BS EN 50363-0:2011

BSI Standards Publication

Insulating, sheathing and covering materials for low-voltage energy cables

Part 0: General introduction

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National foreword

This British Standard is the UK implementation of EN 50363-0:2011. It supersedes BS EN 50363-0:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/20/17, Electric Cables - Low voltage.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English version

Insulating, sheathing and covering materials for low-voltage energy cables - Part 0: General introduction

Matériaux pour enveloppe isolante, gainage et revêtement pour les câbles d'énergie basse tension - Partie 0: Introduction générale

Isolier-, Mantel- und Umhüllungswerkstoffe für Niederspannungskabel und -leitungen - Teil 0: Allgemeine Einführung

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 20, Electric cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50363-0 on 2011-03-14.

This document supersedes EN 50363-0:2005.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-03-14
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-03-14

Contents

Introduction

EN 50363 contains, in its various parts, the requirements for insulating, sheathing and covering materials that are used for harmonized low voltage energy cables in EN 50525.

The previous edition of EN 50363-0 (2005) showed, in its Annex A, the original location in HD 21 and HD 22 of each material and its place in the full series of EN 50363. For this second edition, this annex has been deleted.

The content of EN 50363 is not, and will not be, restricted only to materials for cables to EN 50525. Other materials for harmonized LV industrial cables may be included. Furthermore, the use of materials in EN 50363 for cables outside EN 50525 is not prohibited, but it is strongly recommended that expert advice be taken before such use, or before any proposal for incorporation into another standard.

1 Scope

EN 50363 contains, in its various parts, the requirements for insulating, sheathing and covering materials that are used for harmonized low voltage energy cables.

EN 50363 is published as this Part 0 together with a series of separately published parts as listed in Table 1 and these parts require that Part 0 be read in conjunction with them. It also includes a list of the test methods called up in the particular parts of the standard, with references to the current editions of other standards in which the relevant test methods are given.

Table 1 — Parts for EN 50363

Part number	Title	Compounds included
0	General introduction	-
1	Cross-linked elastomeric insulating compounds	EI 2, EI 3, EI 4, EI 6, EI 7
2-1	Cross-linked elastomeric sheathing compounds	EM 2, EM 3, EM 4, EM 6, EM 7, EM 9
2-2	Cross-linked elastomeric covering compounds	EM 5
3	PVC insulating compounds	TI 1, TI 2, TI 3, TI 4, TI 5
4-1	PVC sheathing compounds	TM 1, TM 2, TM 3, TM 4, TM 5,
4-2	PVC covering compounds	TM 6
5	Halogen-free, cross-linked insulating compounds	EI 5, EI 8
6	Halogen-free, cross-linked sheathing compounds	EM 8, EM 10
7	Halogen-free, thermoplastic insulating compounds	TI 6, TI 7
8	Halogen-free, thermoplastic sheathing compounds	TM 7
9-1 [a]	Miscellaneous insulating compounds – Cross-linked polyvinyl chloride (XLPVC)	XI 1
10-1 [a]	Miscellaneous sheathing compounds – Cross-linked polyvinyl chloride (XLPVC)	XM 1
10-2	Miscellaneous sheathing compounds – Thermoplastic polyurethane	TMPU
[a] This part is proposed for withdrawal.		

Materials for use specifically in utility power cables are not covered by this EN. They can be found in HD 603, HD 604, HD 620, HD 621, HD 622, HD 626 and HD 627.

