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NPS/001/010 – Technical Specification for Fasteners and Fixings for Wood Pole Overhead Lines and General Construction Works

1. Purpose

The purpose of this document is to detail the requirements for all fasteners and fixings to be utilised on the distribution networks of Northern Powergrid.

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

Document Reference	Document Title	Version	Published Date
NPS/001/010	Technical Specification for Fasteners and Fixings for Wood Pole Overhead Lines and General Construction Works.	5.0	April 2020

2. Scope

This document applies to the materials, dimensions and finish of bolts, eye bolts, eye nuts, nuts, screws, tie-rods, wall fixings and washers used for general construction works on the Northern Powergrid distribution networks.

This document includes details of national, international and industry standards that are listed within the technical particulars for each fastener type.

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3. Technical Requirements

3.1. General Requirements

Fastenings and fixings will generally be in compliance with the requirements of ENA TS 43-96. A self-certification conformance declaration has been included in Appendix 1 and shall be completed by the supplier. A schedule of items required is listed in Appendix 2.

Where the specified item consists of multiple component parts they shall be supplied pre-assembled e.g. earth bolts comprise of a bolt, two half nut and two washers.

3.2. Bolts and Nuts

3.2.1. General

Bolts and nuts shall be ISO metric black hexagonal to BS 4190 and galvanised to BS EN 1461. The strength grade for bolts shall be grade 4.6 and grade 4.0 for nuts.

3.2.2. Pole and Assembly Bolts

Pole and assembly bolts shall comply with ENA TS 43-96, Tables 2 and 3 and be supplied complete with one full nut.

3.2.3. Nuts

Nuts shall normally be supplied as full nuts unless otherwise stated.

3.2.4. Earth Bolts

Steel earth bolts shall be in accordance with BS 4190 Form E and F and supplied with two half nuts and two round steel washers.

3.2.5. Eye Bolts and Eye Nuts

Eye Bolts shall be manufactured in accordance with ENA TS 43-96 Fig. 2 and supplied complete with one full nut. They shall preferably be of drop forge manufacture. Eye nuts shall be in accordance with ENA TS 43-96 Fig. 1 and have metric, course series, screw threads complying with BS 3643 Parts 1 and 2.

3.2.6. Tie Bolts

Tie bolts shall be in accordance with ENA TS 43-96 Fig. 5 and supplied with four full nuts.

3.3. Washers

3.3.1. Round Flat Washers

Round flat washers shall be manufactured from mild steel to BS 4320 Table 3, Form E and suitable to accommodate M10, M12, M16, M20 and M24 bolts as detailed in ENA TS 43-96 Table 6.

3.3.2. Square Flat Washers

Square flat washers shall be manufactured from grade EN 10025 Fe430a steel in accordance with ENA TS 43-96 Table 6.

3.3.3. Tapered Washers

Tapered washers shall be 'D' shaped and manufactured from grade BS EN 10 025 Fe430a steel with dimensions and design in accordance with ENA TS 43-96.

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3.3.4. Square Curved Washers

Square curved washers shall be manufactured from grade BS EN 10 025 Fe430a steel in accordance with ENA TS 43-96 Fig. 3.

3.4. Coach Screws

Coach screws shall be manufactured from galvanised heat treated steel with a minimum strength of 40 kg/mm², gimlet pointed in accordance with ENA TS 43-96 – 1986 Fig. 6, Drawing number 439609.

The thread form shall be uniform over the length except where the thread blends with the shank and point. The thread depth shall be 15% of the nominal screw diameter +/- 0.1mm. The number of threads shall be in accordance with the table in clause 7.1 of ENA TS 43-96 – 1986.

The point of the screw shall be tapered over a length 2 x the nominal diameter or $\frac{2}{3}$ of the nominal screw length, whichever is the least. The taper from the shank to the root of the thread shall be approximately one half thread. The remaining portion of the screw shall be parallel.

