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# NPS/002/002 – Technical Specification for Industrial and Insulating Tapes and Mastic Compounds

## 1. Purpose

The purpose of this document is to detail the requirements of Northern Powergrid (the Company) in relation to the products specified within this document.

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

Document Reference	Document Title	Version	Published Date
NPS/002/002	Technical Specification for Industrial and Insulating Tapes and Mastic Compounds	5.0	Sept 2015

## 2. Scope

This document applies to the specification required and describes in detail the requirements of the Company with respect to: -

- Anti-Corrosion Tape
- Insulating Tape
- Identification Tape
- Self-Amalgamating Tape
- Electrical Insulating Putty/Tape
- Moisture Sealing Mastic Compound
- Adhesive Tape
- Vinyl Mastic Tape
- Glass Fibre Tape
- Butyl Mastic Tape
- Cotton Tape
- Solid Setting Putty

The following appendices form part of this technical specification:

- Appendix 1: Schedule of Requirements
- Appendix 2: Logistical requirements
- Appendix 3: Self Certification Conformance Declaration
- Appendix 4: Technical Information Check List

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### 3. Technical Requirements

#### 3.1. Anti-Corrosion Tape

The Fabric Grease Impregnated Anti-Corrosion Tape shall be used as corrosion protection on electrical plant and associated equipment. The tape shall provide corrosion resistance in all weathers and shall be used above ground exposed to the atmosphere or directly into various ground conditions. The tape shall be resistant to UV rays, abrasion, corrosion, alkalis and acids.

#### 3.2. PVC Insulating Tape.

For outdoor, general purpose use as primary insulation on electrical terminations, cables etc. up to 600V. The tapes shall conform in all weather applications. The tape shall also be colour fade resistant, resistant to UV rays, abrasion, corrosion, alkalis and acids. The tape shall adhere to PVC and metal surfaces and have pliability and adhesion at 0<sup>0</sup>c

#### 3.3. Coloured Identification Tape

For identification purposes on electrical terminations etc. the tapes shall be colour fade resistant, resistant to UV rays, abrasion, corrosion, alkalis and acids. The tape shall adhere to PVC and metal surfaces and have pliability and adhesion at 0<sup>0</sup>c.

#### 3.4. Self-Amalgamating Tape

The Self amalgamating tape shall be based on Polyisobutylene (PIB). The tape shall be interleaved with an easy to remove plastic film and must be non-tacky, easy to handle and apply. The tape shall amalgamate rapidly when applied under tension and provide a void free homogenous wrapping without the need for external heat or pressure. It shall be compatible with polyethylene, cross-linked polyethylene, ethylene propylene rubber, PVC, butyl and neoprene cable insulation and polyurethane resins. The tape must be highly resistant to prolonged immersion in water, resistant to ozone and compatible with hot pouring compounds up to 125<sup>0</sup>c used in cable joint-boxes.

#### 3.5. Electrical Insulating Putty / Tape

Rubber insulating compound in tape form that is backed by a removable fabric. The tape shall be permanently elastic, non-hardening and highly resistant to chemical corrosion. The tape will be used for filling voids and irregular shapes in some terminations and joints (not oil filled or oil impregnated cables).

#### 3.6. Moisture Sealing Mastic Compound

The compound shall be self-supporting, moisture sealing media, mainly for the sealing of cable entry ducts to buildings. The compound shall be saturated petroleum hydrocarbons, fibrous filler and thermal extender, which shall be permanently plastic, non-cracking and resistance to moisture, mineral acids and salts. The compound shall not oxidise and shall contain no evaporating solvents.

#### 3.7. Black Adhesive Tape

The tape shall be used to provide temporary protection to PVC oversheath during sheath removal or to build up cable diameters to suit joint shells etc. The tape shall be of a cotton cloth material with a blended rubber adhesive insulating compound coated on both sides.

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### 3.8. Glass Fibre Adhesive Tape

The tape shall be white with thermosetting pressure sensitive adhesive and designed to perform continually at 130°C. The tape shall have good mechanical strength, be waterproof, shrink, rot and stretch resistant in the most arduous conditions. The tape must adhere to any clean dry surface and have good adhesion over a range of ambient temperatures between 0°C and 30°C.

