300W	MB 6					
185C	185W	MB 5					
1650	300W	MB 6					
	95W	MB 7					
240C	185W	MB 7					
	300W	MB 7					

Key: -  $95W = 95mm^2$  Wavecon

 $95C = 95mm^2 Consac$ 

 $185W = 185mm^2$  Wavecon

185C = 185mm<sup>2</sup> Consac

 $240C = 240mm^2 Consac$ 

 $300W = 300mm^2 Wavecon$ 

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

#### **JOINT KIT MATERIALS**

KIT	SHELL			RESIN		CONNECTORS						EARTH TAIL
REF.	1589	1588	1587	5 litre	6.5 litre	<b>UBR 95</b>	UBR 185	UBR 300	TA1	TA2	BCNE 3	LVCU 1700/5
MB 4	1			2	1	3			1		1	1
MB 5		1		5			3			1	1	1
MB 6			1	8				3		1	1	1
MB 7			1	8				3		1	1	1

### ADDITIONAL ITEMS FOR JOINT

Insulation patch

Black cotton tape

Sealing putty

Cable ties

Shell support

16 swg tinned copper wire

Whipping thread

'H' metal

Abrasive metal

PVC tape

De-solvit 1000FD

De-solvit 1000

Workhorse wipes

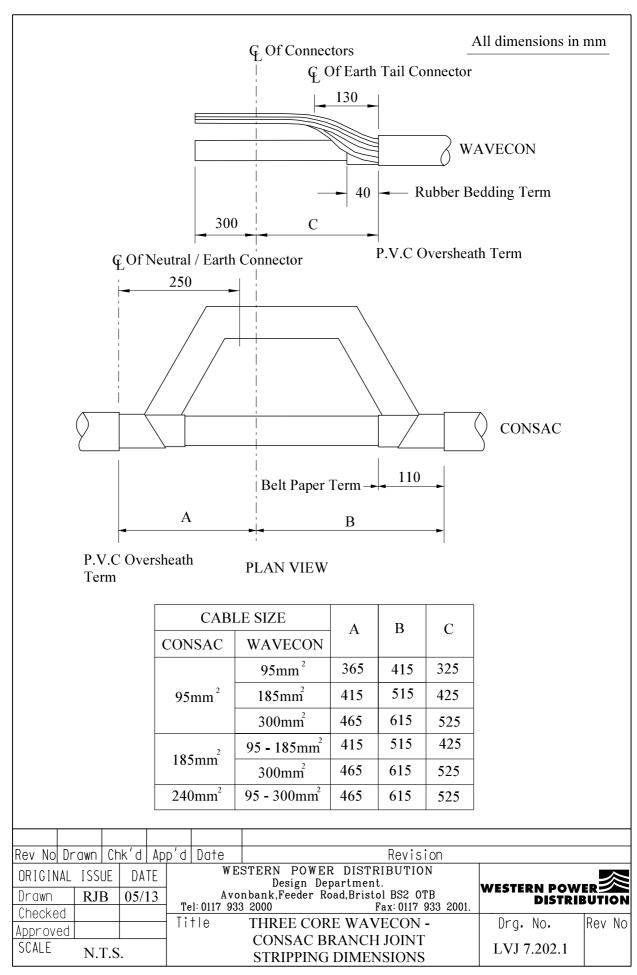
Note: - Individual material item numbers (SHOPS) are to be found in Section 4 – Part I of the LV Jointing Manual.

