NPS/002/010 – Technical Specification for Jointing Sundries

1. Purpose

The purpose of this document is to detail the specific technical requirements for miscellaneous jointing materials utilised on the distribution networks of Northern Powergrid (The Company).

This document supersedes the following documents, all copies of which should be destroyed.

Document Reference	Document Title	Version	Published Date
NPS/002/010	Technical Specification for Jointing Sundries	5.1	October 2019

2. Scope

This document describes Northern Powergrid requirements for a range of jointing and miscellaneous items for use on the companies' distribution network.

- Cable end caps
- Cable end shorting caps
- Wraparound repair sleeves
- Thin wall heatshrink tubing
- Heavy wall heatshrink tubing
- Cable breakouts
- Transformer LV insulating shrouds
- Single core cable box entry glands
- Cable ties
- Solders and fluxes
- Miscellaneous items

The following appendices form part of this technical specification:-

- Appendix 1 – Product Requirements
- Appendix 2 – Logistical Requirements
- Appendix 3 – Addendum to Supplier Requirements
- Appendix 4 - Technical Information Check List

2.1. Contents

3. Requirements

3.1. Cable End Caps

A range of heat shrink and / or cold shrink end caps used to seal the ends of plastic and paper insulated cables from moisture, dirt and corrosion.

Heat or cold shrink end caps shall be coated with hot melt adhesive or a suitable sealing medium respectively, which shall form an effective seal onto the cable sheath during installation.

The range of cables sizes for which end caps are required are detailed in Appendix 1 (3.1).

3.2. Cable End Shorting Caps

A range of heat shrink and / or cold shrink cable end shorting caps are required which will allow the conductors of abandoned or newly installed/pre-commissioned 3 - phase lv cables to be shorted together and connected to earth.

Each kit shall comprise of a quantity of nails (or similar), a shorting device (i.e. a small strip of copper braid or equivalent) and a heat shrink and / or cold shrink end cap. To distinguish this arrangement from other end caps the kit shall also include a 200mm (min) GREEN heatshrink or cold shrink tube.

There is also a requirement for a kit suitable for single core XLPE cables; each kit should contain all the components necessary for one core.

The range of cables sizes for which shorting caps are required are detailed in Appendix 1 (3.2).

3.3. Wraparound Repair Sleeves

Utilized to affect a permanent repair on the damaged sheath of an installed cable where it would not be possible to install a tubular sleeve.

The inner wall of the wraparound sleeve shall be coated with a hot melt adhesive. When heated the sleeve shall shrink and the adhesive shall melt, providing an insulating and a permanent moisture seal around the cable sheath. The shrink ratio shall be printed on the outer sleeve.

The range of cables sizes for which sheath repair wraparounds are required are detailed in Appendix 1 (3.3).

3.4. Thin Wall Heatshrink Tubing

A flexible cross-linked, UV resistant, polyolefin thin-walled heat-shrinkable tubing utilized for insulating and sealing low-voltage accessories and power cables. The tubing shall conform to ENATS 09-11 and have a shrink ratio 3:1, which shall be printed on the outside of the tube.

The range of sizes and colours is detailed in Appendix 1 (3.4).

3.5. Heavy Wall Heatshrink Tubing

A flexible cross-linked, UV resistant, polyolefin heavy walled heat-shrinkable tubing utilized for insulating and sealing low-voltage accessories and power cables. The tubing shall conform to ENATS 09-11 and have a shrink ratio 3:1 which shall be printed on the outside of the tube.

The range of sizes is detailed in Appendix 1 (3.5).

3.6. Cable Breakouts

A range of heat shrink and / or cold shrink cable breakouts required to seal the crutch of plastic or paper-insulated cables. Heat-shrink breakouts shall be coated with a hot melt adhesive which shall seal onto the cable sheath and core insulation during insulation. Cold shrink breakouts shall contain a suitable sealing medium, to seal onto the cable sheath and core insulation. The shrink ratio is to be printed on the outside of the breakout.

The range of sizes and types is detailed in Appendix 1 (3.6).

