NPS/002/013 – Technical Specification for Telephone and Pilot Cable Joints

1. Purpose

The purpose of this document is to detail the technical requirements for telephone and pilot cable joints for use on Northern Powergrid (the Company) distribution network.

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

Reference	Version	Date	Title
NPS/002/013	3.0	Nov 2015	Technical Specification for Telephone and Pilot Cable Joints

2. Scope

This document specifies the requirements for joints intended for use on multipair and multicore auxiliary cables manufactured generally in accordance with ENATS 09-6. It is recognised, however that it may be also necessary to joint similar cables with specifications which are now superseded, including paper insulated lead sheathed wire armoured (PILSWA) pilot and telephone cables.

Technical documents referenced within this specification refer to 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.

The following appendices form part of this technical specification:

- Appendix 1 – Joint requirements,
- Appendix 2 - Logistical requirements,
- Appendix 3 - Self certification conformance declaration,
- Appendix 4 - Addendum to supplier requirements, and,
- Appendix 5 - Technical information check list.

2.1. Table of Contents

3. Technical Requirements

3.1. Test Criteria

Polythene insulated multipair cables as detailed in NPS/002/018 – 'Technical Specification for Pilot, Control and Telephone Cables', clause 3.1 are designed for either 5kV or 15kV induced voltage levels, it is intended that that joints supplied against this specification shall be meet the test requirements for 15kV systems as detailed in ER C64 – 'Testing Procedure for Approval of Joints for Cables Generally to B.E.B.S. – C.5 (Issue 1 / 1969)' and the after laying and jointing requirements of ENA TS 09-6 – 'Auxiliary Multicore and Multipair Cables'.

3.2. Earth Connection

Earth connections and conductors will be suitable for carrying fault current and will be compatible with paper lead tape and wired armoured cables as well as P.V.C. wired armoured cables.

3.3. Joints

Joints will be required to connect together a range of cables types including:-

- XLPE insulated gel filled or unfilled,
- PVC insulated, and,
- Paper lead.

3.4. Connectors and Joints

Connectors and joints for multipair and multicore cables shall provide a reliable and consistent mechanical connection with adequate insulation (either IPC or suitable patch/sleeve) properties across the range of insulation thickness expected to be encountered on 5/15kV cables with PVC, Polythene or XLPE cables. This shall be verified by confirmation of the joints ability to satisfy both the tensile and electrical test requirements of ENA C64, clauses 3.1 and 3.2 respectively.

Insulation piercing or similar connectors are not acceptable if there is a risk of damage to the conductors due to over compression or open circuit connection due to under compression.

3.5. Filling Medium

The joint when filled with the selected filling medium i.e. resin, shall still match the 15kV induced withstand voltage of the cable required by clause 3.1 of this specification, however additionally the completed joint must also demonstrate adequate mechanical and moisture ingress prevention properties by satisfactory completion of the mechanical impact tests requirements of ER C64, clause 3.4 and the final electrical tests of required by ENA C64, clause 3.6.

3.6. Kits

Joints kits shall contain all of the required components and including:-

- Connectors,
- Joint shell,
- Resin,
- Earth braid, and,
- Assembly instructions.

4. References

The products described within this document shall comply with the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of tendering, except where varied by this standard. In respect the following documents are particularly relevant.

4.1. External Documentation

Reference	Version / Date	Title
ENA TS 09-6	8.0 / 2012	Auxiliary Multicore and Multipair Cables
ER C64	1.0 / 1969	Testing Procedure for Approval of Joints for Cables Generally to B.E.B.S. – C.5

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
NPS/002/018	Technical Specification for Pilot, Control and Telephone Cables

4.3. Amendments from Previous Version

Reference	Title
Appendix 3	Amended Clause ref numbers to **ENA TS 09-6**

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
Liz Beat	Governance Administrator	16/11/2022

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	17/11/2022

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
Joe Helm	Policy & Standards Manager	18/11/2022
Steve Salkeld	Policy & Standards Engineer	17/11/2022

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	System Engineering Manager	21/12/2012

Appendix 1 – Joint Requirements

Multipair Joint Type							
Number of Pairs	Core Size (mm^2)	Polythene to Polythene	Polythene to Impregnated Paper	Polythene to PVC	PVC to PVC	Polythene to Dry Paper	Commodity Code
7	0.8	✓	✓	✓	✓	X	171614
19	0.8	✓	✓	✓	✓	X	171615
37	0.8	✓	✓	✓	✓	X	171616
61	0.8	✓	✓	✓	✓	X	TBA