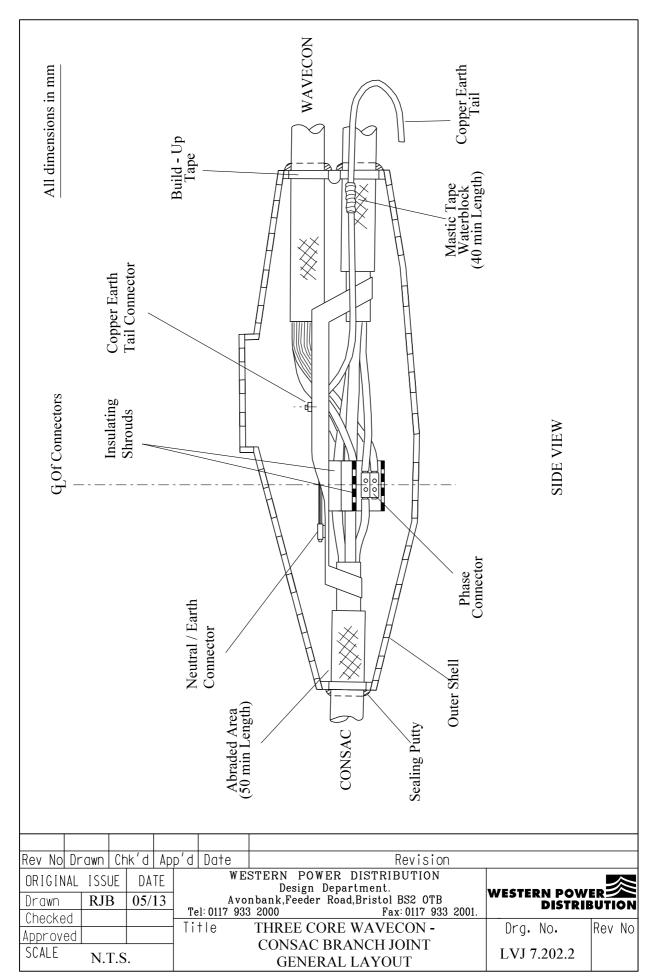
Actions	General Requirements
	(ST: CA1C/4)

	Refer to Drawing LVJ 7.202.1, 7.202.2 whilst undertaking this Jointing l	Procedure
1.	Set up and mark cables	4
	BRANCH CABLE - Preparation	
2.	Open and cut cable	14
3.	Prepare neutral/earth wires for jointing	8
	MAIN CABLE – Preparation	
4.	Remove PVC oversheath	6
5.	Open and prepare neutral/earth sheath for jointing	12
6.	Remove the belt papers and carry out moisture test	19
	COMPLETION OF JOINT	
7.	Set cores in joint position	27
8.	Connect neutral/earth wires to neutral/earth sheath	29
9.	Remove temporary earth connection applied in 2	
10.	Apply temporary shrouding	21
11.	Make and insulate phase connections	29/30
12.	Remove temporary shrouding applied in 10	
13.	Form neutral/earth wires and neutral/earth sheath into their final position	31
14.	Connect copper earth tail to neutral/earth wires	29
15.	Abrade and build up oversheaths	32
16.	Thoroughly degrease the joint	35
17.	Apply mastic water blocks to copper earth tail and Consac PVC oversheath termination	33

## **JOINTING PROCEDURE 7.202 – Continued**

Acti	ions	General Requirements (ST: CA1C/4)
18.	Remove all temporary binders	
19.	Prepare and fit shell ensuring 15mm clearance	36
20.	Mix and pour resin	37







# ST: CA1E/4 PROCEDURES FOR MAKING MAINS CABLE BRANCH JOINTS

## **JOINTING PROCEDURE 7.203**

## PILC – THREE CORE WAVECON MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	ABLE SIZE	JOINT KIT REFERENCES					
FROM	TO	BRANCH JOINT					
	95W	MB 8					
95 PILC	185W	MB 9					
	300W	MB 10					
185 PILC	185W	MB 9					
183 PILC	300W	MB 10					
300 PILC	300W	MB 10					

Key: -  $95W = 95mm^2$  Wavecon

 $185W = 185mm^2$  Wavecon  $300W = 300mm^2$  Wavecon

#### JOINT KIT MATERIALS

KIT	SHELL			RESIN		CONNECTORS				EARTH TAIL
REF.	1589	1588	1587	5 litre	6.5 litre	<b>UBR 95</b>	UBR 185	UBR 300	BCNE 3	LVCU 1700/5
MB 8	1			2	1	4			2	1
MB 9		1		5			4		2	1
MB 10			1	8				4	2	1

### ADDITIONAL ITEMS FOR EACH JOINT

Insulation patch
Black cotton tape
Sealing putty
Cable ties
Shell support
16 swg tinned copper wire
Whipping thread
PVC tape

35mm<sup>2</sup> PVC sheathed (green/yellow) copper

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 Jointing Manual.