3.7. Transformer LV Insulating Shrouds

An insulating shroud moulded in a thermos-plastic or similar material shall be a one-piece snap-on fit designed to fit a transformer low voltage terminal bushing (see BS 2562: 1979, fig 16 for typical arrangement). The shroud shall be suitable to accommodate up to 2 single 4-holed palm mechanical lugs (side by side), with tapered cable outlets which can be cut to suit the different diameters of cables to be used.

3.8. Single Core Cable Box Entry Glands

a) A nylon type stuffing gland with a heatshrink cable entry seal for use on unarmoured single core cables.

b) PVC cable stuffing gland to connect incoming cable to an item of equipment; a rubber seal or similar shall be incorporated into the gland to protect the incoming cable. A suitable locking washer shall also be supplied with the gland

The cable range is detailed in Appendix 1 (3.8)

3.9. Cable Ties

Cable ties shall be medium duty, UV stable and manufactured in a Polyamide 6.6 or Nylon type material.

The range of sizes and colours is detailed in Appendix 1 (3.10)

3.10. Solders and Fluxes

A range of solders and fluxes as detailed: -

a) Abrasion solder – Tinning of Aluminium sheaths and solid conductors

b) Grade ‘H’ solder – for Aluminium sheath plumbing

c) Grade ‘D’ solder – for lead Sheath plumbing

d) Grade ‘G’ multi cored solder 40/60 16 SWG

e) Flux for stranded copper conductors

f) Tallow – Cooling of lead plumbs/lubrication

For items a – e the grade letters shall be endorsed during the moulding process at each end and the middle of the bar. Solders shall comply with the requirements of BS EN ISO 9453:2020 or equivalent.

Further product information is detailed in Appendix 1 (3.11)

3.11. Miscellaneous Items

- Thread Impregnated, flax lacing 6C USL waxed 250G package.
- 16SWG tinned copper wire x 0.4Kg reel.
- 18SWG tinned copper wire x 0.4Kg reel.

Further product information is detailed in Appendix 1 (3.12)

4. References

4.1. External Documentation

The products described within this specification shall comply with the latest versions of the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of supply.

Reference	Title
ENATS 09-11	Heat shrink insulating materials for use with 600/1000V cable and accessories.
BS EN ISO 9453:2020	Soft solder alloys. Chemical compositions and forms.
BS 2562: 1979	Cable boxes for Transformers and Rectors
BS HD 60269-2:2013+A1:2022, BS 88:2:2013+A1:2022	Low-voltage fuses. Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)- Examples of standardized systems of fuses A to K

4.2. Internal Documentation

Reference	Title
None	

4.3. Amendments from Previous Version

Clause	Amendments
3.11 Solders and Fluxes	Remove 'M' grade solder
3.12 Miscellaneous Items	Remove Penatrox 'A' compound bottle
4.1 External Documentation	Update standard specification version dates
6. Authority for Issue	Update Author, Technical Assurance, Authorisattion
Appendix 1 – Product Requirements	Remove: • 265526 - A5 - Cold Shrink Cable End Cap for Cable Diameter 26 – 50mm • 265527 - A6 - Cold Shrink Cable End Cap for Cable Diameter 45 – 85mm • 170095 - C2 - Sleeve, Wraparound, Heat Shrink for Cable Dia 50 x 1000mm Long • 083329 – E2 - Heavy Walled Sleeving 30mm Dia x 1000mm Long • 171026 – E5 - Tubing, Heavy Wall, to suit diameter 49mm - 1000mm Long • 082834 – F4 -Breakout, 4 Finger Heat Shrink for Cable in Range 35 –95mm^2 • 082867 – F5 - Breakout, 4 Finger Heat Shrink for Cable in Range 120 – 300mm^2 • 104760 – J1 - Cable Tie Red 100mm x 2.5mm (Pack of 100) • 104761 – J2 - Cable Tie Natural: 100mm x 2.5mm (Pack of 100) • 061820 – K4 - Solder Copper Cond Grade M • 361295 – L4 - Compound Penetrox A (Plastic Bottle)

5. Definitions

Term	Definition
The Company	Northern Powergrid

6. Authority for issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document, and I am satisfied with its content and submit it for approval and authorisation.