### 3.9. Miscellaneous Items

- a) Tape Vinyl Mastic: Self-fusing rubber based insulating compound laminated to a flexible, all weather grade vinyl (PVC) backing.  
Main usage: - To insulate and moisture-seal all connections up to 600volts.
- b) Butyl mastic tape: Non curing type that shall retain the same properties and consistency after ageing in different environments.
- c) Semi-conducting: Ethylene Polpylene Rubber Tape.  
Usage: - too electrically round out high voltage connectors and to minimise electrical stresses on overhead conductors (Scotch 13 Type or equivalent).
- d) Aluminium Oxide Tape: 25mm x 50M: Grade P- 400.
- e) Identification Tape: Black “N” on Yellow Background: Self - Adhesive: CLOTH: 17mm Wide.
- f) Solid Setting Putty 2-Part Mixture (Resin and Hardener): Used for sealing, repairing, insulating and waterproofing a variety of materials including metal, wood glass and some plastics.

The tapes shall conform in all weather applications. The tapes shall also be colour fade resistant, resistant to UV rays, abrasion, corrosion, alkalis and acids. They should be suitable for outdoor and general use.

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## 4. References

### 4.1. External Documentation

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

Reference	Title
BS EN 29862: 2019	Self-adhesive tapes. Determination of peel adhesion properties
BS EN 60454-1:1995	Specifications for pressure-sensitive adhesive tapes for electrical purposes. General requirements
BS EN 60454-3-2:2006	Pressure-sensitive adhesive tapes for electrical purposes. Specifications for individual materials. Requirements for polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked adhesives
BS EN 60454-3-4:2007	Pressure-sensitive adhesive tapes for electrical purposes. Specifications for individual materials. Cellulose paper, creped and non-creped, with rubber thermosetting adhesive
BS EN 60454-3-6:1998	Specifications for pressure-sensitive adhesive tapes for electrical purposes. Specifications for individual materials. Polycarbonate film tapes with acrylic thermoplastic adhesive
BS EN 60454-3-7:1998	Specifications for pressure-sensitive adhesive tapes for electrical purposes. Specifications for individual materials. Polyimide film tapes with pressure-sensitive adhesive
BS EN 60454-3-8:2006	Pressure-sensitive adhesive tapes for electrical purposes. Specifications for individual materials. Woven fabric tapes with pressure-sensitive adhesive based on glass, cellulose acetate alone or combined with viscose fibre

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

### 4.2. Internal Documentation

Reference	Title
n/a	

### 4.3. Amendments from Previous Version

Clause	Subject	Amendments
4.1	External Documentation	References to external documents have been updated to reflect the latest document versions
6	Authority for Issue	Amended to reflect new authority for issue format and 5 year document life
Appendix 3	Self-certification Conformance Declaration	Table format updated

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## 5. Definitions

Term	Definition
The Company	Northern Powergrid

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## 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
Liz Beat	Governance Administrator	18/06/2020

### 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 and Reason	
No	Period: 5	Reason: Update will be dictated by contact 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
Steven Salkeld	Policy and Standards Engineer	18/06/2020

### 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
Paul Hollowood	Policy and Standards Engineer	24/06/2020
Mick Emsley	Policy and Standards Manager	22/06/2020

### 6.4. Authorisation

Approval is given for the content of this document

		Date
Greg Farrell	Head of System Engineering	18/08/2020

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## Appendix 1 – Schedule of Requirements

