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Electricity Specification 400J3

Issue 3 March 2023

Low Voltage Cable Joint Shells

Amendment Summary

ISSUE NO. DATE	DESCRIPTION
Issue 3 **March 2023**	The new template for Engineering Specification Documents has been applied. All information has been reviewed and updated where appropriate. Prepared by: Philip Howell Approved by: Policy Approval Panel and signed on its behalf by Steve Cox, Asset & Technology Director

Contents

1 Introduction

This Electricity Specification (ES) document covers the supply of suitable plastic joint shells to be used as enclosures during encapsulation with a hard setting, cold pour resin compound in low voltage joints installed on the electricity distribution network (Network) owned by Electricity North West Limited, as Distribution Licensee, herein referred to as Electricity North West

2 Scope

The specification covers a range of moulded plastic shells supplied in two shaped matched halves which are designed for use on the range of low voltage (LV) cable joints used on the Electricity North West network.

The shells will provide a suitably sized cavity when positioned around the joint to ensure the cold pour resin compound can fill the shell and provide sufficient mechanical and moisture protection for the joint when it cures.

To cover the wide range of cable sizes and joint arrangements, several different sized shells are required. This specification provides mandatory requirements relating to the materials, rigidity and thickness, and also guidance on the dimensions for different types of shells to cover the various joint configurations.

The Tenderer shall offer a range of shells which will cover the full range of cable size and joint combinations, but preference will be given to solutions which use a minimum number of unique shells without compromising on excessive resin volumes.

The shells are supplied as “kits” which include all necessary components to enable the shell to be fitted around the cable joint. Connectors and the Encapsulating Resins which are used in the LV joints together with these shells are covered in the following separate ES documents:

- ES400 J4 – Mechanical Connectors for LV Joints
- ES400 R10 –Resin Compound for encapsulation of cable joints up to 33kV

3 Definitions

ABS	Acrylonitrile Butadiene Styrene.
Approval	Sanction by the Electricity North West Circuits Policy Manager that specified criteria have been satisfied
Contract	The agreement between Electricity North West and the Contractor for the execution of the Works including therein all documents to which reference may properly be made in order to ascertain the rights and obligations of the parties under the said agreement.
Contractor	The person or person's firm or company, including personal representatives, successors and permitted assigns, who’s Tender has been accepted by Electricity North West.

CNE	Concentric Neutral Earth
HIPS	High Impact Polystyrene.
PET-G	Polyester Terephthalate Glycol.
PILCSTA/ PILCDSTA/PILCSWA	Paper Insulated, lead covered, steel tape armoured Paper Insulated, lead covered , double steel tape armoured Paper Insulated, lead covered, steel wire armoured
Specification	The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.
Supplier	Any person or person's firm or company who supplies goods to Electricity North West or to its Contractor.
SCNE	Split (or Separate) Concentric Neutral Earth
Tender	An offer in writing to execute work or supply goods at a fixed price.
Tenderer	The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by Electricity North West to submit a Tender.
XLPE	Cross Linked Polyethylene.

4 General Requirements for Approvals and Testing

4.1 Product not to be Changed

No change in the product, packaging or labelling shall be made after Approval has been granted without prior notice to the Electricity North West Circuits Policy Manager, and receipt of a written agreement to the proposed change from the Electricity North West Circuits Policy Manager.

4.2 Electricity North West Technical Approval

The Tenderer shall submit, with this Tender, proposals for testing which will demonstrate, to the satisfaction of the Electricity North West Circuits Policy Manager, compliance with this Specification. Such tests shall be carried out without expense to Electricity North West.

Alternatively, technical reports and other data may be submitted that the Tenderer considers will demonstrate, to the satisfaction of the Electricity North West Circuits Policy Manager, compliance with this Specification. Acceptance of this evidence shall be at the discretion of the Electricity North West Circuits Policy Manager but will not be unreasonably withheld.

Approval shall be 'factory specific' and is not transferable to another factory without the written Approval of the Electricity North West Circuits Policy Manager.

The Supplier and product shall comply with all the relevant requirements of Electricity North West document CP311.

4.3 Quality Assurance

The Tenderer shall confirm whether or not Approval is held in accordance with a quality assurance scheme accredited under ISO 9000. If not, the Tenderer shall submit a statement of the quality assurance procedures employed to control the quality of the product, including the performance of Suppliers and Sub-Contractors.

The right is reserved for the repeat of such tests, from time to time, that the Electricity North West Circuits Policy Manager may deem to be reasonably necessary to demonstrate continued compliance with the Specification.

The Tenderer shall submit, with the Tender, a list of tests and inspections which are carried out on the product prior to despatch which shall demonstrate, to the satisfaction of the Electricity North West Circuits Policy Manager, fitness for installation and service.

The Tenderer shall provide free of charge to Electricity North West such samples as may, in the opinion of the Electricity North West Circuits Policy Manager, be reasonably required for inspection and/or retention as quality control samples. The Electricity North West Circuits Policy Manager will confirm the requirement for samples at the time of Tendering.

The right is reserved for inspections to be made of Tenderer's facilities, from time to time, as deemed reasonably necessary by the Electricity North West Circuits Policy Manager to ensure compliance with this Specification and any Contract of which it forms a part.

The Tenderer shall submit, with the Tender, such details of product packaging disposal, as will enable Electricity North West to comply with the requirements of BS EN ISO 14001 - Environmental Management Systems.

4.4 Formulation

The Tenderer shall submit, with the Tender, such details of the formulation and use of the product and associated substances as will enable Electricity North West to comply with the obligations of the Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health Regulations 2002, in the use, storage and disposal of the product. The Tenderer may stipulate, prior to submission of such information, that it is to remain confidential, and the Electricity North West Circuits Policy Manager will, if requested, confirm agreement to this prior to receipt of the information.

4.5 Identification Markings

The Tenderer shall submit, with the Tender, details of markings which it is proposed to apply to the product or packaging to identify manufacturing batches or items. The forms and content of such markings shall be subject to the Approval of the Electricity North West Circuits Policy Manager and shall in all cases include the Electricity North West approved description and commodity code number.

The Tenderer shall submit, with the Tender, such details of marking gross weight on components, assemblies and packages, as will enable Electricity North West to comply with the Health and Safety Manual Handling Operation Regulations 1992, for components, assemblies and packages supplied with a gross weight over 1kg. The forms and content of such markings shall be subject to the Approval of the Electricity North West Circuits Policy Manager.

4.6 Minimum Life Expectancy

The minimum life expectancy of all products covered by this Specification is 10 years prior to installation when stored as per manufacturers recommendations. When installed, the joint shell becomes redundant once the resin has cured but should not cause any reduction in the overall life expectancy of the assembly joint which is 60 years.

4.7 Product Conformity

Preference will be given to those Suppliers who can provide suitable product conformity certification to a recognised or specified standard, or an equivalent certification.

4.8 Confirmation of Conformance

The Tenderer shall complete the conformance declaration sheets in Appendix C. Failure to complete these declaration sheets may result in an unacceptable bid.

5 Requirements for Type and Routine Testing

The Electricity North West Circuits Policy Manager shall set out the requirement of the following tests to be carried out by the Supplier at the Supplier's cost.

5.1 Requirement for Type Tests at Suppliers Premises

These are a series of one-off type tests, which are carried out to ensure the satisfactory performance of the product design, under extremes of operating stresses, and of endurance, as may be appropriate, to be determined by the Electricity North West Circuits Policy Manager.