3.5. Electroplated Screw Sets, Nuts and Washers

Screw sets, nuts and washers shall be manufactured from Grade 8.8 high tensile steel and electroplated in accordance with BS EN 4042. Washers and spring washers shall be supplied to accommodate M6, M8, M10, M12 and M16 bolts.

3.6. Roundhead Drive Screws

Roundhead drive screws shall be of galvanised steel (40kgf/mm²) of a form in accordance with BS 1494, Part 1, 1964: 6.0mm diameter and 65mm long as detailed in table 6 of ENA TS 43-96.

3.7. Wood Screws

Wood screws shall be manufactured in accordance with BS 1210 – Specification for wood screws. They shall be supplied as specified in the product description as shown in Appendix 2 – Schedule of Items with options for round head or countersunk with a slotted or pozi-drive head.

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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 (ENA TS) current at the time of supply.

Reference	Title
BS 1210 – 1963 (withdrawn for reference only)	Specification for Wood Screws
BS 1494 Part 1 – 1964 (withdrawn for reference only)	Specification for Fixing Accessories for Building Purposes: Part 1 – Fixings for Sheet, Roof and Wall Coverings
BS 3643 Part 1 - 2007	ISO Metric Screw Threads. Principles and basic design
BS 3643 Part 2 - 2007	ISO Metric Screw Threads. Specification for selection of size limits
BS 4190 - 2014	Specification for ISO Metric Black Hexagonal Bolts, Screws and Nuts
BS 4320 - 1968	Specification for Metal Washers for General Engineering Purposes, Metric Series
BS EN 10 025 - 2004	Specification for Hot Rolled Products of Non-alloy Structural Steels and their Technical Delivery Conditions
BS EN ISO 1461 - 2009	Hot Dipped Galvanised Coating on Fabricated Iron or Steel Articles
BS EN ISO 4042: 2018	Specification for Electroplated Coatings
ENA TS 43-96 Issue 2: 1986	Fasteners and Washers for Wood Pole Overhead Lines

4.2. Internal Documentation

Reference	Title
N/A	

4.3. Amendments from Previous Version

Reference	Description
Appendix 2 – Schedule of Items	Two items removed due to duplication and harmonisation of bolt sizes

5. Definitions

Term	Definition
N/A	

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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	19/05/2021

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	Reason: In alignment with 5 year contract award
Should this document be displayed on the Northern Powergrid external website?		Yes
		Date
Steven Salkeld	Policy and Standards Engineer	19/05/2021

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
Ged Hammel	Senior Policy and Standards Engineer	24/05/2021
Joseph Helm	Policy and Standards Manager	17/06/2021

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Greg Farrell	Head of System Engineering	26/05/2021

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Appendix 1 - Self Certification Conformance Declaration

Fasteners and fixings shall comply with the latest issues of the relevant international and international standards.

ENATS 43-96 Issue 2: 1986 is intended to amplify and/or clarify the requirements of those Standards.

This check sheet identifies the clauses of the aforementioned standard relevant to fasteners and fixings for use on the Northern Powergrid distribution networks.

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.

Instructions for completion

- When Cs1 code is entered the supplier shall provide evidence of conformance
- 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 References:

Name:

Signature:

Date:

• ENATS 43-96 Issue 2: 1986			
Clause/Sub-clause	Requirement	Conformance Code	Remarks
3.0	Materials and finish		
4.1	Technical particulars including "safe working loads"		
4.4	Eye bolts and nuts including "safe working loads"		

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Appendix 2 – Schedule of Items