		Date
Eve Fawcett	Governance Administrator	18/11/2024

6.2. Author

I sign to confirm that I have completed and checked this document, and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period.

Standard CDS review of 3 years?	Non-Standard Review Period & Reason	
No	**Period:** 5 Years	**Reason:** Update will be dictated by contract renewal date or any significant changes in the specification or documents referenced.
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Paul Hanrahan	Engineer – Asset Management	18/11/2024

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Steven Salkeld	Policy & Standards Engineer	18/11/2024
Aaron Chung	Policy & Standards Engineer	18/11/2024

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	27/11/2024

Appendix 1 – Product Requirements

Spec Ref	Item No	Requirements	Commodity code
Cable End Caps (Typical cable range)			
3.1	A1	Heatshrink Cable Cap End Shrink Ratio 20-6	163458
	A2	Heatshrink Cable End Cap Shrink Ratio 40-15	082123
	A3	Heatshrink Cable End Cap Shrink Ratio 63-24	082081
	A4	Heatshrink Cable End Cap Shrink Ratio 106-45	082198
Cable End Shorting Caps			
3.2	B1	Cable end shorting kit for Cable Diameter 15-30mm	163770
	B2	Cable end shorting kit for cable diameter 25-50mm	163774
	B3	Cable end shorting kit for Cable Diameter 45-95mm	163776
	For Single Core XLPE Type Cables		
	B4	Cable End Shorting Kit: For 95mm Triplex Cables	163766
	B5	Cable End Shorting Kit: 185 - 300mm Triplex Cables.	163768
Wraparound Repair Sleeves (Typical range)			
3.3	C1	Sleeve, Wraparound, Heat Shrink for Cable Dia 10mm - 35mm x 1000mm Long	170269
	C3	Sleeve, Wraparound, Heat Shrink for Cable Dia 40mm - 140mm x 1000mm Long	170108
Thin Wall Heatshrink Tubing (Typical range)			
3.4	D1	Polyolefin Tubing 25mm Dia Black	083048
	D2	Polyolefin Tubing 25mm Dia Blue	083113
	D3	Polyolefin Tubing 25mm Dia Yellow	083121
	D4	Polyolefin Tubing 25mm Dia Red	083139
	D5	Tube: Heatshrink: 19mm Dia: Black: To Fit Earth Wires 35-50mm	160002
	D6	Polyolefin Tubing 12.7mm Dia Black	083063
	D7	Black Tube 9mm-3mm x 1M Suitable for twist and tipping in pilot and telephone joints	171632
Heavy Wall Heatshrink Tubing (Typical range)			
3.5	E1	Heavy Walled Sleeving 48mm Dia x 300mm Long	083345
	E3	Heavy Walled Sleeving 30mm Dia x 300mm Long	083352
	E4	Heavy Walled Sleeving 20mm Dia x 250mm Long	083311
Cable Breakouts (Typical cable range)			
3.6	F1	Breakout 2 Finger Heatshrink for Cable in Range 25-35 mm^2	082321
	F2	Breakout 3 Finger Heatshrink for Cable in Range 4-25 mm^2	082339
	F3	Breakout, 3 Finger Heat Shrink for Cable in Range 95 – 300mm^2	162949
Transformer LV Insulating Shrouds			
3.7	G1	Shroud for Transformer Low Voltage Bushing. Suitable for Double or Single Cable Take-off's. Manufacturers Reference 07 - 131	162239
Single Core Cable Box Entry Glands			
3.8	H1	Cable Gland: Heatshrink for Single Core 19 - 40mm Dia Cables: (Pack of 3)	356848
	H2	Cable Gland; Heatshrink; for Single Core 36mm - 65mm Dia Cables. (Pack of 3)	058958
	H3	Nylon Stuffing Gland for cable in range 7mm - 13mm dia	356807
Cable Ties (Typical sizes)			