These may or may not be destructive tests.

5.2 Requirement for Routine Tests at the Supplier's Premises

These tests may be required to be carried out on every individual unit or component, as specified, or at some regular frequency to be determined by the Electricity North West Circuits Policy Manager.

The results of these tests may be required to be supplied to Electricity North West with each unit purchased or retained for inspection, at a period to be determined by the Electricity North West Circuits Policy Manager.

6 Technical Particulars

6.1 General Requirements

The joint shells shall be suitable for use with the cables listed in Clause 6.2 of this specification.

The joint shells shall consist of two matched halves and can be either vertically or horizontally split. For horizontal split shells, the upper shell shall incorporate one or more openings of a sufficient size to allow easy access during filling. For Vertically split shells the openings shall be incorporated into the top edges of both halves. These openings shall be provided with suitably sized lids made of same materials as the shells.

The joint shells shall be supplied with suitable accessories to enable the two halves of the shell to be securely held together so that a leak-proof joint is ensured when filled with the Approved cold pour resin compound.

The shells and fixing accessories shall be suitable to enable the approved resin compound to cure and set hard after which point the completed joint will be backfilled in accordance with the requirements of CP410 Chapter 3.

The joint shells shall be manufactured from a plastic material such as Virgin HIPS, Virgin ABS, PETG or other similar material which is compatible with all types of encapsulating resins, cable materials and jointing sundries as listed in Clause 6.3.
The shells shall be black in colour , or alternatively preference will be given to shells from clear materials if there is no significant cost premium.

The joint shells may be manufactured from either sheet material vacuum forming methods or by an injection moulding process. The finished joint shells shall be suitably contoured and free from sharp edges which may give rise to undue thinning of the material. The minimum thickness at any point on the shell shall be as per Clause 6.4

The shell material shall be mechanically strong enough to support the total weight of the cold pour encapsulation resin compound, whilst still in its liquid state and sufficiently resilient to withstand the maximum curing temperature of the material or exposure to direct sunlight without any deformation. Joint shells shall pass the rigidity test in Clause 6.5 and the cold weather stress cracking test in Clause 6.6.

Joint shells shall also have the manufacturer's reference number stamped on one or both of the two halves.

All joint shells shall be designed for range taking applications and shall be provided with stepped cable entry positions to minimise cable movement and strengthen entry positions. The cable entry orifices shall be of sufficient length to allow a seal to be applied between the outer sheath of the cable and the shell to prevent leakage of the cold pour encapsulation resin compound. The stepped entry should be adequate for trimming and removal of steps by use of a junior hacksaw or other suitable tool without cracking or splitting around the entry positions.

The shell design will provide for a minimum radial thickness of 10 mm of cured resin between all parts of the joint and the inner surface of the shell after the shell is filled with the cold pour encapsulation resin.
It is anticipated a number of shell designs will be required to cover the entire scope of joints and Clause 6.7 details the outline size and range of joints. However, the Tenderer shall offer a range of shells which will fully meet the criteria but may either reduce or increase the number of unique shell kits whilst not incurring excessive resin volumes.
Preference will be given to a proposed joint shell range which optimises the number of kits required and the resin volumes of resin per joint type.

6.2 Cable range covered

The shells shall be suitable for use with the following types of cables and their combinations:

- Paper-insulated, lead sheathed cables to BS 6480 with Steel Tape Armour, two and four cores with cross sections between 0.007 in^2 and 0.5 in^2.This may also include “legacy twin lead” and concentric lead sheathed types.

- Paper-insulated, aluminium sheathed Consac cables to ENATS 09-8 with three cores of conductor cross sections between 95mm^2 and 300mm^2
- PVC or XLPE insulated CNE cables to BS7870-3 , single or three cores with cross sections between 4mm^2 and 35mm^2
- PVC or XLPE insulated SCNE cables to BS7870-3 , single or three core with cross sections between 4mm^2 and 35mm^2
- PVC or XLPE insulated steel wire armoured cables to BS5467 , two or three core with cross sections between 4mm^2 and 300mm^2
- Waveform polymeric insulated cables to BS7870 with concentric copper waveform wires , 3 or 4 core with cross sections between 70mm^2 and 300mm^2

6.3 Compatibility

All components in the shell kits shall not be adversely affected when they come into contact with materials used in the construction of any Cable or preparation for jointing.

All components specified shall be fully compatible with the following:

- Methacrylate resins used for cable joint encapsulation
- Polyurethane resins (filled or unfilled) used for cable joint encapsulation
- Mastics and Tapes
- Installation greases
- Approved Pre-soaked PF Solvent Degreasing Wipes

6.4 Material Thickness

The joint shells supplied shall be manufactured using material of sufficient wall thickness and formed using adequate reinforcing ribs to withstand the encapsulating weight of compound without significant deformation.
The minimum thickness of the shell material at any point shall be as follows;

Empty Shell Volume in litres	Vacuum formed shells	Injection moulded shells
Up to 10 litres	2mm	1.5mm
Greater than 10 litres	3mm	1.5mm

6.5 Rigidity Test

All joint shells with empty volumes greater than 10 litres shall pass the Rigidity Test as described below:

The shell shall be fitted around a cable within the usable diameter range of the shell and sealed using the standard clips or sliders and foam strips which are supplied with the kit. Additional sealing putty and tape can be applied around the cable exit points to replicate normal procedures.

The cable shall be supported at either side of the shell such that the bottom of the shell is raised at a minimum height of 300mm to the ground. The shell is then filled with the Approved Encapsulating Resin until completely filled and then left to cure.

The shell shall not display any evidence of distortion or resin leakage from around the flanges before the resin is fully cured. Any initial leakage around cable ports is acceptable as long as it is sealed with tape or putty immediately during the test.

The test shall be carried out at ambient temperature.

The Tenderer shall provide a test report detailing the result of the Rigidity Test for each shell offered, including details of any independent witnesses, at the time of Tender.

6.6 Environmental Stress Cracking (Cold Weather Test)

The joint shells shall pass the Cold Weather Test as described below:

All tendered plastic joint shells shall be tested to prove they are compatible with the Company's current Approved encapsulation resin during cold weather and will not split in these conditions due to Environmental Stress Cracking. The tendered shells and Approved resin should be put into an environmental chamber and left for minimum 12 hours to chill to -20°C.

Once the materials have fully acclimatised to -20°C, the resin shall be mixed, and the shells filled while still inside the environmental chamber. During the mixing, pouring and waiting stage the temperature shall be kept between -5° and -10°C.
The shells shall be left for 2 hours after filling and then inspected. No evidence of any cracking or other damage to the shells shall be observed.

The Tenderer shall provide a test report detailing the result of the Cold Weather Test for each shell offered, including details of any independent witnesses, at the time of Tender.

6.7 Outline Dimensions for Joint Range

Appendix A gives details of the outline dimensions for a range of 12 shells as follows;

- Service Cable Bottle End
- Small 1phase Service Cable Straight Joint
- Large 1 phase service cable straight joint
- 3phase service cable straight joint/1ph service cable branch joint
- 3phase service cable branch joint
- Mains Cable Bottle End

- Small Mains straight joint
- Medium Mains Cable straight joint / Service of a Mains joint
- Large Mains Cable straight joint / Service of a Mains Cable Joint
- Small Mains Branch / Loop Joint
- Medium Mains Branch /Loop Joint
- Large Mains Branch / Loop Joint

The Tenderer shall use the information given in Appendix A on the 12 joint types to propose a range of joint shells which will cover the cable types, sizes and configurations for all the joints stated. This may be less, or more than 12 different shells and the Tenderer shall fully detail the intended application for each shell offered.

