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Technical Specification 12-24

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Technical specification for plastic ducts for buried electric cables

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PUBLISHING AND COPYRIGHT INFORMATION

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Amendments since publication

Issue	Date	Amendment
Issue 3	July, 2014	Major revisions of Issue 2 to reflect changes in the British Standards referenced, amendment of affected clauses, new duct classification for directional drilling/trenchless installation applications and other minor amendments. This issue includes the following principal technical changes. References to BS EN 50086-1 and BS EN 50086-2-4 updated to BS EN 61386-1 and BS EN 61386-24 respectively and requirements added for ducts suitable for directional drilling/trenchless installation applications. Foreword. New duct classification (Class 1+) for directional drilling/trenchless installation applications introduced. Clause 1: Scope. Scope expanded to include ducts suitable for use in directional drilling/trenchless installation applications. Clause 2: Normative references. BS EN 60529:1992, BS EN ISO 1183-1:2012, BS EN ISO 13479:2009, BS ISO 11922-1:1997, BS ISO 21307:2011, ISO 527-2:2012 and ENA ER G78 added to the list of Normative references. Clause 3: Terms and definitions. (i) Definition for 'coilable cable duct' replaced by definitions for 'coilable small diameter cable duct' and 'coilable large diameter cable duct'. (ii) Definition for 'coupling' amended to delete use as a termination of ducts and a definition for 'terminating coupling' added. (iii) Definition for 'effective length' amended to distinguish between a plain-ended duct and a single-socket ended duct. (iv) Definition added for 'horizontal directional drill duct (HDD)'.

		(v) In definition of 'ovality' units for stating ovality changed from "mm" to "percentage of the nominal internal duct diameter". (vi) Definition added for standard dimension ratio (SDR). (vii) Definition for 'plastic (cable) duct' enhanced to define both a plain-ended duct and a single-socket ended duct. Clause 4.4. Additional requirement that material for HDD ducts to be suitable for jointing using butt fusion welding techniques. Clause 4.5.1. Additional requirement for type approval to be carried out whenever a new material grade is proposed. Clause 6: Classification. Additional duct type classification 1+, intended for HDD duct applications. Clause 6.4: Class 4 ducts: G78 ducts. Text added to cross-reference to ENA Engineering Recommendation G78. Clause 7.3. Requirement for 'coilable cable ducts' to be indelibly marked on one line only, restricted to 'coilable small diameter cable ducts'. Clause 7.6: Additional Clause that 7.6 of BS EN 50086-1 shall apply. Clause 7.7. Additional Clause that ducts having an integral duct coupling shall be marked in accordance with Clause 7.2 but no requirement for separate duct couplings to be marked where this is impractical. Clause 8.1: Cable duct dimensions. (i) Requirement added that cable ducts dimensions shall be specified by duct ID unless otherwise agreed. (ii) Requirements revised that dimensions of the cable duct to be agreed between the specifier and manufacturer. (iii) Reference to 'preferred sizes' amended to 'commonly used sizes'. (iv) Table 8.1 deleted and data added to table in the (new) Annex B, 'Table B.1 Nominal inside duct diameters – Commonly used sizes'. (v) New ID duct sizes 168, 205, 225 and 236 mm added to Table B.1. Clause 8.2.3: Method, item a). (i) Measurement of ID to be the average of 4 measurements taken at regular intervals around the cross-section instead of 3 measurements taken at 120°. (ii) Compliance revised to require a check against Table B.1 or the sizes agreed between specifier and manufacturer, as appropriate. (iii) Additional compliance requirement that tolerances to be in accordance with ISO 11922-1, applied to the ID measurements. Clause 8.2.3: Method, item b). (i) Compliance revised to require check against Table B.1 to replace Table 8.2. (ii) Table 8.2 deleted. (iii) Data from Table 8.2 added to Table B.1 with the following changes: - Values of "maximum ovality" changed from "mm" to "% of Nom ID"; - Maximum ovality column of Table 8.2 re-labelled non-coilable cable duct; - Column added of maximum ovality of class 3 coilable cable ducts; - Table note on use of OD for maximum ovality measurements; amended to require also the considerations outlined in Annex B. - Table note that values for ovality of coilable cable ducts apply once the coiled duct has been un-coiled. Clause 8.3: Duct couplings. Additional Clause giving requirements for