Clause	DESCRIPTION	Catalogue Number
3.1	Fabric Grease Impregnated Anti-Corrosion Tape: 50mm x 10m (Denso)	062661
3.2	Insulating Tape: PVC Self Adhesive Colour <b>BLACK</b> : 19mm Wide.	063529
3.3	Identification Tape: PVC Self Adhesive Colour <b>RED</b> : 19mm Wide.	063412
3.3	Identification Tape: PVC Self Adhesive Colour <b>BLUE</b> : 19mm wide.	063446
3.3	Identification Tape: PVC Self Adhesive Colour <b>YELLOW</b> : 19mm wide.	063438
3.3	Identification Tape: PVC Self Adhesive Colour <b>GREEN</b> : 19mm wide.	063453
3.3	Identification Tape: PVC Self Adhesive Colour <b>BROWN</b> : 19mm wide.	350960
3.3	Identification Tape: PVC Self Adhesive Colour <b>GREY</b> : 19mm wide.	350961
3.4	Self-Amalgamating Tape: Colour <b>BLACK</b> : 50mm Wide.	064220
3.5	Rubber insulating compound in tape form	353871
3.6	Mastic Compound: 330mm x 50mm	089896
3.6	Mastic Compound: 3kg blocks	353208
3.7	Tape Black Cotton Cloth Adhesive Coated 19mm X 20M	350498



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Clause	DESCRIPTION	Catalogue Number
3.8	Glass Fibre Tape Adhesive: 25mm x 50M (AG Tape)	062752
3.8	Glass Fibre Tape Adhesive: 100mm x 50M (AG Tape)	062778
3.9 (a)	Tape Vinyl Mastic: 38mm x 2.3mm x 6M	064832
3.9 (a)	Tape Vinyl Mastic: 102mm x 2.3mm x 3M	064840
3.9 (b)	Butyl Mastic Tape: 25mm x 5M (Black)	064857
3.9 (d)	Aluminium Oxide Tape: P-400	350959
3.9 (c)	Semi-Conducting: 20mm x 5M (Scotch fill 13 Type) (For Use On HV Overhead Conductors)	365328
3.9 (e)	Identification Tape: Black "N" on Yellow Background: Self - Adhesive: CLOTH: 17mm Wide.	350963
3.9 (f)	Solid Setting Putty 2-Part Mixture (Resin and Hardener)	351931

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## Appendix 2 – Logistical Requirements

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

Details shall be provided where relevant, in respect of 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 protected to enable storage in an outdoor environment whilst maintaining the product and packaging as “fit for service” prior to installation. 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.

In order to maximise storage space all palletised goods shall be supplied in standard returnable box pallets with the following specification. Where applicable, suppliers shall also indicate the maximum number of units of each product that are storable per box pallet.

Size - 1200mm (w) x 1000mm (d) x 750mm (h)

Weight (empty) – Up to 33kg

Load Capacity – Up to 450kg

Maximum Stacking Capacity – 10 High

Suppliers shall also include details of the type of material used to manufacture the box pallets.

The Company will give consideration to innovative alternatives to this specification.

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.

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### Appendix 3 - SELF CERTIFICATION CONFORMANCE DECLARATION

Specification for Industrial and Insulating Tapes required to be supplied against this specification shall comply with the latest issues of the relevant ENATS, British and International Standards specified. The following tables are intended to amplify and/or clarify the requirements of elements of these Standards but do not preclude meeting all requirements of the standards. .

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

#### Conformance declaration codes

N/A = Clause is not applicable/ appropriate to the product

Cs1 = The product conforms fully with the requirements of this clause

Cs2 = The product conforms partially with the requirements of this clause

Cs3 = The product does not conform to the requirements of this clause

Cs4 = The product 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 Reference:**

**Details of the product**

**Name:**

**Signature:**

**Date:**

**NOTE:**

#### Instructions for completion

- When Cs1 code is entered the supplier shall provide evidence of conformance
- When any other code is entered the reason and supporting evidence for non-Conformance shall be entered
- Prefix each remark with the relevant 'BS EN' or 'ENATS' as appropriate
- Provide technical data sheets and associated drawings for each product.