7 Packaging

Joint shells shall be supplied in an individual kit form i.e. including any required accessories to hold the shell halves together and seal all cable entries and filling openings.

Shell Kits including accessories shall be individually packed in suitable robust materials in order to prevent damage in normal handling.

Preference will be given to environmentally sustainable solutions for packaging.

Each Shell kit shall be labelled to indicate the empty volume of resin required to fill the shell.

8 Information to be supplied with Tender

The Tenderer shall provide the following:

- Drawings complete with dimensions for every joint shell offered.
- Details of test results as detailed in Clause 6.5 and Clause 6.6.
- Details of the joint/cable configurations, which can be accommodated in each joint shell, offered
- Details of the packaging for each type of joint shell kit.
- Details of any special tools or equipment necessary to attach both sides of the shell together.

9 Samples

The manufacturer, if requested, shall submit samples of all offered products in support of their Tender response.
In order to ensure products are fit for all applications, further samples may be required at the request of the Circuits Policy Manager. The quantity of samples required, and delivery location shall be agreed at the time of Tender product approval.

10 Technical Support

During the Contract period questions will arise regarding unusual or non-standard applications where advice will be required on matters such as jointing non-standard cable types etc. The successful Tenderer(s) will be expected to support Electricity North West with technical advice on these matters.

In addition, the successful Tenderer(s) will be expected to assist and provide suitable documentation in order to produce installation instructions which will be included in Electricity North West's LV Code of Practice for LV Cable Jointing CP411Pt1.

11 Documents Referenced

All references to documents listed below are to the latest versions, unless stated otherwise

DOCUMENTS REFERENCED	
Health and Safety at Work Act.	
Control of Substances Hazardous to Health Regulations.	
Manual Handling Operations Regulations	
BS EN ISO 9000	Quality management systems.
BS EN ISO 14001	Environmental Management Systems.
BS 5593	Impregnated Paper Insulated Cables with Aluminium Sheath / Neutral Conductor and Three Shaped Solid Aluminium Phase Conductors (CONSAC), 600/1000 V, for Electricity Supply.
BS 6480	Specification for impregnated paper-insulated lead or lead alloy sheathed electric cables of rated voltages up to and including 33000 V.
BS 7870	LV and MV polymeric insulated cables for use by distribution and generation
CP311	Electricity North West Code of Practice for Approval Policy and Process
CP411Pt1N	Electricity North West Code of Practice for LV Jointing

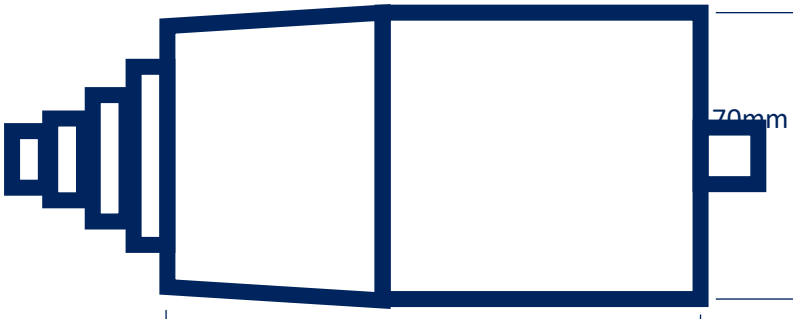
CP410	Electricity North West Code of Practice for General Installation Practice for Cables up to 132kV
ES400 J4	Electricity North West Specification for LV Joint Connectors
ES400 R10	Electricity North West Specification for Resin Compounds for joint encapsulation up to 33kV

12 Keywords

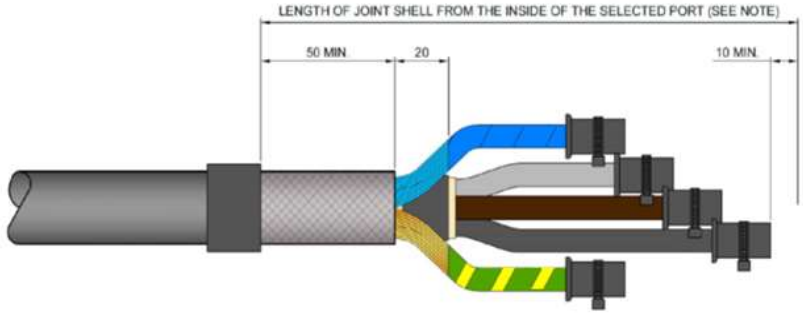
LV; Joint; Shell

Appendix A – Outline Guide Dimensions for service bottle end

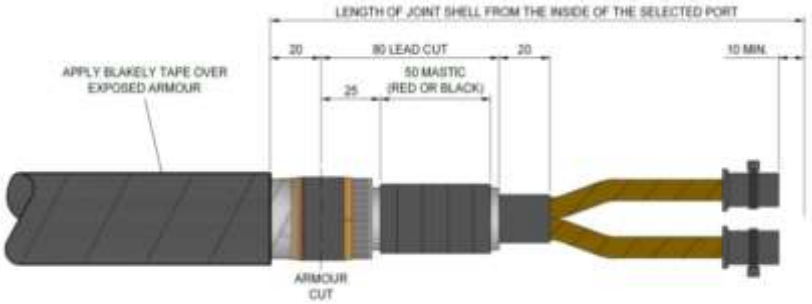
Stepped cable entry ports for range of cables as per table below



***dimensions are "guide" only – Tenderer to propose shells which can accommodate the range of cable sizes shown**



Stripping details for polymeric CNE/SCNE cables



Stripping details for pilcsta cables

Cable	Size Range	Joint Type	Strip length
CNE Plastic	4 – 35mm^2	Pot End	As shown
SCNE Plastic	4 – 35mm^2	Pot End	As shown
PILC 2c	0.007"-0.06"	Pot End	As shown
PILC 4c	0.007"-0.06"	Pot End	As shown

Scale: n t s

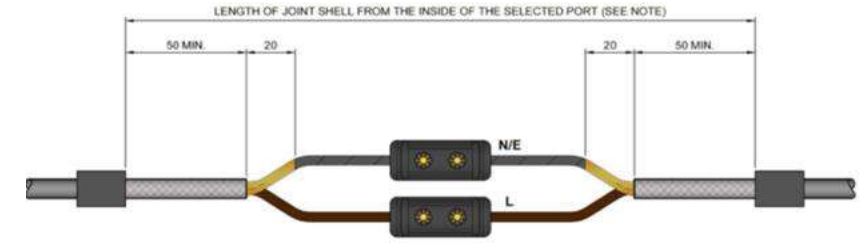
Service Bottle End Shell Dimensions

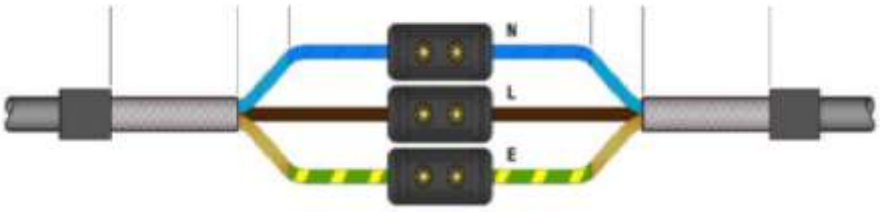
Drawn: PPH
Approved:

Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for small 1ph service straight joint

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**





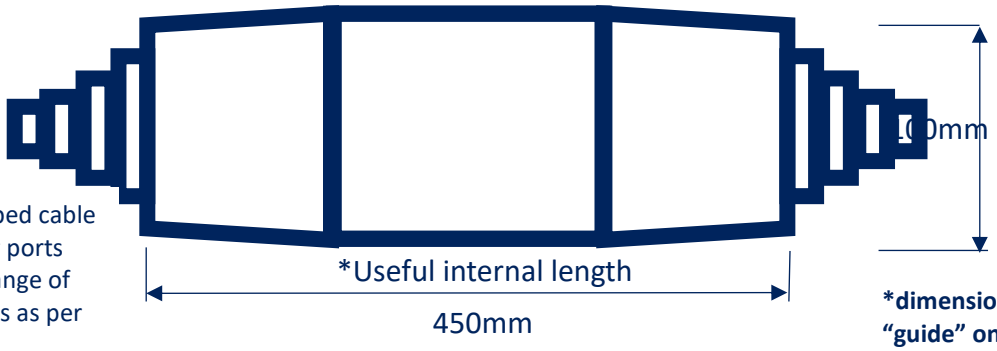
Cable	Size Range	Joint Type	Strip length
CNE Plastic	4 – 35mm^2	1ph Straight	200mm
SCNE Plastic	4 – 35mm^2	1ph Straight	200mm

Scale: n t s

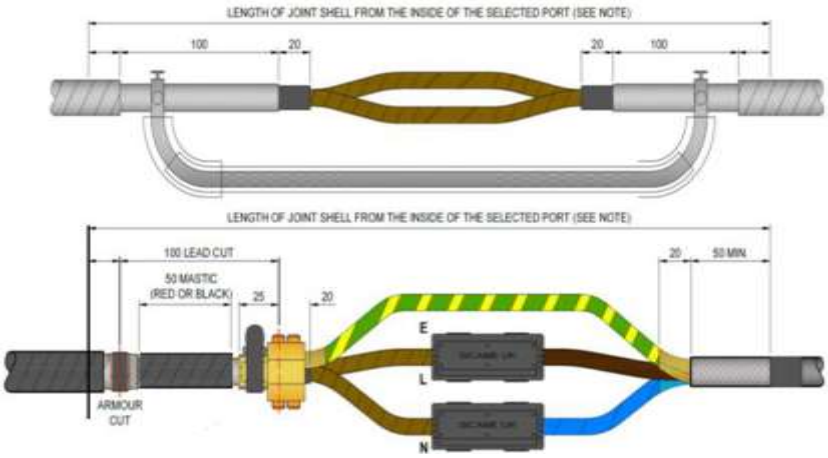
Small 1ph Service Straight –Shell Kits

Drawn: PPH
Approved:

Appendix A – Outline Dimensions for large 1ph service straight joint



***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**



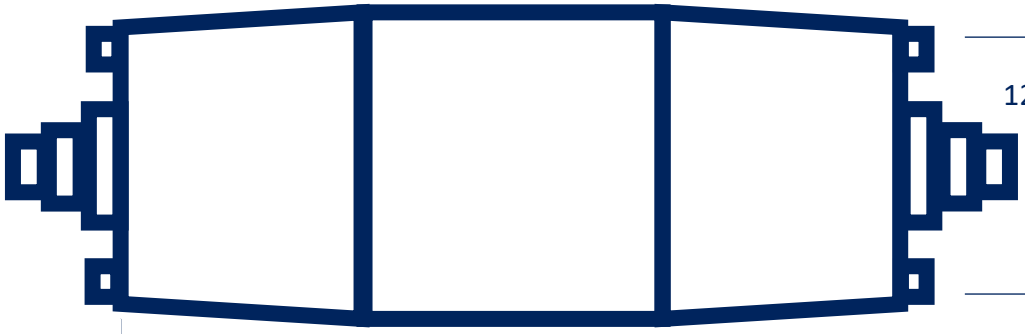
Cable	Size Range	Joint Type	Strip length
CNE Plastic	16 – 35mm^2	1ph Straight	200-300mm
SCNE Plastic	16 – 35mm^2	1ph Straight	200-300mm
PILC 2core	0.007 – 0.0.06"	1ph Transition Straight	400mm

Scale: n t s

Large 1ph Service Straight –Shell Kits

Drawn: PPH
Approved:

Appendix A – Outline Dimensions for large 1ph branch/3ph straight joint



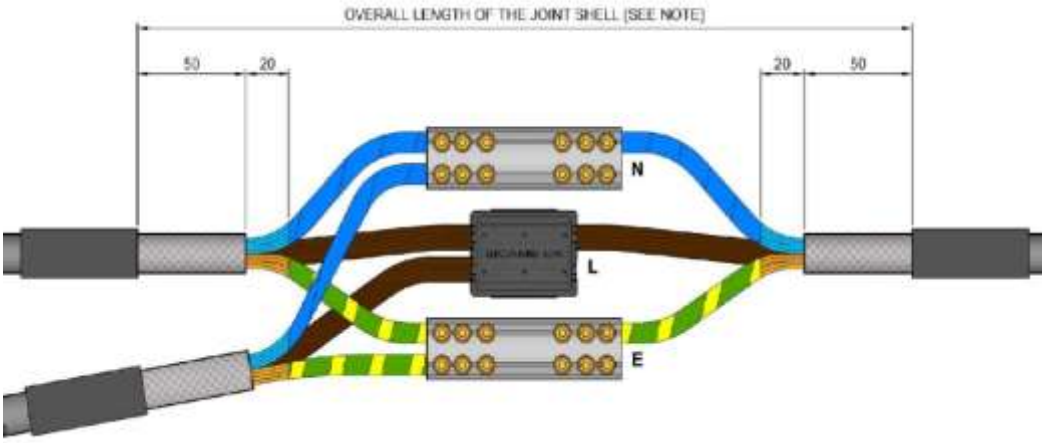
Stepped cable entry ports for range of cables as per table below

450mm

*Useful internal length

Shell to have one branch cable entry port located at each corner

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**



Cable	Size Range	Joint Type	Strip length
CNE Plastic	16 – 35mm²	1ph Branch	300mm
SCNE Plastic	16 – 35mm²	1ph Branch	300mm
PILC 2core	0.007 – 0.0.06"	1ph Transition Branch	300mm
CNE Plastic	25 – 35mm²	3ph Straight	300mm
SCNE Plastic	25 – 35mm²	3ph Straight	300mm
PILC 4 core	0.007 – 0.0.06"	3ph Transition Straight	300mm

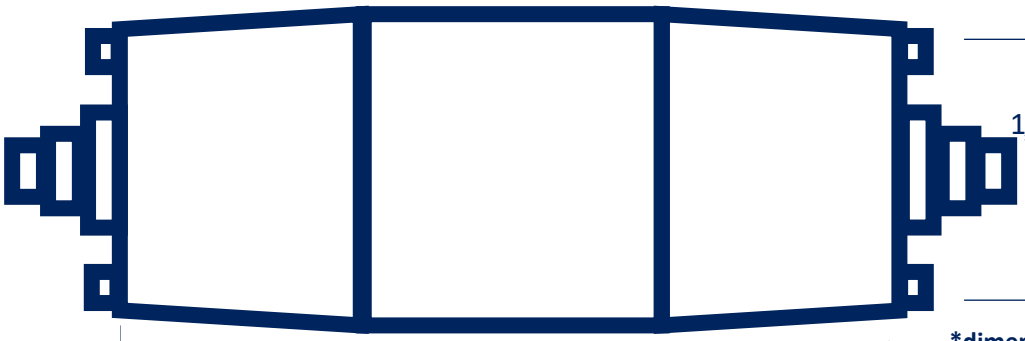
Scale: n t s

1ph Branch/3ph straight Shell Kit

Drawn: PPH
Approved:

Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for large 3ph branch straight joint



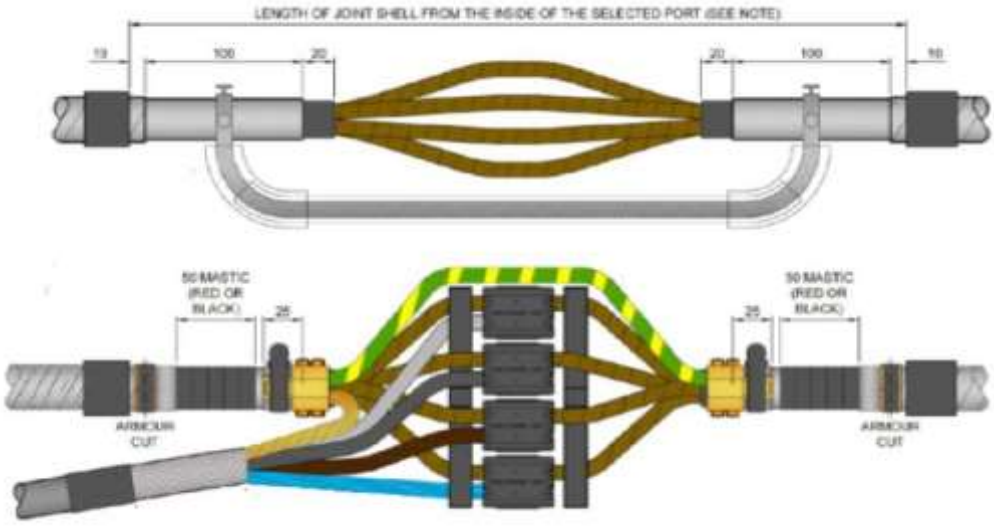
Stepped cable entry ports for range of cables as per table below

600mm

*Useful internal length

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**

Shell to have one branch cable entry port located at each corner



Cable	Size Range	Joint Type	Strip length
CNE Plastic	16 – 35mm²	3ph Branch	400mm
SCNE Plastic	16 – 35mm²	3ph Branch	400mm
PILC 4core	0.0225 – 0.0.06"	3ph Transition Branch	400mm

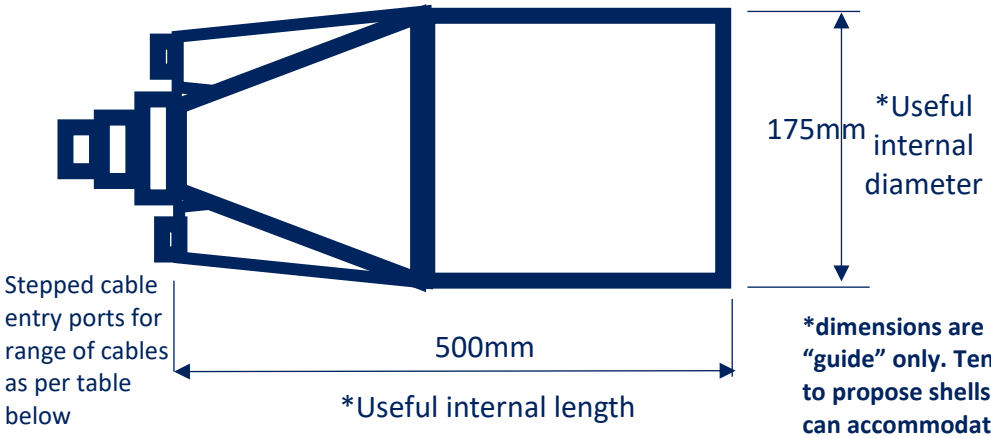
Scale: n.t.s

3ph Service Branch Shell Kit

Drawn: PPH
Approved:

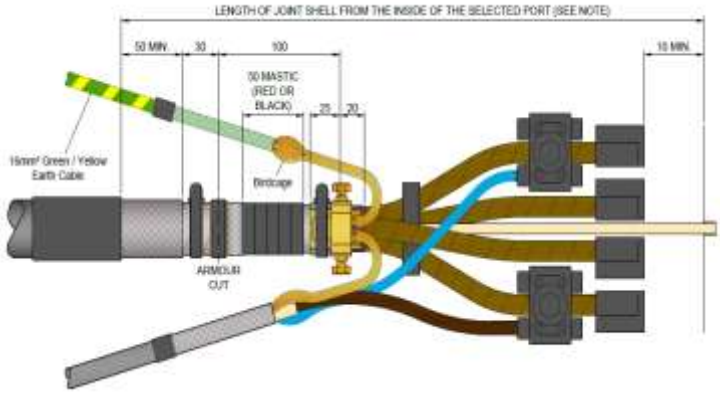
Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for Mains bottle end joint



***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**

Shell to have one branch cable entry port located at each corner



Cable	Size Range	Joint Type	Strip length
Waveform	95-300mm^2	Bottle End	-
Consac	95-300mm^2	Bottle End	-
PILC	0.06 – 0.5"	Bottle End	-

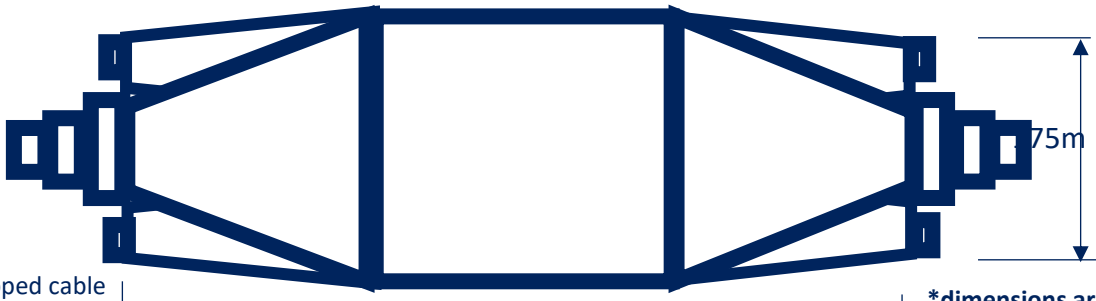
Scale: n.t.s

Mains Bottle End Shell Dimensions

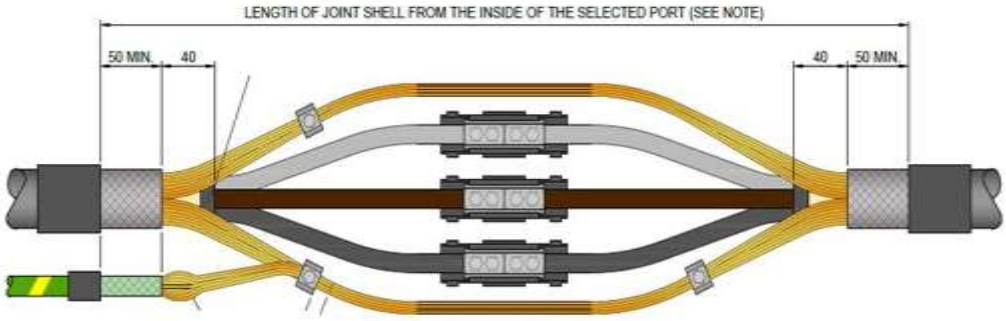
Drawn: PPH
Approved:

Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for small Mains straight joint



Shell to have one branch cable entry port located at each corner



Cable	Size Range	Joint Type	Strip length
Waveform	95mm^2	Straight	500mm
Waveform	95mm^2	Service from Mains	500mm

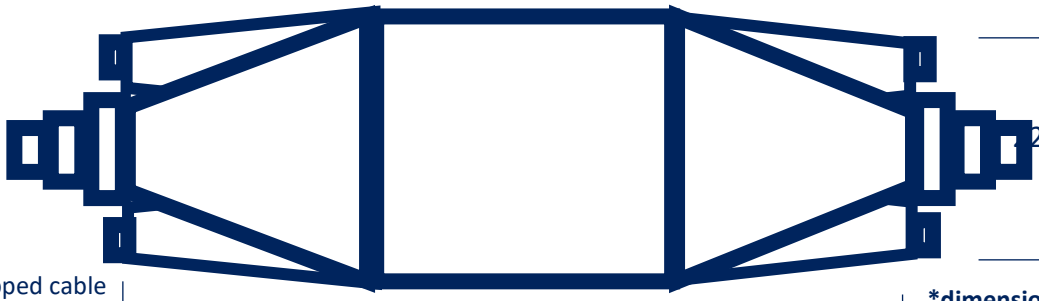
Scale: n.t.s

Small Mains Straight Shell Dimensions

Drawn: PPH
Approved:

Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for medium Mains straight joint



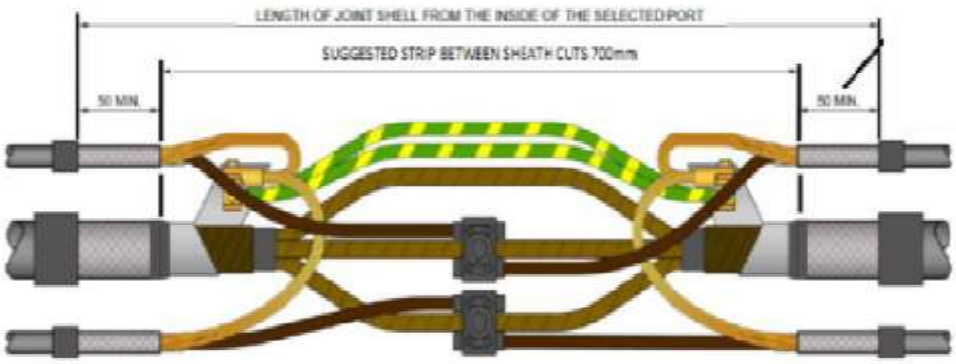
Stepped cable entry ports for range of cables as per table below

800mm

*Useful internal length

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**

Shell to have one branch cable entry port located at each corner



Cable	Size Range	Joint Type	Strip length
Waveform	185mm^2	Straight	600mm
Consac	95-185mm^2	Straight	700mm
PILC	0.06 – 0.3"	Straight Transition	700mm
Waveform	95-185mm^2	Service from Mains	600mm
Consac	95-185mm^2	Service from Mains	700mm

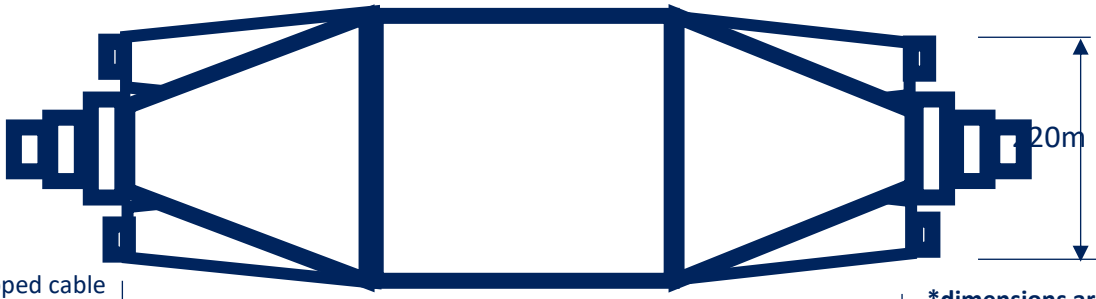
Scale: n.t.s

Medium Mains Straight Shell

Drawn: PPH
Approved:

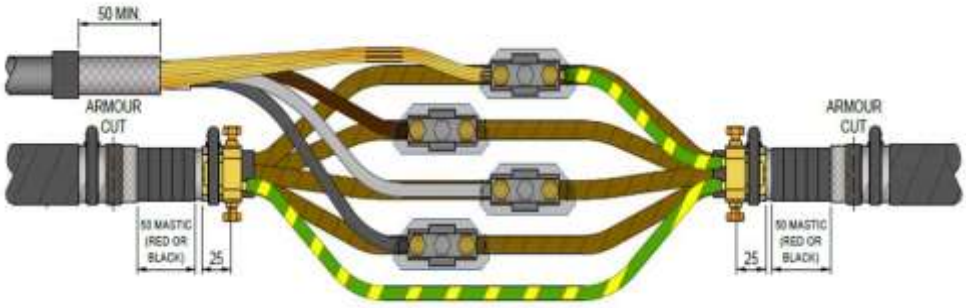
Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for large Mains straight joint



***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**

Shell to have one branch cable entry port located at each corner



Cable	Size Range	Joint Type	Strip length
Waveform	300mm^2	Straight	700mm
Consac	185-300mm^2	Straight	700mm
PILC	0.3 – 0.4"	Straight Transition	750mm
Waveform	185-300mm^2	Service from Mains	700mm
Consac	185-300mm^2	Service from Mains	750mm
PILC	0.06" – 0.5"	Service from Mains	750mm

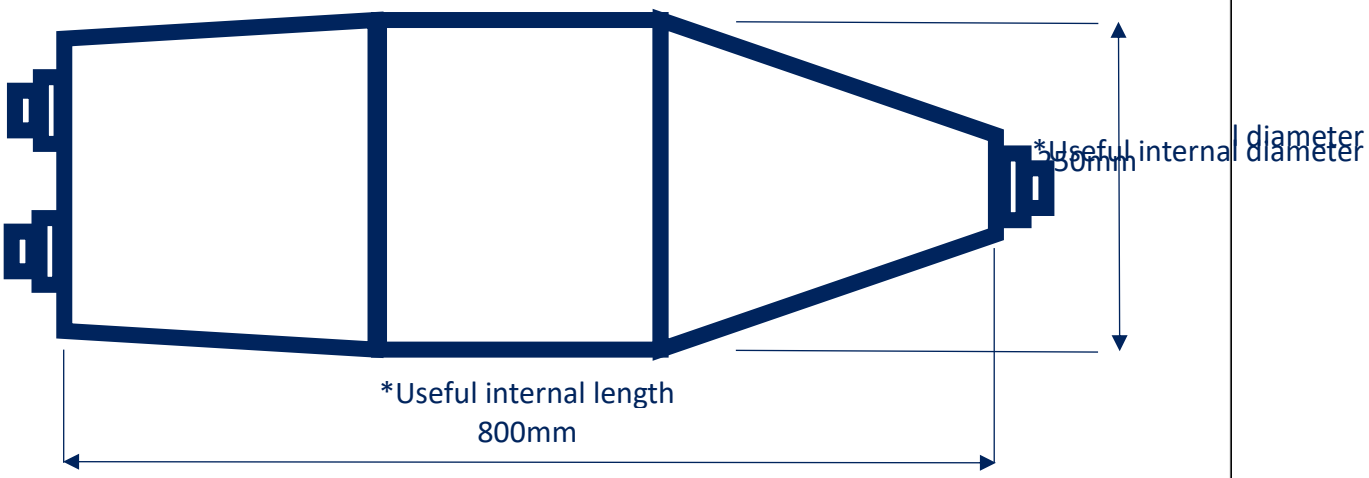
Scale: n.t.s

Large Mains Straight Shell Dimensions

Drawn: PPH
Approved:

