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Electricity Specification 400 S14

Issue 3 January 2022

Shorting and Storage Caps for Cable Ends

Amendment Summary

ISSUE NO. DATE	DESCRIPTION
Issue 3 **January 2022**	The new template for Engineering Specification Documents has been applied. Storage Caps, Transmission Cable and Pilot Cable Shorting kits added. 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, DSO Director

Contents

1 Introduction

This Specification covers the supply of cable shorting kits and storage caps for use on redundant, out of commission or non-commissioned cables 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 the material, construction and testing requirements for cable shorting kits and cable storage caps to be used on cables from LV up to 132 kV. The kits are designed for use on Dead cables to prevent moisture ingress (storage cap) , and also to prevent any accidental energisation of cables not in use by shorting out the metallic conductors and sheaths (shorting caps).

3 Definitions

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.
Specification	The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.
Shorting Cap	A device to seal end of a cut cable against moisture ingress and to prevent the cable becoming energised by shorting out all metallic conductors and sheaths such that an immediate short circuit would occur and activate protection on the circuit.
Storage Cap	A polymeric or elastomeric cap fitted over the end of a cut cable to seal against moisture ingress
Supplier	Any person or person's firm or company who supplies goods to Electricity North West or to its Contractor.
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.

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 25 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 B. 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 Cable Shorting Kits

6.1.1 General Requirements

Cable Shorting Kits shall provide a means to quickly "short out" all metallic conductors in cut cable ends and provide adequate sealing against ingress of moisture or other contaminants.
They shall be provided in kit form with all necessary components included.

The range of cable shorting cap kits covered by this specification are covered in the information given in Appendix A. The stated "recovered" dimensions for achieving the minimum cable diameter are critical; the expanded dimensions can be larger than those specified.

The end caps shall comply with ENA TS 09-11. The inside surface of the end caps shall be lined with hot-melt adhesive to ENA TS 09-11.

The heat shrink tubing shall be coloured green and shall have a minimum expanded length of 200mm long and shall comply with requirements for thin wall heat shrink tubing to ENA TS 09-11.

The nails shall be hardened steel clout nails to BS EN 10230-1 with dimensions shown in Appendix A

Note - Coldshrink alternatives may be offered for approval. However, in this case, kits shall be supplied with self-amalgamating waterproof tape (in place of adhesive). The tape shall be 500mm long and 20mm wide (minimum).

The tinned copper braid shall have the following dimensions (+5%, -0%):

- Minimum width of 12mm.
- Minimum length of 150mm.
- Minimum thickness of 1mm.
- Minimum cross-sectional area (CSA) of 6mm^2.
- Minimum diameter of individual wires of 0.15mm.
- Sufficient width, length and thickness (which may be greater than the minima specified above) to meet the requirements for continious current rating and short circuit withstand tests detailed below.

6.1.2 Continuous Current Rating of Tinned Copper Braid

- The tinned copper braid shall have a continuous current rating of 66 Amps in still air at an ambient temperature of 20ºC
- The temperature of the braid shall not exceed 76ºC when carrying the continious current rating.

6.1.3 Fault Current Withstand of Tinned Copper Braid

- The initial temperature at start of test shall be ambient at 20ºC
- The test shall be done in still air.
- A short circuit current shall be 600 Amps for 1 second shall be applied to the braid.
- Repeated tests of 600 Amps for 1 second shall be carried out when the braid has cooled to 70ºC.
- The braid shall be capable of withstanding six test cycles without any deleterious effects, i.e. cooling to 70ºC and then applying the short circuit current for 1 second again
- The temperature of the braid shall not exceed a maximum of 160ºC during any of the test cycles.

6.2 Cable Storage Caps

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6.2.1 Requirements

Cable Storage caps should provide adequate protection of cut cable ends against the ingress of moisture and contaminants for a range of cables up to 132 kV. They are for installation on Dead cables only.
The range of cable storage caps covered by this specification are covered in the information given in Appendix A. The stated “recovered” dimensions for achieving the minimum cable diameter are critical; the expanded dimensions can be larger than those specified.

6.2.2 Heat Shrink Caps

Heat shrink end caps shall comply with ENA TS 09-11. The inside surface of the end caps shall be lined with hot-melt adhesive to ENA TS 09-11.