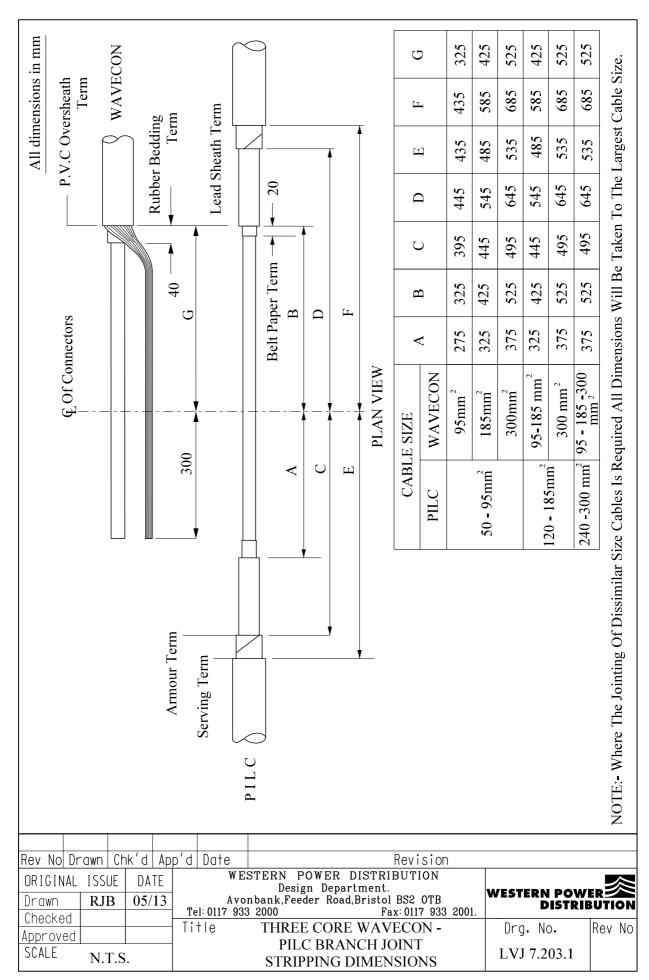
Actions General Requirements (ST: CA1C/4)

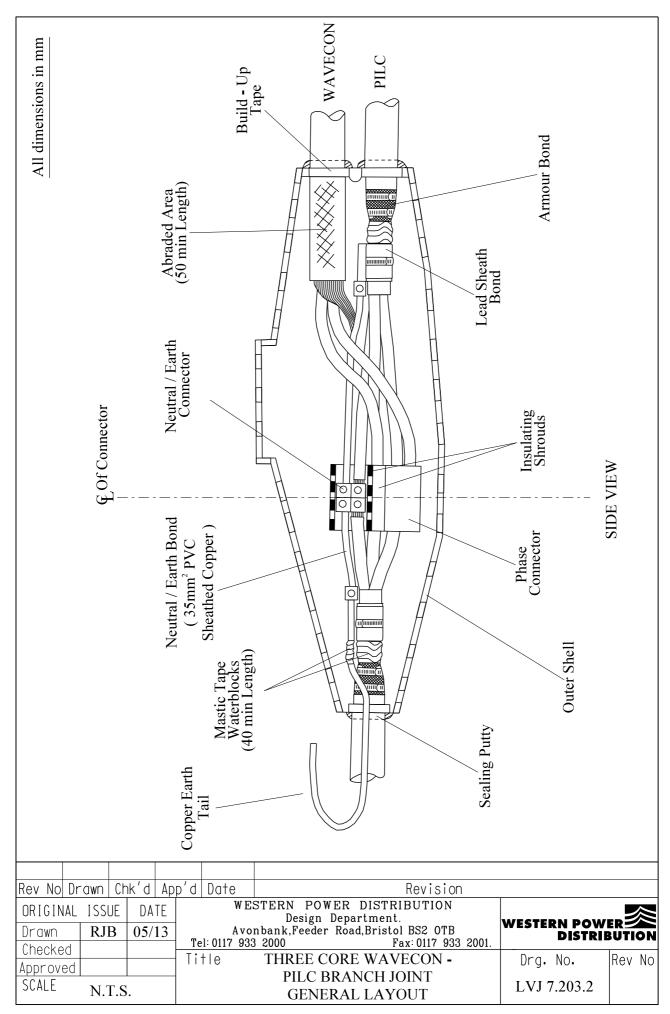
Refer to Drawing LVJ 7.203.1, 7.203.2 whilst undertaking this Jointing Procedure