		duct coupling systems. Clause 9.7: Material properties of HDD ducts. Additional Clause with requirement to test the properties of material used for HDD ducts. Clause 10.2.5. Added requirements for Class 1+ ducts and that compliance of Class 1+, 1 and/or 2 ducts tested at an equivalent force at 23 ºC to be subject to agreement between specifier and manufacturer. Note added that testing at ambient temperature better reflects actual installation performance. Clause 10.7. Additional Clause with a tensile test requirement for HDD ducts based on amended Clause 10.7 of BS EN 61386-1. Clause 11: Electrical properties. Requirement amended to state Clause 11 of BS EN 61386-24 is not applicable. NOTE: BS EN 50086-2-4 stated that this clause of BS EN 61386-1 is not applicable. This has been reversed in BS EN 61386-24, i.e. is stated as applicable. Clause 12: Thermal properties. Requirement amended to state Clause 12 of BS EN 61386-24 shall apply. NOTE: BS EN 50086-2-4 stated that Clause 12.1 of BS EN 50086-1 is applicable but not Clause 12.2. In BS EN 61386-1 Clause 12.1 has been omitted and only the previous Clause 12.2 remains. BS EN 61386-24 now states that BS EN 61386-1 is not applicable. Clause 13: Fire effects. Requirement amended to state Clause 13 of BS EN 61386-24 is not applicable. NOTE: BS EN 50086-2-4 stated that this clause of BS EN 61386-1 is not applicable. This has been reversed in BS EN 61386-24, i.e. is stated as applicable. Table 16.1: Summary of tests and requirements. Entries added of the tests for HDD ducts of material properties of Clause 9.7 and tensile test of Clause 10.7. Clause 16.4.3: (i) Tolerance of $^{+5}_{0}$ min added to the conditioning time of 1 h. (ii) Tolerance for conditioning temperature amended from ±2 °C to $^{+2}_{0}$ °C. Clause 16.4.4: Test method amended from requiring the test to be completed within 1 minute of removal from the oven to a requirement that the samples be maintained at a minimum temperature of 75 °C (for Class 1 duct) or 50 °C (for Class 2 duct) during the test. Clause 16.6: HDD duct material tests. Additional Clause with test methods and compliance requirements for measurement of density, tensile strength and resistance to slow crack growth of the material used to manufacture HDD ducts. Annex A: Check sheet of 'Self Certification Conformance Declaration' added. Annex B: Cable duct dimensions. Additional informative annex of duct dimensions, including: (i) Guidance to select a duct size giving a fill ratio not exceeding 65%; (ii) Table B.1 giving preferred duct dimensions; (iii) Guidance on the method of determining ovality of the duct ID from OD measurements. Annex C: Butt fusion welding of Polyethylene HDD duct. Additional informative annex with guidance on the use of and potential problems with butt fusion welding of HDD ducts. Annex D: SDR of HDD ducts. Additional informative annex with information on SDR value for HDD ducts. Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).

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Foreword

This Technical Specification (TS) is published by the Energy Networks Association (ENA) and comes into effect from date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “ENA TS 12-24”.

This document replaces and supersedes Technical Specification 12-24 Issue 2 2008.

This Specification has been revised to meet the requirements of the Electricity Industry and the New Roads and Street Works Act 1991 for circular section plastic ducts for containment and protection of electric cables, normally installed underground. A new duct classification (Class 1+) for directional drilling/trenchless installation applications together with associated requirements has also been included.

This Technical Specification supplements or modifies the corresponding clauses in BS EN 61386-24:2010 and BS EN 61386-1:2008. The clause numbering of this Technical Specification aligns with that of BS EN 61386-24 to facilitate cross-referencing between the documents. Where there is no equivalent clause or subclause in BS EN 61386-24, reference should be made to BS EN 61386-1. This Technical Specification should be read, therefore, in conjunction with BS EN 61386-1 and BS EN 61386-24.