6.2.3 Cold Applied Caps

The cold applied end caps shall be made from an elastomeric material that will protect the cable from moisture contamination and corrosion and shall be black in colour. The Tenderer shall provide details of the material at the time of tender.

Cold applied end caps expanded and loaded onto a removable core shall be preferred.
Other cold applied methods may be considered.

A reusable or recyclable removable core shall be preferred.

6.3 Product Marking and Labelling

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End caps used in Cable Shorting kits, or as storage caps shall be marked with the following information:

- Manufacturer's name
- The manufacturer's batch number (for quality assurance traceability)
- The expanded size and recovered size of the end cap in millimetres.
- Other information can also be provided optionally such as manufacturers part number , but there shall be no text or "live flash" marking included which may indicate a live cable end.

Green Heat Shrink tubing used in Cable Shorting kits should be marked with the following information

- The manufacturer's batch number (for quality assurance traceability)

The letters and figures shall consist of upright block characters and shall appear at least once in a prominent position. The size of the letters and numerals shall not be less than 15% of the nominal overall expanded diameter but in no case greater than 13mm.

The Tenderer shall state at the time of tender how the cable shorting kits and storage caps are packaged for delivery.
All packaging shall be sufficiently durable giving regard to the function, reasonable use and contents of the packaging.

Any packaging shall be labelled with the following information as a minimum:

- Manufacturers name
- Manufacturers Product code
- Electricity North West Commodity Code
- Expiry date of use, if applicable.
- A description of the contents.
- Minimum and maximum storage temperature.
- Any necessary hazard symbols required under COSHH Regulations

The Tenderer can also provide other optional information such as a QR-code or equivalent containing/allowing access to fitting instructions or data sheet. Details of these additional information shall be provided at time of Tender.

7 Samples

The Tenderer shall submit samples for approval during the tender as required by Electricity North West. Such samples shall remain the property of Electricity North West.

8 Documents Referenced

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

DOCUMENTS REFERENCED	
Health and Safety at Work Etc Act 1974.	
Control of Substances Hazardous to Health Regulations 2002.	
Manual Handling Operations Regulation 1992.	
BS EN ISO 9000	Quality management systems.
BS EN ISO 14001: 2004	Environmental Management Systems.
ENA TS 09-11	Heat Shrinkable Insulating Materials for use with 600/1000V Cables and Accessories
BS EN 10230-1	Steel Wire Nails Part 1: Loose Nails for General Applications
CP311	Approval Policy and Process

9 Keywords

Shorting, Storage, Cap , Sealing

Appendix A – Scope of Materials

The following equipment is currently approved for use on Electricity North West Network.

ITEM NO.		COMMODITY CODE
1	**Shorting kit MC1** for multi core cables with overall diameters between 30mm and 60mm	**163786**
2	**Shorting kit MC2** for multi core cables with overall diameters between 55mm and 80mm	**163787**
3	**Shorting kit SC3** for single core cables with overall diameters between 27mm and 49mm (set of three phase ends)	**163788**
4	**Shorting kit SC4** for single core cables with overall diameters between 41mm and 70mm (set of three phase ends)	**163789**
5	**Transmission Cable Shorting Kit TC5** for transmission cables with overall diameters between 70mm and 125mm (for single/three phase cable – one cap in kit)	**163800**
6	**HSL Shorting Kit** for HSL 3 core 33 kV cables only	**163801**
7	**Pilot Cables Shorting Kit PC1** For 7 to 61 pair copper telecom cables with overall diameters between 15mm and 40mm	**163812**
9	**Heat Shrink Storage Cap for Cable Diameters 8mm-18mm**	**163790**
10	**Heat Shrink Storage Cap for Cable Diameter 16mm-32mm**	**163791**
11	**Heat Shrink Storage Cap for Cable Diameter 33mm-60mm**	**163792**
12	**Heat Shrink Storage Cap for Cable Diameter 50mm-95mm**	**163793**
13	**Cold shrink Storage Cap for Cable Diameter 12mm-17mm**	**163794**
14	**Cold shrink Storage Cap for Cable Diameter 17mm-24mm**	**163795**
15	**Cold shrink Storage Cap for Cable Diameter 25mm-45mm**	**163796**
16	**Cold shrink Storage Cap for Cable Diameter 46mm-75mm**	**163797**

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For details on individual components in each shorting kit – refer to drawing no next page.