1.	Set up and mark cables	4
	BRANCH CABLE - Preparation	
2.	Open and cut cable	14
3.	Prepare neutral/sheath wires for jointing	8
	MAIN CABLE - Preparation	
4.	Remove serving, armour and bedding and thoroughly clean the lead sheath	10
5.	Apply armour bonds to lead sheath	22
6.	Fit temporary earth continuity bond to lead sheath	11
7.	Remove lead sheath	13
8.	Remove belt papers and carry out moisture test	19
9.	Apply lead sheath bonds	23
10.	Connect the 35mm earth wire to lead sheath bonds (ensuring slack in the earth wire to allow fitting into the neutral/earth connection) including the copper earth tail	23
11.	Remove temporary earth continuity bond applied in 6	
	COMPLETION OF JOINT	
12.	Set cores in joint position	27
13.	Connect and insulate the neutral/earth wires to the neutral core including the 35mm earth wire	29/30
14.	Remove temporary earth connection applied in 2	

## **JOINTING PROCEDURE 7.203 – Continued**

Actio	ons	General Requirements (ST: CA1C/4)
15.	Apply temporary shrouding	21
16.	Make and insulate phase connections	29/30
17.	Remove temporary shrouding applied in 15	
18.	Form neutral/earth wires into their final position	
19.	Abrade and build up oversheaths	32
20.	Thoroughly degrease the joint	35
21.	Apply mastic water blocks to lead sheaths and copper earth tail	33
22.	Remove temporary binders	
23.	Prepare and fit shell, ensuring 15mm clearance	36
24.	Mix and pour resin	37







# ST: CA1E/4 PROCEDURES FOR MAKING MAINS CABLE BRANCH JOINTS

## **JOINTING PROCEDURE 7.204**

# FOUR CORE WAVECON – FOUR CORE WAVECON MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	ABLE SIZE	JOINT KIT REFERENCES
FROM	ТО	BRANCH JOINT
	95W	MB11
95W	185W	MB12
	300W	MB13
185W	185W	MB12
	300W	MB13
300W	300W	MB13

Key: -  $95W = 95mm^2$  Wavecon

 $185W = 185mm^2$  Wavecon  $300W = 300mm^2$  Wavecon

#### **JOINT KIT MATERIALS**

KIT REF.		SHELL		RESIN			EARTH TAIL			
KEF.	1589	1588	1587	5 litre	6.5litre	<b>UBR 95</b>	UBR 185	<b>UBR 300</b>	BCNE 3	LVCU 1700/5
MB 11	1			2	1	4			2	1
MB 12		1		5			4		2	1
MB 13			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 1.5)
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.

# Actions General Requirements (ST: CA1C/4)

Refer to Drawing LVJ 7.204.1, 7.204.2 whilst undertaking this Jointing Procedure

**BRANCH CABLE** 2. 14 Open and cut cable 3. Prepare the earth wires for jointing 8 **MAINS CABLE – Preparation** 4. Remove PVC oversheath 6 5. Prepare the wires for jointing 8 9 6. Remove rubber bedding **COMPLETION OF JOINT** 7. Set cores in joint position 27 8. Connect the earth wires including equalisation bond and 29 copper earth tail

10.	Make and insulate neutral connection	29/30
11.	Make and insulate phase connections	29
12.	Remove temporary shrouding applied in 9	
13.	Form earth wires into their final position	
14.	Abrade and build up oversheaths	32
15.	Thoroughly degrease the joint	35
16.	Apply mastic water block to copper earth tail	33

21

1.

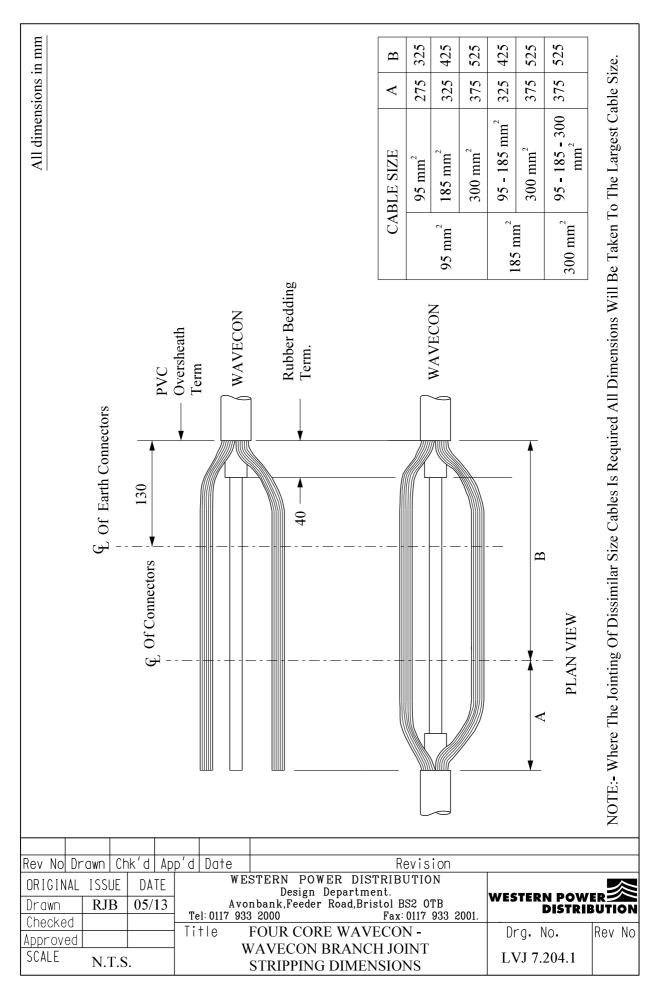
9.

