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<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 1	<b>of</b> 12

# 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	5.0	August 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
- Fuse carriers
- 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

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 2	<b>of</b> 12

## 2.1. Contents

<b>1. Purpose</b> .....	<b>1</b>
<b>2. Scope</b> .....	<b>1</b>
2.1. Contents.....	2
<b>3. Requirements</b> .....	<b>3</b>
3.1. Cable End Caps.....	3
3.2. Cable End Shorting Caps .....	3
3.3. Wraparound Repair Sleeves.....	3
3.4. Thin Wall Heatshrink Tubing .....	3
3.5. Heavy Wall Heatshrink Tubing .....	3
3.6. Cable Breakouts .....	3
3.7. Transformer LV Insulating Shrouds.....	4
3.8. Single Core Cable Box Entry Glands .....	4
3.9. Fuse Carriers .....	4
3.10. Cable Ties .....	4
3.11. Solders and Fluxes.....	4
3.12. Miscellaneous Items .....	4
<b>4. References</b> .....	<b>5</b>
4.1. External Documentation .....	5
4.2. Internal Documentation.....	5
4.3. Amendments from Previous Version .....	5
<b>5. Definitions</b> .....	<b>6</b>
<b>6. Authority for issue</b> .....	<b>7</b>
6.1. CDS Assurance.....	7
6.2. Author .....	7
6.3. Technical Assurance.....	7
6.4. Authorisation .....	7
<b>Appendix 1 – Product Requirements</b> .....	<b>8</b>
<b>Appendix 2 – Logistical Requirements</b> .....	<b>10</b>
<b>Appendix 3 – Addendum to Supplier Requirements</b> .....	<b>11</b>
<b>Appendix 4 - Technical Information Check List</b> .....	<b>12</b>

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 3	<b>of</b> 12

### 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 Iv 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).

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 4	<b>of</b> 12

### 3.7. Transformer LV Insulating Shrouds

An insulating shroud moulded in a thermo 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. Fuse Carriers

The fuse carrier shall be capable of accepting BS HD 60269-2 and BS88-2 “J” type 82mm centre fuses. The carrier shall be manufactured in glass reinforced polyester or a similar material and the operation shall be by wedge tightening thumb screws.

Further product information is detailed in Appendix 1 (3.9)

### 3.10. 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)

### 3.11. 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 ‘M’ solder – for Copper conductors
- e) Grade ‘G’ multi cored solder 40/60 16 SWG
- f) Flux for stranded copper conductors
- g) 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 9453:2014 or equivalent.

Further product information is detailed in Appendix 1 (3.11)

### 3.12. 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.
- Penetrox “A” compound (bottle).

Further product information is detailed in Appendix 1 (3.12)

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 5	<b>of</b> 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 9453:2014	Soft solder alloys. Chemical compositions and forms.
BS 2562: 1979	Cable boxes for Transformers and Rectors
BS HD 60269-2 & BS 88:2 – 2013	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
3.7 Cable Crutch Seal	Section removed as product in question has been removed from use due to inadequate performance creating potential safety implications
4.1 External Documentation	Section updated with latest documentation.
Appendix 1- Product Requirements	<p>Items <b>added</b> to this specification as part of this update:</p> <ul style="list-style-type: none"> <li># 265526 - Cold Shrink Cable End Cap: Size 3: Ref EC3</li> <li># 265527 - Cold Shrink Cable End Cap: Size 4: Ref EC4</li> <li># 171026 - Tubing, Heavy Wall, to suit diameter 49mm - 1000mm Long</li> <li># 171632 - Black Tube 9mm-3mm x 1M Suitable for twist and tipping in pilot and telephone joints</li> <li># 354094 - Cable Tie Black: 100mm x 2.5mm (Pack of 100)</li> <li># 354111 - Cable Tie Black: 200mm x 4.6mm (Pack of 100)</li> <li># 354126 - Cable Tie Black: 300mm x 4.6mm (Pack of 100)</li> </ul> <p>Items <b>removed</b> as part of this update:</p> <ul style="list-style-type: none"> <li># 365436 - A non-heatshrink "Y" piece PVC crutch seal (see 3.7 in this table)</li> <li># 330121- Soft Solder For Aluminium In Cartons Containing 40 X 0.25kg Bars</li> <li># 080531 - Flux Alum 250CC Alusol Eutectic \$</li> <li># 168682 - Antimonial Lead Wire 2.8mm</li> <li># 366693 - Wire Fuse Tinned Cu 20 Swg (On 0.4kg Reels)</li> </ul> <p>Items <b>replaced</b> resulting in commodity code change as part of this update:</p> <ul style="list-style-type: none"> <li># Cable Tie Red 100mm x 2.5mm (Pack of 100). 299297 replaced with 104760</li> <li># Cable Tie Natural: 200mm x 4.8mm (Pack of 100). 104745 replaced with 104762</li> <li># Cable Tie: Natural: 300mm x 4.6mm (Pack of 100). 104729 replaced with 104763</li> <li># Compound Sealing Putty Bicaseal Ref No F70612-52. 089201 replaced with 351931</li> </ul> <p>Items <b>identified as duplicates</b> as part of this update:</p> <ul style="list-style-type: none"> <li># Cable Tie Natural; 100mm x 2.5mm (Packs of 100). Duplicates were 104711 and</li> </ul>

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 6	<b>of</b> 12

Clause	Amendments
	104761. 104711 now removed.  Items <b>moved</b> to another technical specification: # 351931 - Compound Sealing Putty Bicaseal Ref No F70612-52. Moved to NPS/002/002 – Technical Specification for Industrial and Insulating Tapes and Mastic Compounds.
Appendix 2 – Logistical Requirement	Section updated to represent latest requirements.
Appendix 3 – Addendum to Supplier Requirements	Section updated to represent latest requirements.
Appendix 4 – Technical Information Check List	Section updated to represent latest requirements.