Item	Description
265628	ABC Fit Hook Bolt Extended 320mm,
265632	ABC Fit Hook Nut M20
265613	ABC Fit Pig Tail Hook Bolt Extended M20 240mm,
265609	ABC Fit Pig Tail Hook Bolt M20, 320mm
265596	ABC-Fit M20 Pigtail Hook Bolt 220MM
371210	Anchor Bolt, M12 x 100mm, Hilti Fixing
374929	Bolt, Earthing M12 x 25mm Brass, 25mm Thread, Complete with Two Round Washers and Two Half Nuts
370491	Bolt, Earthing M12 x 40mm Galvanised, 30mm Thread, Complete with Two Round Washers and Two Half Nuts
370487	Bolt, Earthing M12 x 55mm Galvanised, 30mm Thread, Complete with Two Round Washers and Two Half Nuts
370504	Bolt, Earthing M20 x 60mm Galvanised, 46mm Thread, Complete with Two Round Washers and Two Half Nuts
218115	Bolt, M10 x 130mm Galvanised, 60mm Thread, Complete with Full Nut
378417	Bolt, M10 x 50mm Galvanised, 40mm Thread, Complete with Full Nut
378474	Bolt, M12 x 100mm Galvanised, 30mm Thread, Complete with Full Nut
218131	Bolt, M12 x 25mm Galvanised, 15mm Thread, Complete with Full Nut
378440	Bolt, M12 x 75mm Galvanised, 30mm Thread, Complete with Full Nut
378629	Bolt, M16 x 220 Galvanised, 150mm Thread, Complete with Full Nut.
378633	Bolt, M16 x 260 Galvanised, 150mm Thread, Complete with Full Nut
378652	Bolt, M16 x 300 Galvanised, 150mm Thread, Complete with Full Nut
378671	Bolt, M16 x 400mm Galvanised, 150mm Thread, Complete with Full Nut.
372816	Bolt, M20 x 160mm Galvanised, 100mm Thread, Complete with Full Nut.
378101	Bolt, M20 x 140mm Galvanised, 100mm Thread, Complete with Full Nut.
374098	Bolt, M20 x 180mm Galvanised, 60mm Thread, Complete with Full Nut
378794	Bolt, M20 x 300 Galvanised, 150mm Thread, Complete with Full Nut
378794	Bolt, M20 x 300 Galvanised, 150mm Thread, Complete with Full Nut
372355	Bolt, M20 x 600 Galvanised, 200mm Thread, Complete with Full Nut
372552	Bolt, M22 x 70mm Galvanised, 50mm Thread, Complete with Full Nut.
378421	Bolt: M12 x 40mm & 30mm Thread: Galvanised & Complete With Full Nut.
378582	Bolt: M16 x 130mm & 100mm Thread: Galvanised & Complete With Full Nut.
378544	Bolt: M16 x 50mm & 38mm Thread: Galvanised & Complete With Full Nut.
218438	Bolt: M16 x 70mm, 38mm Thread: Galvanised: Complete with Full Nut.
378756	Bolt: M20 x 220mm & 150mm Thread: Galvanised & Complete With Full Nut.
372904	Bolt: M20 x 400mm & 150mm Thread: Galvanised & Complete With Full Nut.
372815	Bolt: M20 x 530mm & 150mm Thread: Galvanised & Complete With Full Nut.
378703	Bolt: M20 x 60mm & 46mm Thread: Galvanised & Complete With Full Nut.
373911	Bolt: M20 x 70mm & 46mm Thread: Galvanised & Complete With Full Nut.
337632	Bolt, M24 x 80 Hex Galvanised c/w M24 full nut
337631	Bolt, M24 x 60 Hex Galvanised c/w M24 full nut
297812	Coach Screw, M10 x 120 Galvanised