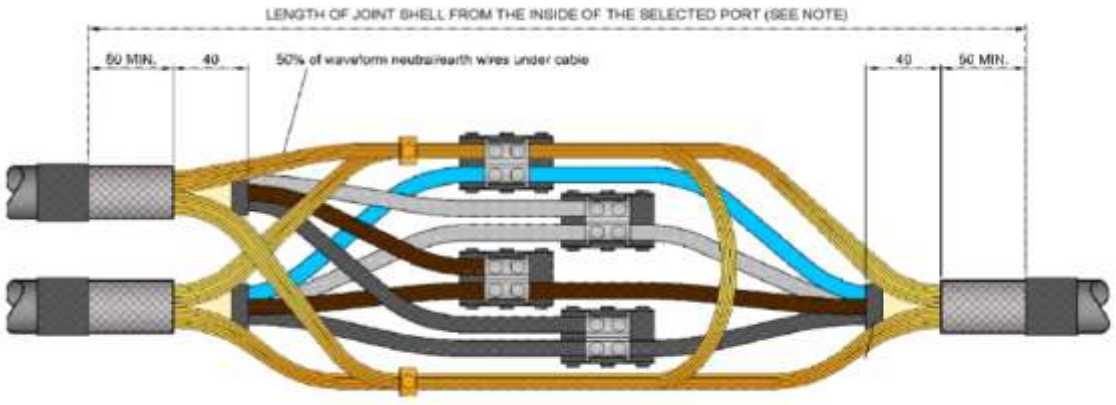
Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for small Mains Branch joint



Stepped cable entry ports for range of cables as per table below

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**



Cable	Size Range	Joint Type	Strip length
Waveform	95mm^2	Branch/Loop	700mm

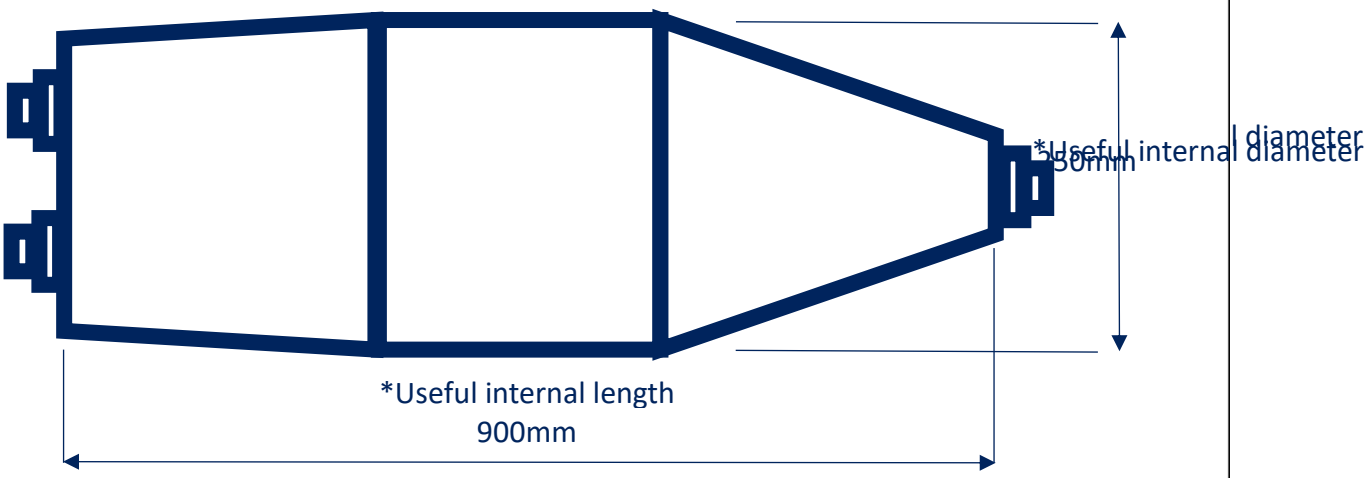
Scale: n.t.s

Small Mains Branch Shell Dimensions

Drawn: PPH
Approved:

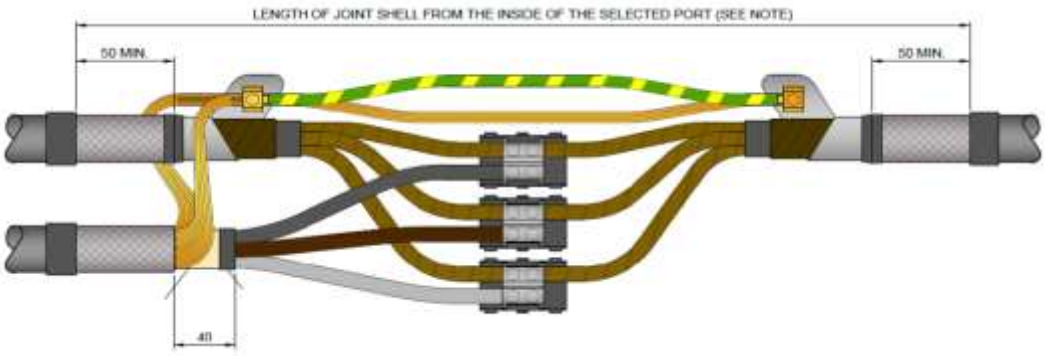
Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for medium Mains Branch joint



Stepped cable entry ports for range of cables as per table below

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**



Cable	Size Range	Joint Type	Strip length
Waveform	185mm^2	Branch/Loop	750mm
Concsac	95 – 185mm^2	Branch/Loop	750mm
PILC	0.06" – 0.15"	Branch/Loop	750mm