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Specification for Industrial and Insulating Tapes				
		Clause / Requirements	Conformance Code	Evidence Reference / Remarks / Comments
	Anti-Corrosion Tape			
	General	NPS/002/002 3.1		
	Carrier	Fabric of high strength and chemical resistance		
	Impregnant	Petroleum Jelly based corrosion inhibitor		
	Weight	1.4Kg/sq M Average.		
	Breaking Strength	50 N/cm width minimum		
	Electrical Breakdown	5kV/mm minimum		
	Insulation Resistance	5 x 10 <sup>6</sup> Megohms/25mm		
		PVC Insulating Tape		
General		NPS/002/002 3.2		
Classification		3 (plastics) group 31/90 plasticised PVC		
Breaking Strength		35 MPa		
Elongation		150%		
Electrical Breakdown		40kV/mm		
Adhesion - Peel		2.8 (steel)		
		1.6 (backing)		
		Flagging - 2mm maximum		
PH of Water Extract		5.5 - 8		
Water Conductivity Extract		2.5mS/m maximum		
Freedom from Corrosive Sulphur		As in specification		
Insulation Resistance		100 000 Megohms/25mm		
Electrolytic Corrosion		CLF to be mutually agreed		

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	Resistance to Flame Propagation	Category 1 or 2		
<b>Specification for Industrial and Insulating Tapes</b>				
		<b>Clause / Requirements</b>	<b>Conformance Code</b>	<b>Evidence Reference / Remarks / Comments</b>
	<b>Coloured Identification Tape</b>			
	General	NPS/002/002 3.3		
	Classification	3 (plastics) group 31/90 plasticised PVC or 30/90		
	Breaking Strength	30 MPa		
	Elongation	100%		
	Electrical Breakdown	40kV/mm		
	Adhesion - Peel	2.0 (steel)		
		1.5 (backing)		
	PH of Water Extract	5.5 - 8		
	Freedom from Corrosive Sulphur	As in specification		
	Insulation Resistance	100 000 Megohms/25mm		
	<b>Self-Amalgamating Tape</b>			
	General	NPS/002/002 3.4		
	Breaking Strength	50 N/cm width minimum		
	Electrical Breakdown	20kV/mm		
	<b>Electrical Insulating Putty/Tape</b>			
	General	NPS/002/002 3.5		
	Temperature Range	-10 <sup>0</sup> c to 80 <sup>0</sup> c		
	Electrical Breakdown	5kV/mm		
	Insulation Resistance	5 x 10 <sup>6</sup> Megohms/25mm		

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Specification for Industrial and Insulating Tapes				
	Clause / Requirements	Conformance Code	Evidence Reference / Remarks / Comments	
<b>Moisture Sealing Mastic Compound</b>				
General	NPS/002/002 3.6			
Composition	Saturated Petroleum Hydrocarbons, Fibrous Filler and Thermal Extender			
Characteristics	Permanently plastic, Non-cracking and resistance to moisture, mineral acids and salt. Will not contain Oxidise and contains no evaporating solvent.			
Storage Life	Unlimited at normal temperatures			
Temperature Range	-10 <sup>0</sup> c - 70 <sup>0</sup> c			
<b>Black Adhesive Tape</b>				
General	NPS/002/002 3.7			
Breaking Strength	80N/cm (20kg per 25mm)			
<b>Glass Fibre Adhesive Tape</b>				
General	NPS/002/002 3.8			
Adhesion Temp Range	0 <sup>0</sup> c to 30 <sup>0</sup> c			
Max Continuous Operating Temperature	130 <sup>0</sup> c			
Characteristics	Good Mechanical Strength, Waterproof, Shrink, Rot and Stretch Resistant.			

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Specification for Industrial and Insulating Tapes				
	Clause / Requirements	Conformance Code	Evidence Reference / Remarks / Comments	
<b>Miscellaneous Items</b>				
General	NPS/002/002 3.9			
Vinyl Mastic Tape	Self-fusing rubber based insulating compound laminated to a flexible, all weather grade vinyl (PVC) backing			
Butyl mastic tape	Non curing type that shall retain the same properties and consistency after ageing in different environments			
Semi-conducting	Ethylene Polypylene Rubber Tape (Scotch 13 Type)			
Aluminium Oxide Tape	25mm x 50M: Grade P -400			
Solid Setting 2-part Putty	Temperature withstand -20 <sup>0</sup> C - +80 <sup>0</sup> C Suitable for use on wood, metal, some plastics and Glass.			

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## **Appendix 4 - Technical Information Check List**

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	
Appendix 3 – completed self-certification conformance declaration	
Type test evidence	
Packaging/delivery information	