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297754	Coach Screw, M10 x 50 Galvanised
297986	Coach Screw, M10 x 75 Galvanised
297762	Coach Screw, M10 x 90 Galvanised.
372919	Coach Screw, M12 x 110 Galvanised.
297770	Coach Screw, M12 x 75 Galvanised.
297721	Coach Screw: M6 x 50mm: Galvanised.
372764	Coach Screw: M8 X 125MM: Galvanised.
368082	Eyebolt, M20 x 100mm Galvanised, Complete with Full Nut
368044	Eyebolt, M20 x 200mm Galvanised, Complete with Full Nut
368059	Eyebolt, M20 x 300mm Galvanised, Complete with Full Nut
250270	Eyebolt, M20 x 400mm Galvanised, Complete with Full Nut
369507	Full Nut M10 Electroplated.
369598	Full Nut M12 Electroplated.
369691	Full Nut M16 Electroplated.
369441	Full Nut M6 Electroplated
369456	Full Nut M8 Electroplated.
378883	Full Nut, M10 Galvanised
379405	Full Nut, M22 Galvanised
378898	Full Nut: M12: Galvanised.
378915	Full Nut: M20 Galvanised.
371653	Nails, Oval: 3.0": (per kg)
371579	Nails, Round: 4.0" X 9 Gauge: (per kg)
371526	Nails, Round: 1.5" x 12 Gauge. (per kg)
371564	Nails, Round: 2.5" X 11 Gauge: (per kg)
378402	Nails: Roofing: M6 x 65mm: Galvanised: Convex Head: (per kg)
371244	Nails; Round Plain head 1.8 x 25mm Galvanised to BS 1202 Part 1, Table 1 (in packs of 200)
371688	Nails: Sherardized Annular Ring Shank 50mm x 3.35. Supplied in 1kg packs
371140	Rawl Through bolt: 10mm X 95mm
254300	Rawl Through bolt: M10 x 30mm
254292	Rawl Through bolt: M10 x15mm x 75mm
371155	Rawl Through bolt: M12 x 135mm.
254284	Rawl Through bolt: M8 x 25mm
371738	Screw Nail: 50mm: BZP: Flat Head: (Box of 500)
369579	Screw Set: Electroplated M6 x 25mm.
369530	Screw Set: Electroplated: M16 x 50mm.
425827	Screw Set: Electroplated: M10 x 25mm: Hex Head.
425835	Screw Set: Electroplated: M10 x 40mm: Hex Head.
425876	Screw Set: Electroplated: M12 x 40mm: Hex Head.
425884	Screw Set: Electroplated: M12 x 50mm: Hex Head.
379212	Screw Set: Electroplated: M12 x 60mm: Hex Head.
425785	Screw Set: Electroplated: M8 x 25mm: Hex Head.
425819	Screw Set: Electroplated: M8 x 50mm; Hex Head.
425833	Fixing: N6 x 80mm Nylon Hammer-in Type (box of 200)

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350500	Spring - stainless steel spring 5mm i/d 8mm o/d 80mm long spring to be "weak". (to increase diameter of thin shackle lock when used on aerial switches. must easily thread onto shackle.
299214	Staple 1.1/2" Galvanised 8SWg (per kg)
299222	Staple, Galvanised 60mm x 6mm x 21mm
374416	Staple: Copper: No12 x 1" (per kg)
374399	Staple: Copper: No8 x 1.5" (per kg)
374384	Staple: Copper: 4.0mm x 40mm x 13mm (per kg)
375599	Staple: M9 x 1-1/4": Galvanised: (per kg)
248711	Clamp 3/8 wire rope 7/12 SWG wire to drawing no: 66.5/10.176/2
372730	Studding, Steel Zinc Electroplated M10 x 300mm Grade 4.6, Table 14
372745	Studding, Steel Zinc Electroplated M12 x 300mm Grade 4.6, Table 14
372726	Studding, Steel Zinc Electroplated M8 x 300mm Grade 4.6, Table 14
375828	Tie Rod, M20 x 330, threaded 150mm. Galvanised Complete with Four Full Nuts
229420	Tie Rod, M20 x 400, threaded 150mm. Galvanised Complete with Four Full Nuts
375832	Tie Rod, M20 x 450, threaded 150mm. Galvanised Complete with Four Full Nuts
375902	Tie Rod, M20 x 550, threaded 150mm. Galvanised Complete with Four Full Nuts.
346484	Tie Rod, M24 x 1200, threaded 200mm. Galvanised Complete with Four Full Nuts
371969	Wall Plug: Plastic - Brown
371954	Wall Plug: Plastic - Red.
371988	Wall Plug: Plastic: M12 x 50mm Grey or Green
369668	Washer M10 Electroplated.
369672	Washer M12 Electroplated.
369437	Washer M6 Electroplated.
379852	Washer, Galvanised M16 Tapered - 'D' Shaped
374488	Washer, Galvanised M20 Tapered - 'D' Shaped
350799	Washer: Bellville M12: Standard Finish.
353301	Washer: Bellville M16: Standard Finish.
352135	Washer: Bellville M8: Standard Finish.
351715	Washer: Bellville: M20 Standard Finish.
351912	Washer: Bellville: M10 Standard Finish.
375601	Washer: M12: Galvanised.
375601	Washer: M12: Galvanised.
369494	Washer: M16 Electroplated.
378987	Washer: M16: Galvanised.
378987	Washer: M16: Galvanised.
368078	Washer: M20 Square Curved, 65mm x 65mm.
368063	Washer: M20, Flat Square 65mm x 65mm.
375616	Washer: M20: Galvanised.
369653	Washer: M8 Electroplated.
369422	Washer: Spring: M6: Electroplated.
369615	Washer: Spring: M10: Electroplated.
369634	Washer: Spring: M12: Electroplated.
369475	Washer: Spring: M8: Electroplated.
369649	Washer: Spring: M16: Electroplated.