Multicore Joint Type							
Number of cores	Core Size (mm^2)	Polythene to Polythene	Polythene to Impregnated Paper	Polythene to PVC	PVC to PVC	Polythene to Dry Paper	Commodity Code
2	2.5	✓	✓	✓	✓	X	TBA
4	2.5	✓	✓	✓	✓	X	171617
7	2.5	✓	✓	✓	✓	X	TBA
12	2.5	✓	✓	✓	✓	X	171618
19	2.5	✓	✓	✓	✓	X	171619
27	2.5	✓	✓	✓	✓	X	TBA
2	4.0	✓	✓	✓	✓	X	TBA
5	4.0	✓	✓	✓	✓	X	TBA
7	4.0	✓	✓	✓	✓	X	TBA
2	6.0	✓	✓	✓	✓	X	TBA
5	6.0	✓	✓	✓	✓	X	TBA
7	6.0	✓	✓	✓	✓	X	TBA

Appendix 2 – Logistical Requirements

Storage

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, maximum stacking height 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

Packaging and labelling

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

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

Appendix 3 – Self Certification Conformance Declaration

Telephone and pilot cable joints are 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, where appropriate indicating if tests are type or routine tests.

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.

Instructions for completion

- When Cs1 code is entered no remark is necessary.
- When any other code is entered the reason for non-conformance shall be entered.
- Prefix each remark with the relevant 'BS EN' 'IEC' or 'ENATS' as appropriate.

Manufacturer:

Product Reference:

Details of the Cable Type (Voltage, Conductor Type and Size)

Name:

Signature:

Date:

NOTE: One sheet shall be completed for each type of cable offered.

Specification for Pilot and Telephone Cable Joints			
	Clause / Requirements	**Conformance Code**	**Remarks / Comments**
Engineering Recommendation C64 (Issue 1 ; 1969)			
Conductor Continuity	ER C64 Pt 4: Resistance ≤ 110% of equivalent length of cable.		
Voltage Withstand	ER C64 Pt 5: DC / 1 min. Values as specified in Table 1.		
Insulation Resistance	ER C64 Pt 6: 500v DC / 1 Min (min steady state values after 15 sec):-		
	Polythene : 10^4 MΩ		
	Polythene / Paper : 500 MΩ		
	Polythene / PVC : 50 MΩ		
	PVC: 25 MΩ		
Tensile Test	ER C64 Pt 7: Values as specified in Table 3 (no measurable extension after 5 min).		
Heating Cycle in Water	ER C64 Pt 8: 35 cycles.		
Impact Test	ER C64 Pt 9: Superficial / moderate damage acceptable.		
Heating Cycle in Water	ER C64 Pt 10: 65 cycles.		
Final / Repeat Verification tests to carried out after joint conditioning from the heating cycle testing			
Conductor Continuity	ER C64 Pt 11: Resistance ≤ 110% of equivalent length of cable.		
Voltage Withstand	ER C64 Pt 12: DC / 1 min. Values as specified in Table 1.		
Insulation Resistance	ER C64 Pt 13: 500v DC / 1 Min (min steady state values after 15 sec):-		
	Polythene : 10^4 MΩ		
	Polythene / Paper : 500 MΩ		
	Polythene / PVC : 50 MΩ		
	PVC: 25 MΩ		

ENA TS 09-6			
Insulation Resistance Clause 6.3.2	The insulation resistance shall not be lower than 500 MΩ/km for unfilled cables 50 MΩ/km for unfilled cables At least 90% of measurements shall be greater than : 5,000 MΩ/km for unfilled cables 1,000 MΩ/km for unfilled cables		
6.4 Transmission Tests			
Attenuation Tests Clause 6.4.1	Attenuation of the pairs shall not exceed the values stated in Table 1		
Cross-talk Clause 6.4.2	Cross-talk between adjacently terminated pairs shall be measured at a frequency in the range 800 Hz to 1,300 Hz after the cable has been balanced. The measured cross-talk shall be not worse than 74 dB Where carrier operation is specified, cross-talk shall be measured between three nominated carrier pairs at 108 kHz. The measured far end cross-talk shall be not worse than 70 dB.		
Impedance Clause 6.4.3	Values shall be within the quoted manufactures tolerance at 1,000 Hz		

Appendix 4 – Addendum to Supplier Requirements

To enable the Company to install the product(s) in accordance with the manufacturer's recommendations the supplier shall provide a single copy of drawings, descriptive leaflets and instruction manuals appropriate to the goods being offered, which shall incorporate details of an approved installation procedure / work instruction required in order to provide optimal performance of the goods during their operational life.

Each kit will be supplied with all components necessary required to complete the joint.

Appendix 5 – Technical Information Check List

The following information shall be provided by the supplier for technical review by Northern Powergrid. 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	
Complete set of drawings for each variant	
Type test evidence	
Routine test plan (example)	
Pre-commissioning testing/inspection requirements	
Recommended periodical inspection and maintenance requirements	
Packaging/delivery information	