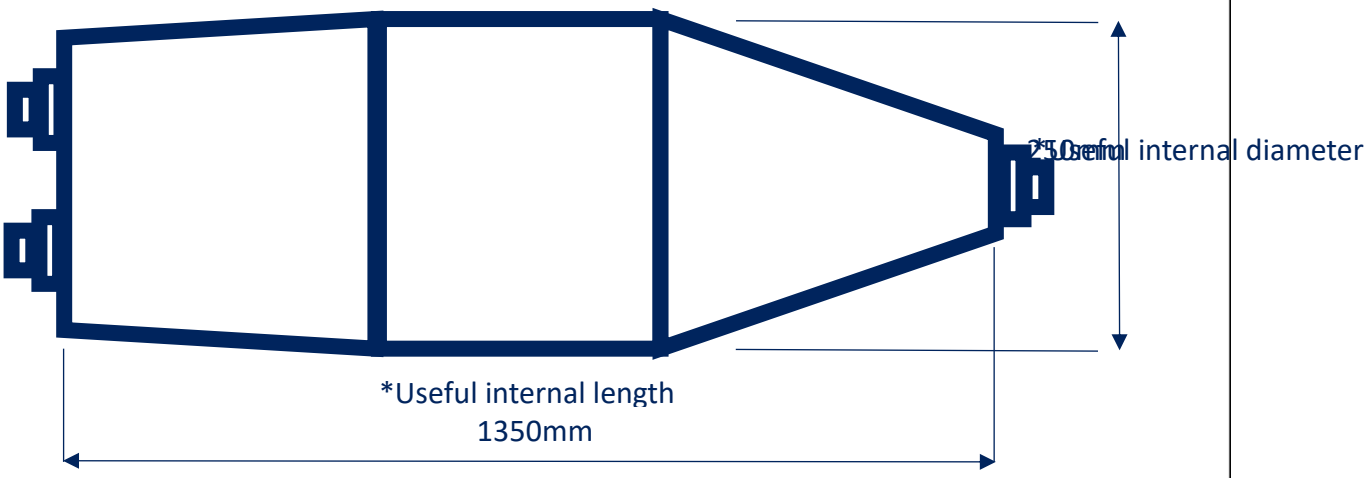
Scale: n.t.s

Medium Mains Branch Shell Dimensions

Drawn: PPH
Approved:

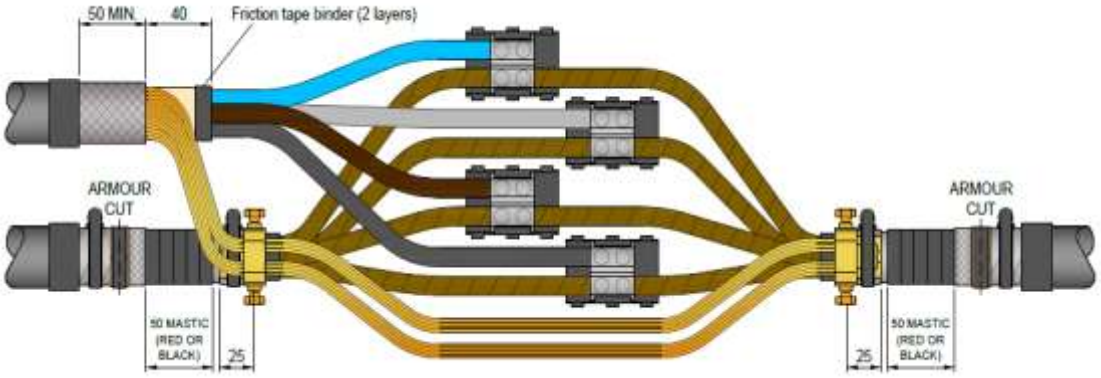
Drawing Number: ES400 J4 – D001

Appendix A – Outline Dimensions for Large Mains Branch joint



Stepped cable entry ports for range of cables as per table below

***dimensions are "guide" only. Tenderer to propose shells which can accommodate the range of cable sizes shown**



Cable	Size Range	Joint Type	Strip length
Waveform	300mm^2	Branch/Loop	1000mm
Concsac	185-300mm^2	Branch/Loop	1000mm
PILC	0.2 - 0.5"	Branch/Loop	1000mm

Scale: n.t.s

Large Mains Branch Shell Dimensions

Drawn: PPH
Approved:

Drawing Number: ES400 J4 – D001

Appendix B – Scope of Materials

The following equipment is currently approved for use on Electricity North West Network.
*The Shells kits in bold green are non preferred types and are subject to review to potentially remove.

ITEM NO	Shell Kits	Supplier	Supplier Reference	Commodity Code
1	S17 – Service Cable Bottle End Shell Kit for plastic cables	Sicame	51663-58	161032
2	S07 - Service Cable Bottle End Shell Kit for pilc cables	Sicame	51663-76	161203
3	S14 – Service Cable 1ph Straight Joint Shell Kit (Small)	Sicame	51663-61	161021
4*	S15 – Service Cable Straight Joint Shell Kit (Large)	Sicame	51663-60	161026
5	S16– Service Cable Straight Joint Shell Kit (Large)	Sicame	51663-59	161027
6*	MS26 - Service Cable 1ph Branch Joint Shell Kit	Sicame	51663-66	161023
8	MST27 - Service Cable 3ph Branch Joint Shell Kit	Sicame	51663-67	161035
9*	S11- Service Cable 3ph Branch Joint Shell Kit	Sicame	51663-65	161159
9	MS10 - Service Cable 3ph Branch Joint Shell Kit	Sicame	51662-58	161093
10	MST26– Small Mains Straight Joint Shell Kit	Sicame	51663-74	161204
11	MST14– Medium Mains Straight Joint Shell Kit	Sicame	51616-69	161155
12	MST15 – Large Mains Straight Joint Shell Kit	Sicame	51616-71	161156
13	MB12– Small Mains Branch Joint Shell Kit	Sicame	51628-24	161106
14	MB21– Medium Mains Branch Joint Shell Kit	Sicame	51663-62	161170
15	MB15 – Large Mains Branch Joint Shell Kit	Sicame	51663-63	161171
16*	MB03 – Mains Loop Joint Shell Kit	Sicame	51628-19	161107
17*	MB14- Mains Loop Joint Shell Kit	Sicame	51628-20	161154
18	MSE04 Mains Bottle End Shell Kit	Sicame	51628-21	161144
19*	Large Shell Kit for “oversize 0.5” cables”	Sicame	51608-43	366150

Appendix C – Conformance Declaration

SECTION-BY-SECTION CONFORMANCE WITH SPECIFICATION

The Tenderer shall declare conformance or otherwise for each product/service or range of products/services, section-by-section, using the following Conformance Declaration Codes.

Conformance Declaration Codes:

N/A =	Clause is not applicable/appropriate to the product/service.
C1 =	The product/service conforms fully with the requirements of this clause.
C2 =	The product/service conforms partially with the requirements of this clause.
C3 =	The product/service does not conform to the requirements of this clause.
C4 =	The product/service does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Manufacturer:

Product/Service Description:

Product/Service Reference:

Name:

Company:

Signature:

SECTION-BY-SECTION CONFORMANCE			
Section	**Section Topic**	**Conformance Declaration Code**	**Remarks * (must be completed if code is not C1)**
1	**Introduction**		
2	**Scope**		
4.1	**Product not to be Changed**		
4.2	**Electricity North West Technical Approval**		
4.3	**Quality Assurance**		
4.4	**Formulation**		
4.5	***Identification Markings***		
4.6	**Minimum Life Expectancy**		
4.7	**Product Conformity**		
4.8	**Confirmation of Conformance**		
5.1	**Requirements for Type Tests at the Supplier's Premises**		
5.2	**Requirement for Routine Tests at the Supplier's Premises**		
6.1	**General Requirements**		
6.2	**Cable Range Covered**		
6.3	**Compatibility**		
6.4	**Material Thickness**		

6.5	**Rigidity Test**		
6.6	**Environmental Stress Cracking Test**		
6.7	**Outline Dimensions for Shells**		
7	**Packaging**		
8	**Information to be supplied with Tender**		
9	**Samples**		
10	**Technical Support**		

* Applicable specifications shall be stated in the Remarks column where alternatives are quoted within a section. The Remarks column shall also be used to indicate cases where the products or services exceed the quoted specifications.