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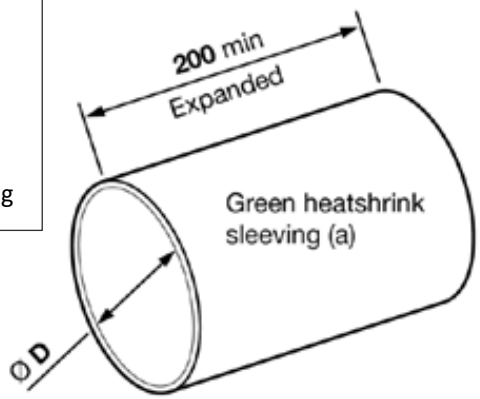
Commodity Code	Kit Ref.	Heat Shrink End Cap (Item (c)				Green Heat Shrink Sleeve Diameter (Item (a)		Quantity per kit				
		A (length)	B (Inner Diameter)		C adhesive depth			(a)	(b)	(c)	(d)	(e)
		Recovered (min.)	Expanded	Recovered (min.)	min.	Expanded	Recovered (min.)					
		+ /- 5mm	+ /- 5mm	mm	mm	mm	mm					
163786	MC1	150	65	30	50	80	40	1	1	1	6	0
163787	MC2	160	105	45	80	100	50	1	1	1	6	0
163788	SC3	150	55	25	80	50	25	3	3	3	0	12
163789	SC4	150	75	35	80	80	40	3	3	3	0	12
163800	TC5	160	150	75	80	150	75	1	1	1	7	0
163801	HSL	150	75	35	80	80	40	3	3	3*	8	0
163812	PC1	150	60	25	50	80	40	1	1	0	3	0

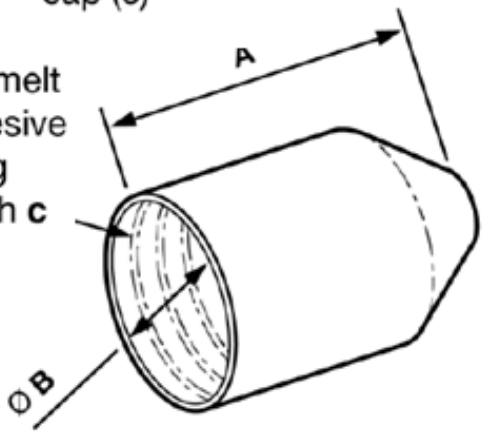
***Note :**
Kit HSL copper braids should be min. 400mm long
Kit HSL also requires additional components:

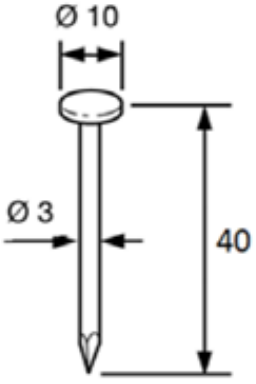
- 3 x Constant Force Spring 25mm diameter
- 1 x Stainless Steel worm drive lamp 75-125mm dia.
- 1 x Heat Shrink 3 core breakout boot 170/60
- 1 x Tinned Copper mesh 50mm wide a 1000mm long
- 3 x Mastic Sealing Strip 25mm wide x 150mm long



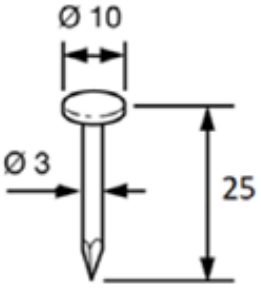
Tinned copper braid (b)

Plastic end cap (c)





NAIL (d)



NAIL (e)

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Scale: n.t.s

Details of Cable Shorting Kits

Drawn: PPH
Approved:

Drawing Number: ES400 S14 – D001

Appendix B – 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**		
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6.1.2	**Continuous Current Rating of Tinned Copper Braid**		
6.1.3	**Fault Current Withstand of Copper Braid**		
6.2.1	**Requirements**		

6.2.2	**Heat Shrink Storage Caps**		
6.2.3	**Cold Applied Storage Caps**		
6.3	**Product marking and Labelling**		

* 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.

Notes :