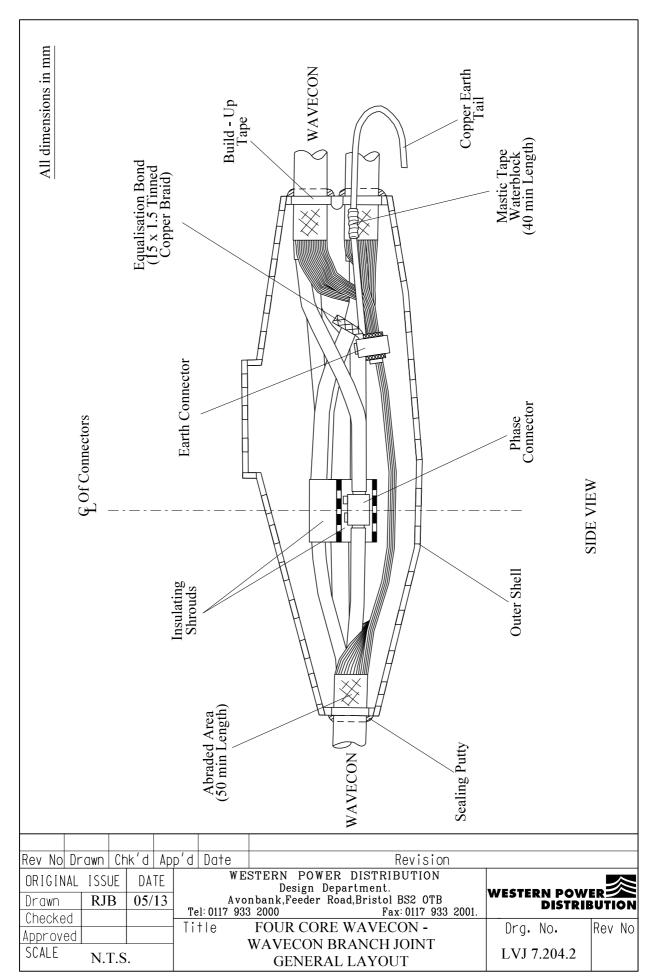
Set up and mark cables

Apply temporary shrouding

# **JOINTING PROCEDURE 7.204** – Continued

Acti	ions	General Requiremen (ST: CA1C/4)
17.	Remove temporary binders	
18.	Prepare and fit shell, ensuring 15mm clearance	36
19.	Mix and pour resin	37







# ST: CA1E/4 PROCEDURES FOR MAKING MAINS CABLE BRANCH JOINTS

## **JOINTING PROCEDURE 7.205**

# PILC – FOUR CORE WAVECON MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	BLE SIZE	JOINT KIT REFERENCES
FROM	TO	BRANCH JOINT
	95W	MB 14
50 PILC	185W	MB 15
	300W	MB 16
185 PILC	185W	MB 15
163 PILC	300W	MB 16
300 PILC	300W	MB 16

Key: -  $95W = 95mm^2$  Wavecon

 $185W = 185mm^2$  Wavecon  $300W = 300mm^2$  Wavecon

#### **JOINT KIT MATERIALS**

KIT	SHELL			RESIN		CONNECTORS				EARTH BOND	EARTH TAIL
REF.	1589	1588	1587	5 litre	6.5 litre	<b>UBR 95</b>	UBR 185	<b>UBR 300</b>	BCNE 3	LVEB 08	LVCU 1700/5
MB 14	1			2	1	4			1	2	1
MB 15		1		5			4		1	2	1
MB 16			1	8				4	1	2	1

### ADDITIONAL ITEMS FOR EACH JOINT

Insulation patch

Black cotton tape

Sealing putty

Cable ties

Shell support

16 swg tinned copper wire

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 Jointing Manual.