## 5. Definitions

Term	Definition
None	

<b>Document Reference:-</b>	NPS/002/010	<b>Document Type:-</b>	Code of Practice				
<b>Version:-</b>	5.1	<b>Date of Issue:-</b>	October 2019	<b>Page</b>	7	<b>of</b>	12

## 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.

		<b>Date</b>
Dan Rodrigues	Governance Analyst	Dan Rodrigues

### 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.

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

		<b>Date</b>
Paul Hollowood	Policy & Standards Engineer	Paul Hollowood

### 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.

		<b>Date</b>
Steven Salkeld	Policy & Standards Engineer	Steven Salkeld
Mick Emsley	Senior Policy & Standards Engineer	Mick Emsley

### 6.4. Authorisation

Authorisation is granted for publication of this document.

		<b>Date</b>
Greg Farrell	Head of System Strategy	Greg Farrell

<b>Document Reference:-</b>	NPS/002/010	<b>Document Type:-</b>	Code of Practice				
<b>Version:-</b>	5.1	<b>Date of Issue:-</b>	October 2019	<b>Page</b>	8	<b>of</b>	12

## Appendix 1 – Product Requirements

Spec Ref	Item No	Requirements	Commodity code	
<b>Cable End Caps (Typical cable range)</b>				
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	
	A5	Cold Shrink Cable End Cap for Cable Diameter 26 – 50mm	265526	
	A6	Cold Shrink Cable End Cap for Cable Diameter 45 – 85mm	265527	
<b>Cable End Shorting Caps</b>				
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	
	<b>For Single Core XLPE Type Cables</b>			
	B4	Cable End Shorting Kit: For 95mm Triplex Cables	163766	
	B5	Cable End Shorting Kit: 185 - 300mm Triplex Cables.	163768	
<b>Wraparound Repair Sleeves (Typical range)</b>				
3.3	C1	Sleeve, Wraparound, Heat Shrink For Cable Dia 10mm - 35mm x 1000mm Long	170269	
	C2	Sleeve, Wraparound, Heat Shrink, For Cable Dia 25mm - 50mm x 1000mm Long	170095	
	C3	Sleeve, Wraparound, Heat Shrink For Cable Dia 40mm - 140mm x 1000mm Long	170108	
<b>Thin Wall Heatshrink Tubing (Typical range)</b>				
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	
<b>Heavy Wall Heatshrink Tubing (Typical range)</b>				
3.5	E1	Heavy Walled Sleeving 48mm Dia x 300mm Long	083345	
	E2	Heavy Walled Sleeving 30mm Dia x 1000mm Long	083329	
	E3	Heavy Walled Sleeving 30mm Dia x 300mm Long	083352	
	E4	Heavy Walled Sleeving 20mm Dia x 250mm Long	083311	
	E5	Tubing, Heavy Wall, to suit diameter 49mm - 1000mm Long	171026	
<b>Cable Breakouts (Typical cable range)</b>				
3.6	F1	Breakout 2 Finger Heatshrink for Cable in Range 25-35 mm <sup>2</sup>	082321	
	F2	Breakout 3 Finger Heatshrink for Cable in Range 4-25 mm <sup>2</sup>	082339	
	F3	Breakout, 3 Finger Heat Shrink for Cable in Range 95 – 300mm <sup>2</sup>	162949	
	F4	Breakout 4 Finger Heatshrink for Cable in Range 35-95 mm <sup>2</sup>	082834	
	F5	Breakout 4 Finger Heatshrink for Cable in Range 120-300 mm <sup>2</sup>	082867	

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 9	<b>of</b> 12

Spec Ref	Item No	Requirements	Commodity code
<b>Transformer LV Insulating Shrouds</b>			
3.7	G1	Shroud for Transformer Low Voltage Bushing. Suitable for Double or Single Cable Take-off's. Manufacturers Reference 07 - 131	162239
<b>Single Core Cable Box Entry Glands</b>			
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
<b>Fuse Carriers</b>			
3.9	I1	Fuse Carrier with Side Wedges - 3.25in with holes for test purposes	296679
<b>Cable Ties (Typical sizes)</b>			
3.10	J1	Cable Tie Red 100mm x 2.5mm (Pack of 100)	104760
	J2	Cable Tie Natural: 100mm x 2.5mm (Pack of 100)	104761
	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
<b>Solders and Fluxes</b>			
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
	K4	Solder Copper Cond Grade M	061820
	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
<b>Miscellaneous Items</b>			
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
	L4	Compound Penetrox A (Plastic Bottle)	361295

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.

<b>Document Reference:-</b>	NPS/002/010	<b>Document Type:-</b>	Code of Practice				
<b>Version:-</b>	5.1	<b>Date of Issue:-</b>	October 2019	<b>Page</b>	10	<b>of</b>	12

## 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 package 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.

<b>Document Reference:-</b>	NPS/002/010	<b>Document Type:-</b>	Code of Practice				
<b>Version:-</b>	5.1	<b>Date of Issue:-</b>	October 2019	<b>Page</b>	11	<b>of</b>	12

---

### **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.

<b>Document Reference:-</b> NPS/002/010		<b>Document Type:-</b> Code of Practice	
<b>Version:-</b> 5.1	<b>Date of Issue:-</b> October 2019	<b>Page</b> 12	<b>of</b> 12

## 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.

<b>Requirement</b>	<b>Provided (Y/N)</b>
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	