Spec Ref	Item No	Requirements	Commodity code
	J3	Cable Tie Natural: 200mm x 4.8mm (Pack of 100)	104762
	J4	Cable Tie Natural: 300mm x 4.6mm (Pack of 100)	104763
	J5	Cable Tie Black: 100mm x 2.5mm (Pack of 100)	354094
	J6	Cable Tie Black: 200mm x 4.6mm (Pack of 100)	354111
	J7	Cable Tie Black: 300mm x 4.6mm (Pack of 100)	354126
Solders and Fluxes			
3.11	K1	Abrasive Solder - 65% Tin, 35% Zinc Normal Weight 0.2Kg	061754
	K2	Plumbing Metal Grade H	061234
	K3	Grade 'D' Plumbing Metal in Cartons Containing 50 X 0.5kg	330117
	K5	Multi Cored Solder Grade G 40/60 16SWG. 500gm Spools	339450
	K6	Fluxite Jointing Flux for copper cables. supplied in 100gram Tins	355025
	K7	Jointing Tallow	299370
Miscellaneous Items			
3.12	L1	Thread Impregnated: Flax Lacing 6C USL Waxed No1 Packaged 250G COPS	089912
	L2	Wire Fuse Tinned Cu 16 Swg (On 0.4kg Reels)	366674
	L3	Wire Fuse Tinned Cu 18 Swg (On 0.4kg Reels)	366689

Supporting evidence of compliance with type tests shall be submitted with the completed tender document.

Manufacturers may provide alternative tenders for items not complying with the above specification. This shall be clearly stated together with detailed descriptions of any variation from the specification, together with drawings and test results.

The supplier shall provide with the tender full technical details of the equipment offered and shall indicate any divergence from these standards or specifications.

Appendix 2 – Logistical Requirements

To enable the Company to store the product(s) in accordance with the manufacturer's recommendations the Tenderer should provide details of the recommended storage environment with respect to each tendered product.

Details should be provided where relevant in respect to the minimum and maximum exposure levels, frequency of exposure and duration of exposure of the packaged item with respect to;

- Ambient temperature
- Atmospheric corrosion
- Humidity
- Impact
- Water
- Vibration
- Dust
- Solar radiation

The Tenderer shall ensure that each item is suitably packaged and protection to maintain the product and packaging as "fit for service" prior to installation taking account of the potential for an outdoor storage environment. All packaging shall be sufficiently durable giving regard to the function, reasonable use and contents of the packaging. Where product packages tendered are made up of sub packages all the sub packages shall unless varied by this specification, be supplied securely packaged together. Where items are provided in bagged/boxed form the material from which the bags are manufactured shall be capable of sustaining the package weight and resisting puncture by the materials within. Tenderer shall submit at the time of tendering the details of the proposed packaging (i.e. materials composition and structure) to be used for each product. Where the Tenderer is unable to provide packaging suitable for outdoor storage then this should be stated at the time of tender.

Palletised goods shall be supplied on standard 1200mm x 1000mm pallets.

Clearly legible, easily identifiable, durable and unambiguous labelling shall be applied to each individual and where relevant multiple packages of like products. Where products packages tendered are made up of sub packages each sub packages shall be marked. As a minimum requirement the following shall be included;

- Manufacturer's trademark or name
- Supplier's trademark or name
- Description of item
- Date of packaging and/or batch number
- Northern Powergrid product code
- Weight
- Shelf Life

Tenderer shall submit at the time of tendering a sample of the proposed labelling for each product package type.

Appendix 3 – Addendum to Supplier Requirements

Supporting evidence of compliance with type tests shall be submitted with the completed tender document.

Manufacturers may provide alternative tenders for items not complying with the above specification. This shall be clearly stated together with detailed descriptions of any variation from the specification, together with drawings and test results.

The supplier shall provide with the tender full technical details of the equipment offered and shall indicate any divergence from these standards or specifications.

Appendix 4 - Technical Information Check List

Where appropriate the following information shall be provided by the supplier for technical review by the Company. Additional information shall be provided if requested.

Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Complete set of drawings for each variant	
Type test evidence	
Quality Plan	
Pre-commissioning testing/inspection requirements	
Recommended periodical inspection and maintenance requirements	
Packaging/delivery information	
Recommended Storage Requirements (Refer to appendix 2)	
ISO:9001, ISO:14001 and ISO:18001 certificates	