### **Actions**

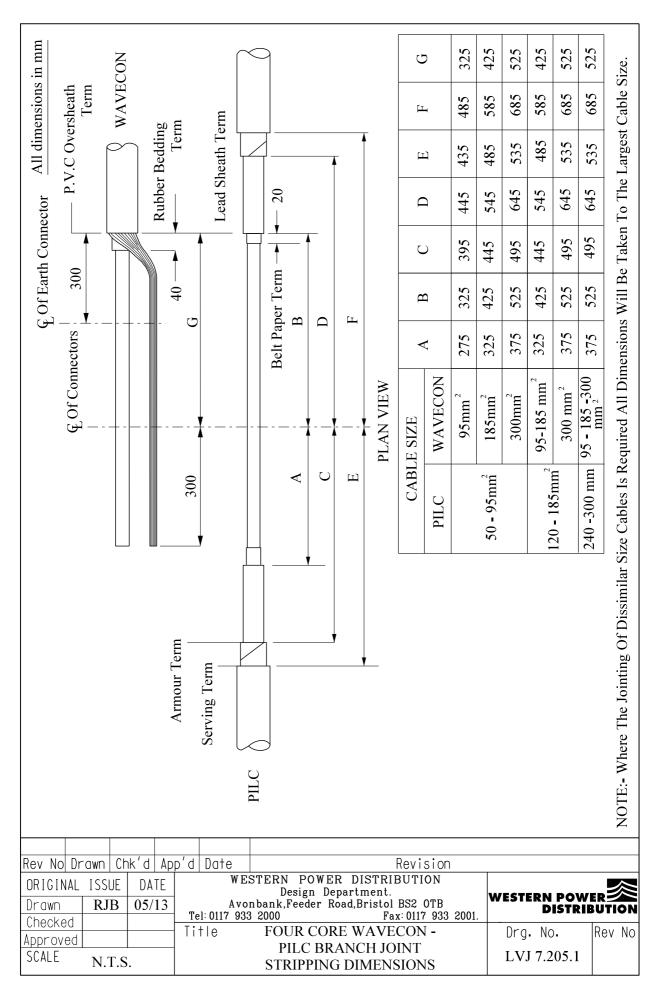
# General Requirements (ST: CA1C/4)

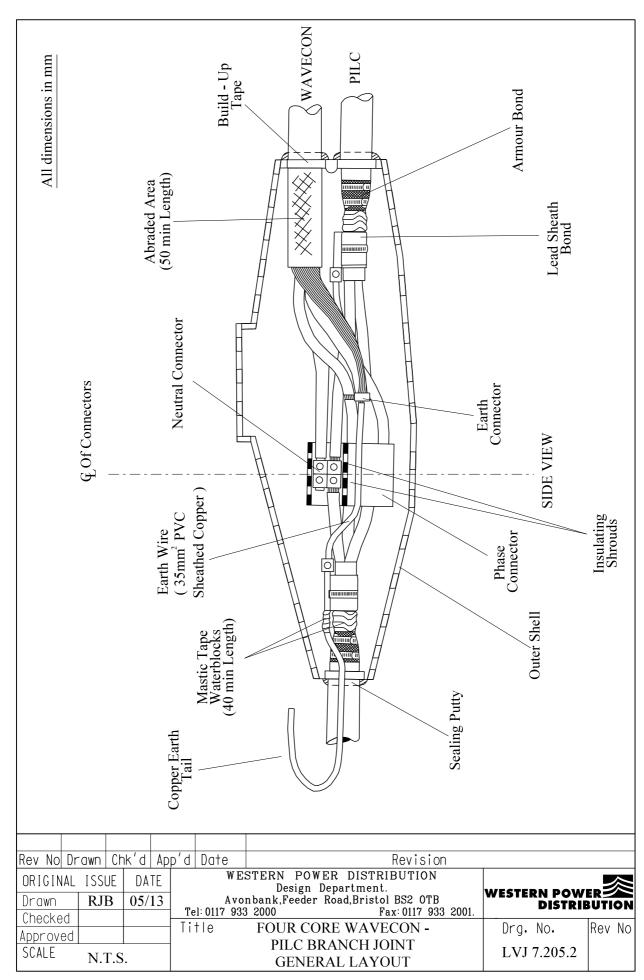
Refer to Drawing LVJ 7.205.1, 7.205.2 whilst undertaking this Jointing Procedure