Where a particular clause or subclause of BS EN 61386-24 or BS EN 61386-1 is not mentioned in this Specification, that clause or subclause applies.

For clarity, compliance requirements in this Specification that differ from those in BS EN 61386-24 are shown in *italics* and constitute a normative element.

Where the term “shall” is used in this document it expresses a requirement. The term “may” is used to express permission.

Commentary, explanation and general informative material is presented in smaller type, and does not constitute a normative element.

1 Scope

This Specification defines the essential performance requirements and specifies limiting dimensions, colour and identification details for coilable and non-coilable, plain or corrugated wall, circular cross section, extruded plastics cable ducts. The ducts and fittings shall be suitable for normal use with electric power and auxiliary cables in buried and directional drilling/trenchless situations, and shall be made from the following materials:

a) Acrylonitrile-butadiene-styrene (ABS).

b) Polyethylene (PE), High or Medium Density.

c) Polypropylene (PP).

d) Unplasticised polyvinyl chloride (uPVC).

2 Normative references

Clause 2 of BS EN 61386-24 is applicable with the following additions.

Standards publications

BS EN 727 (1995), BS 2782-11: Method 1103V (1995), *Plastic piping and ducting systems. Thermoplastic pipes and fittings. Determination of softening temperature*

BS EN 60529:1992, *Specification for degrees of protection provided by enclosures (IP code)*

BS EN 61386-1:2008, *Conduit systems for cable management. General requirements*

BS EN 61386-24:2010, *Conduit systems for cable management. Particular requirements. Conduit systems buried underground*

BS EN ISO 1183-1:2012, *Plastics. Methods for determining the density of non-cellular plastics Immersion method, liquid pyknometer method and titration method*

BS EN ISO 13479:2009, *Polyolefin pipes for the conveyance of fluids. Determination of resistance to crack propagation. Test method for slow crack growth on notched pipes*

BS ISO 11922-1:1997, *Thermoplastic pipes for the conveyance of fluids. Dimensions & Tolerances. Metric Series*

BS ISO 21307:2011, *Plastics pipes and fittings. Butt fusion jointing procedures for polyethylene (PE) pipes and fittings used in the construction of gas and water distribution systems*

ISO 527-2:2012, *Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics*

Other publications

[N1] New Roads and Street Works Act 1991

[N2] ENA Engineering Recommendation G78, *Recommendations for low voltage supplies to mobile phone base stations with antennae on high voltage structures*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Clause 3 of BS EN 61386-24 is applicable with the following additions.

3.1
approval body
individual purchasing distribution network operator

3.2
coilable cable duct

3.2.1
coilable small diameter cable duct
solid wall circular section duct designed for direct burial, where the requirement for resistance to deformation at normal laying depths is secondary to that of flexibility; providing unrestricted access and withdrawal for small diameter service or auxiliary cables and capable of being coiled or bent to a minimum radius of 24 times the nominal inside diameter of the duct without undue distortion, with internal diameters ≤ 55 mm

3.2.2
coilable large diameter cable duct
solid wall circular section duct, designed for direct burial, providing unrestricted access and withdrawal facilities for all types of electric cables under footpaths or carriageways at normal laying depths and capable of being coiled or bent to a minimum radius of 24 times the nominal inside diameter of the duct without undue distortion, with internal diameters > 55 mm up to a maximum inside diameter of 180 mm

3.3
duct coupling

3.3.1
coupling
conduit fitting, as defined in BS EN 61386-1, designed to join one or more components of a duct system or to change direction

3.3.2
terminating coupling
conduit fitting, as defined in BS EN 61386-1, designed to terminate a duct system

3.4
effective length
length of a plain-ended duct or the length remaining when the socket length is subtracted from the overall length of a single-socket duct

3.5
horizontal directional drill (HDD) duct
solid wall circular section duct, designed for horizontal directional drilling applications, where high tensile loads are applied during installation; providing unrestricted access for both high voltage cables and low voltage cables

NOTES.

1. HDD duct can be supplied coiled or in straight lengths being suitable for connection using industry standard techniques such as butt fusion welding provided the inside butt weld or electro fusion coupler weld is removed.
2. See Annex D for information on SDR for HDD ducts.