NPS/002/026 – Technical Specification for Cable Sheath Link Boxes

1. Purpose

The purpose of this document is to detail the requirements of Northern Powergrid (the Company) in relation to cable sheath links boxes for use on insulated sheath or specially bonded cables systems on the 33kV, 66kV and 132kV distribution network.

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

Document Reference	Document Title	Version	Published Date
NPS/002/026	Technical Specification for Cable Sheath Link Boxes	1.3	Feb 2019

2. Scope

Cable sheath link boxes covered by this technical specification shall comply with the latest issue of:-

- Insulated Sheath Power Cable Systems – Engineering Recommendation C55-4
- BS 7912 – Power Cables with XLPE Insulation and metallic sheaths, and their accessories for rated voltages 66kV to 132kV.

This document is intended to amplify and/or clarify the Company's requirements relating to these specifications with respect to cable sheath link boxes.

2.1. Table of Contents

3. Technical Requirements

3.1. Cable Sheath Link Boxes

Cable sheath link boxes shall be suitable for installation above ground on a gantry or similar situations, or installed in a covered pit. Where boxes are to be buried they shall be installed in an appropriate pit, cover and frame assembly, which may or may not be supplied by the manufacture of the link box. Buried link boxes may be immersed in polluted water for the whole of their life and their design should be based on a minimum 40years service.

3.2. Pit Assembly

The link boxes shall be supplied with either a glass fibre reinforced polyester (GRP), high density polyethylene (HDPE) pit frame assembly or similar. This design shall allow the pit frame assembly to sit around and over the link box, locate so that the cover is central and to prevent the ingress of any backfill material entering the pit.

The pit assembly shall be horizontally sectionalised to enable sections to be added or removed, depending on the location of the link box to ground level. The pit frame shall meet the test load requirements of BS EN 124-1:2015, depending on the installed situation and typically class B125 or C250.

3.3. Pavement Access Cover & Frame

The frame for the pavement access cover, which shall fit onto the top of the pit assembly shall be fabricated from steel and hot dipped galvanised. The frame shall be complete with integral "Skirt" to prohibit the ingress of backfill material into the pavement chamber. The frame shall incorporate an adjustment system that allows up to approximately 100mm vertical movement of the cover. The adjustment shall only be achieved from inside the pit with the pavement access cover removed.

The pavement cover shall be a single galvanised steel tray, concrete filled with 2 x "keyhole" type slots to aid removal from the frame. Multiple covers may be required depending on the size of the link box.

The access cover and frame shall meet the test load requirements of BS EN124-1:2015, depending on the installed situation and typically class B125 or C250.

4. References

4.1. External Documentation

Reference	Title
BS 7912	Power Cables with XLPE Insulation and metallic sheaths, and their accessories for rated voltages 66kV to 132kV
BS EN 124-1:2015	Gully tops and manhole tops for vehicular and pedestrian areas. Definitions, classification, general principles of design, performance requirements and test methods .
ENA C55-4	Insulated Sheath Power Cable Systems

4.2. Internal Documentation

Reference	Title
n/a	

4.3. Amendments from Previous Version

Reference	Description
BS EN 124	* Update to current specification
Appendix 3	* Minor text changes

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	21/11/2022

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	
Yes	Period: n/a	Reason: n/a
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Paul Hanrahan	Engineer – Asset Management	28/11/2022

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
Steve Salkeld	Policy & Standards Engineer	21/11/2022
Joe Helm	Policy & Standards Manager	06/12/2022

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	System Engineering Manager	21/12/2022

Appendix 1 - Supplier Requirement

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
* Humidity
* Water
* Dust
* Atmospheric corrosion
* Impact
* Vibration
* 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 boxes 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 with as a minimum requirement the following information;

* 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

Cable sheath link boxes shall comply with the latest issues of the relevant national and international standards, including C55-4 and BS 7912. Additionally this technical specification is intended to amplify and/or clarify requirements relating to these Standards.

This self declaration sheet identifies the clauses of the aforementioned standards relevant to cable sheath link boxes for use on the Company's distribution network. 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.

1. 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:

Name:

Signature:

Date:

NOTE: One sheet shall be completed for each item or variant submitted.

Appendix 3 - Continued

Technical Specification

- **NPS/002/026**

Clause/Sub-clause	Requirement	Conformance Code	Remarks
Material	Metal / Metal Screened and Corrosion Resistant. Suitable for continued immersion in water.		
Frame and Cover (where supplied)	Adjustable frame and covers suitable for in accordance with:- BS EN 124: B125 and C250		
IP Rating	Gantry Mounted :IP65 Buried:IP68		

Appendix 3 - Continued

• **ENA Engineering Recommendation C55-4**			
Clause/Sub-clause	**Requirement**	**Conformance Code**	**Remarks**
1.10.1 Link Boxes	Suitable for installation in shallow pits below ground with "diving bell" or bolted cover lids.		
	Fitted with appropriate "Danger – Electricity", "This / these links must be closed when the cable is service" labels and legends, including circuit and phase identification and schematic diagram of link arrangement.		
1.9 Bonding Leads	Suitable for terminating bonding leads in accordance with Tables 1A and 1B: 120mm² - 33kV and 66kV circuits 240mm² – 132kV circuits		
4.2 Water Immersion	1m head or 0.1bar (g) / 7 days		
4.3 Internal Insulation	25kV / DC, 5 min (phase/phase and phase/earth)		
	Impulse withstand (35kV between links and 17.5kV links to earth)		

Appendix 3 - Continued

- **BS 7912**

Clause/Sub-clause	Requirement	Conformance Code	Remarks
17.1 Bonding Leads	Suitable for terminating bonding leads in accordance with Tables 15 and 16: 120mm2 - 33kV and 66kV circuits 240mm2 – 132kV circuits		
17.3.2 Link Boxes	Suitable for installation in shallow pits below ground with “diving bell” or bolted cover lids.		
	Fitted with appropriate “Danger – Electricity”, “This / these links must be closed when the cable is service” labels and legends, including circuit and phase identification and schematic of link arrangement.		
4.2 Water Immersion	Bolted Covers: 2m head or 0.2bar (g) / 7 x heat cycles		
	Diving Bell Covers: 1m head / 7 x heat cycles		
17.4.2 DC Voltage Test	25kV / DC, 5 min (phase/phase and phase/earth)		
17.4.3 Short Circuit Test	Short circuit currents of : 15.3kA / 1sec - 33kV and 66kV circuits 26.2kA / 1 sec-132kV circuits		
17.4.4 Internal Arc	40kA / .1 sec		
17.4.5 Impulse	Impulse withstand (35kV between links and 17.5kV links to earth)		