1.	Set up and mark cables	4
	BRANCH CABLE – Preparation	
2.	Open and cut cable	14
3.	Prepare the earth wires for jointing	8
	MAIN CABLE - Preparation	
4.	Remove serving, armour and bedding and thoroughly clean the lead sheath.	10
5.	Apply armour bonds.	22
6.	Fit temporary earth continuity bond to lead sheath.	11
7.	Remove lead sheath.	13
8.	Remove belt papers and carry out moisture test.	19
9.	Apply lead sheath bonds	23
10.	Connect a 35mm <sup>2</sup> earth wire to lead sheath bonds including the copper earth tail	23
11.	Remove temporary earth continuity bond applied in 6	
	COMPLETION OF JOINT	
12.	Set cores in joint position	27
13.	Connect the earth wires to the 35mm <sup>2</sup> earth wire	29
14.	Apply temporary shrouding	21
15.	Make and insulate neutral connection	29/30

# **JOINTING PROCEDURE 7.205** – Continued

Acti	ons	General Requirements (ST: CA1C/4)
16.	Make and insulate phase connections	29/30
17.	Remove temporary shrouding applied in 14	
18.	Form earth wires into their final position	
20.	Abrade and build up oversheaths	32
21.	Thoroughly degrease the joint	35
22.	Apply mastic waterblocks to lead sheaths and copper earth ta	iil 33
23.	Remove temporary binders	
24.	Prepare and fit shell, ensuring 15mm clearance	36
25.	Mix and pour resin	37







# ST: CA1E/4 PROCEDURES FOR MAKING LV MAINS CABLE BRANCH JOINT

# **JOINTING PROCEDURE 7.206**

## THREE CORE WAVECON – FOUR CORE WAVECON BRANCH MAINS CABLE BRANCH JOINT

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

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### **JOINT KIT REFERENCES**

CA	BLE SIZE	JOINT KIT REFERENCES				
FROM 3 CORE	TO 4 CORE	BRANCH JOINT				
	95W	MB 17				
95W	185W	MB 18				
	300W	MB 19				
185W	185W	MS 18				
103 W	300W	MB 19				
300W	300W	MB 19				

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

Key: -  $95W = 95mm^2$  Wavecon

 $185W = 185mm^2$  Wavecon  $300W = 300mm^2$  Wavecon

#### JOINT KIT MATERIALS

KIT	SHELL			RESIN			EARTH TAIL			
REF.	1589	1588	1587	5 litre	6.5 litre	<b>UBR 95</b>	UBR 185	UBR 300	BCNE 3	LVCU 1700/5
MB 17	1			2	1	4			2	1
MB 18		1		5			3	1	2	1
MB 19			1	8				4	2	1

### ADDITIONAL ITEMS FOR EACH JOINT

Insulation patch
Black cotton tape
Sealing putty
Cable ties
Shell support
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.

## Actions

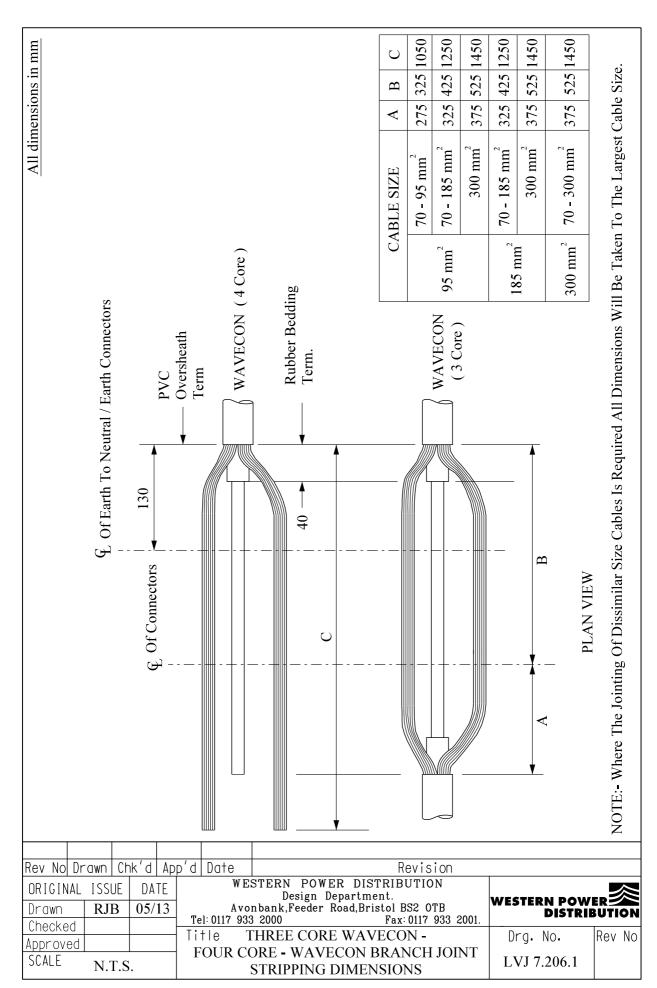
# General Requirements (ST: CA1C/4)