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229450	Washer Galvanised MS Round (Flat) to suit M10 Bolt
372158	Wood Screw: No 10 x 1": Steel Countersunk: Pozi-Drive. (Box of 200)
372162	Wood Screw: No 10 x 1-1/2": Steel Countersunk: Pozi-Drive. (Box of 200)
376958	Wood Screw: No 10 x 1-1/4": Steel Countersunk: Pozi-Drive. (Box of 200)
372177	Wood Screw: No 10 x 2": Steel Countersunk: Pozi-Drive: (Box of 200)
376962	Wood Screw: No 10 x 2-1/2": Steel Countersunk: Pozi-Drive. (Box of 200)
372181	Wood Screw: No 10 x 3": Steel Countersunk: Pozi-Drive. (Box of 200)
372209	Wood Screw: No 12 x 1-1/2": Steel: Countersunk: Pozi-Drive: (Box of 200)
426155	Wood Screw: No 12 x 2 1/2": Brass: Countersunk: (Box of 200)
372228	Wood Screw: No 12 x 2-1/2": Steel: Countersunk: Pozi Drive: (Box of 200)
372497	Wood Screw: No 6 x 1": Brass Round Head: (Box of 200)
426288	Wood Screw: No 8 x 1 1/2": Brass Round Head: (Box of 200)
375777	Wood Screw: No 8 x 1": Brass Round Head: (Box of 200).
372073	Wood Screw: No 8 x 1": Steel Countersunk: Pozi-Drive. (Box of 200)
372088	Wood Screw: No 8 x 1-1/4" Steel Countersunk: Pozi-Drive. (Box of 200)
426296	Wood Screw: No 8 x 2": Brass Roundhead: (Box of 200)
372105	Wood Screw: No 8 x 2": Steel Countersunk: Pozi-Drive. (Box of 200)
372124	Wood Screw: No 8 x 2-1/2"; Steel Countersunk: Pozi-Drive: (Box of 200)
372092	Wood Screw: No8 x 1-1/2": Steel Countersunk: Pozi-Drive. (Box of 200)
372069	Wood Screw: No8 x 3/4": Countersunk: (Box of 200)

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Appendix 3 - Technical Information Check List

The following information shall be provided by the supplier for review by Northern Powergrid. Additional information shall be provided if requested.

Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Appendix 2 – completed self-certification conformance declaration	
Complete set of drawings and/or data sheets for each item	
Manufacturing routine test plan	
Packaging information	
ISO:9001, ISO:14001 and ISO:18001 certificates	