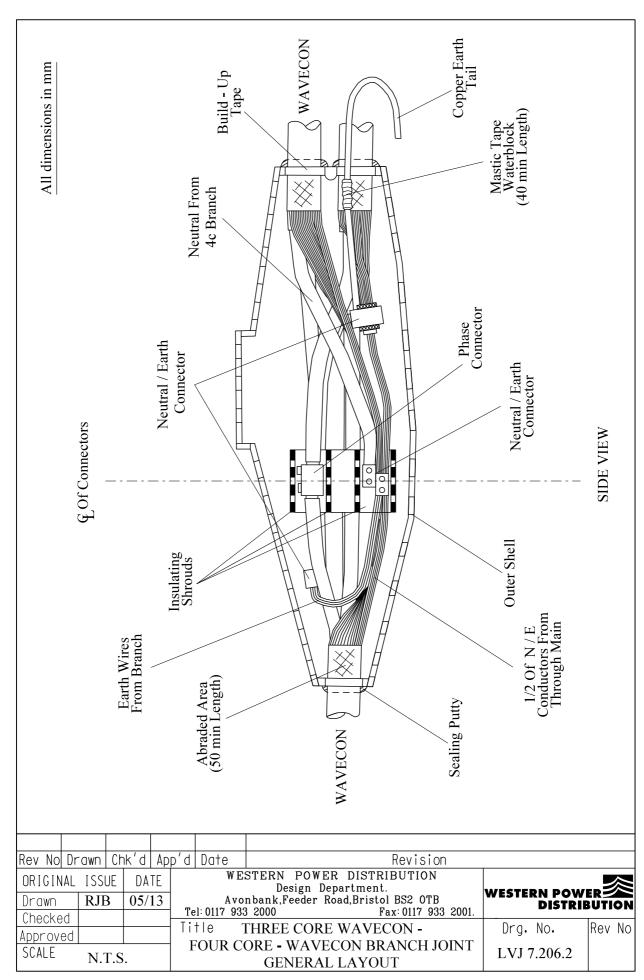
Refer to Drawing LVJ 7.206.1, 7.206.2 whilst undertaking this Jointing Procedure

1.	Set up and mark cables.	4
	4 CORE BRANCH CABLE – Preparation	
2.	Open and cut cable.	14
3.	Prepare the earth wires for jointing leave enough length to bridge both sets of the neutral earths on the through main	8
	3 CORE MAIN CABLE - Preparation	
4.	Remove PVC oversheath.	6
5.	Prepare the neutral/earth wires for jointing.	8
6.	Remove rubber bedding.	9
7.	Set cores in joint position.	27
8.	Connect both the earth wires and the neutral core from the branch cable to half of the neutral/earth wires on the main using a UBR connector. Run the branch earth wires through this connector and loop around to the	
	other half of the neutral / earth wires on the through main. Connect using a BCNE connector.	29
9.	Connect copper earth tail.	29/30
10.	Apply temporary shrouding.	21
11.	Make and insulate phase connections.	29/30
12.	Remove temporary shrouding applied in 11.	
13.	Form neutral/earth wires into their final positions.	

# **JOINTING PROCEDURE 7.206** – Continued

Actions		General Requirements (ST: CA1C/4)
14.	Abrade and build up oversheaths.	32
15.	Thoroughly degrease the joint.	35
16.	Apply mastic water block to copper earth tail.	33
17.	Remove temporary binders.	<del></del>
18.	Prepare and fit shell ensure 15mm clearance.	36
19.	Mix and pour resin.	37





APPENDIX A

#### SUPERSEDED DOCUMENTATION

This Standard Technique supersedes ST: CA1E/3 dated June 2012 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

This document complies with the latest ST: HS8H.

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 branch joints.

**APPENDIX F** 

#### DOCUMENT LAST REVIEWED

May 2013