Materials for use specifically in communications cables are the responsibility of CENELEC TC 46X. At present such materials are given in EN 50290-2-20 to -2-30 inclusive.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Publication	Year	Title
EN 50267-2-1		Common test methods for cables under fire conditions – Tests on gases evolved during combustion of materials from cables – Part 2-1: Procedures – Determination of the amount of halogen acid gas
EN 50267-2-2		Common test methods for cables under fire conditions – Tests on gases evolved during combustion of materials from cables – Part 2-2: Procedures – Determination of degree of acidity of gases for materials by measuring pH and conductivity
EN 50395		Electrical test methods for low voltage energy cables
EN 50396		Non electrical test methods for low voltage energy cables
EN 50525-3-11		Electric cables – Low voltage energy cables of rated voltages up to and including 450/750 V (U_0/U)– Part 3-11: Cables with special fire performance – Flexible cables with halogen-free thermoplastic insulation, and low emission of smoke
EN 60684-2		Flexible insulating sleeving – Part 2: Methods of test (IEC 60684-2)
EN 60811-1-1		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-1: General application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties (IEC 60811-1-1)
EN 60811-1-2		Insulating and sheathing materials of electric cables – Common test methods – Part 1-2: General application – Thermal ageing methods (IEC 60811-1-2)
EN 60811-1-3		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-3: General application – Methods for determining the density – Water absorption tests – Shrinkage test (IEC 60811-1-3)
EN 60811-1-4		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-4: General application – Tests at low temperature (IEC 60811-1-4)
EN 60811-2-1		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance, hot set and mineral oil immersion tests (IEC 60811-2-1)
EN 60811-3-1		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 3-1: Methods specific to PVC compounds – Pressure test at high temperature – Tests for resistance to cracking (IEC 60811-3-1)
EN 60811-3-2		Insulating and sheathing materials of electric and optical cables – Common test methods – Part 3-2: Methods specific to PVC compounds – Loss of mass test – Thermal stability test (IEC 60811-3-2)

EN 60811-4-1	Insulating and sheathing materials of electric and optical cables – Common test methods – Part 4-1: Methods specific to polyethylene and polypropylene compounds – Resistance to environmental stress cracking – Measurement of the melt flow index – Carbon black and/or mineral filler content measurement in polyethylene by direct combustion – Measurement of carbon black content by thermogravimetric analysis (TGA) – Assessment of carbon black dispersion in polyethylene using a microscope (IEC 60811-4-1)

3 Terms and definitions

For the purposes of this document the following terms and definitions apply.

3.1
variation
difference between the median value after ageing and the median value without ageing expressed as a percentage of the latter

3.2
median value
when several test results have been obtained and ordered in an increasing or decreasing succession, middle value if the number of available values is odd, and mean of the two middle values if the number is even

3.3 Type of material/compound

3.3.1
cross-linked silicone rubber (SiR)
compound based on a poly-siloxane polymer which, when cross-linked, meets the requirements given in the particular specification

3.3.2
ethylene vinyl acetate rubber compound (EVA) or equivalent synthetic elastomer
cross-linked compound in which the elastomer is ethylene vinyl acetate or equivalent synthetic elastomer providing a compound with properties similar to EVA

3.3.3
ethylene-propylene rubber compound (EPR) or equivalent synthetic elastomer
cross-linked compound in which the elastomer is ethylene-propylene or equivalent synthetic elastomer providing a compound with properties similar to EPR

3.3.4
polychloroprene compound or equivalent synthetic elastomer
cross-linked compound in which the elastomer is polychloroprene (PCP) or equivalent synthetic elastomer providing a compound with properties similar to polychloroprene

3.3.5
chlorinated rubber compound
cross-linked compound in which the characteristic constituent is a synthetic chlorinated rubber, e.g. Polychloroprene (PCP), Chlorosulphonated Polyethylene (CSP), Chlorinated Polyethylene (CPE), etc.

3.3.6
polyvinyl chloride compound
PVC
combinations of materials of which polyvinyl chloride is the characteristic constituent, suitably selected proportioned and treated which meet the requirements given in the particular specification

3.3.7
crosslinked polyvinyl chloride
XLPVC
combinations of materials of which polyvinyl chloride is the characteristic constituent, including adequate crosslinking agents, suitably selected, proportioned and treated which when crosslinked, meet the requirements given in the particular specification

3.3.8
polyolefin based halogen-free compound
compound, either crosslinked or thermoplastic, in which the polymer is a polyolefin or equivalent synthetic polymer not containing halogens providing a compound which meets the requirements given in the particular specification

3.3.9
thermoplastic polyurethane compound
TMPU
thermoplastic compound based on an ether-based polyurethane which meets the requirements given in the particular specification

4 Testing

4.1 General

The test methods called up in the particular parts of EN 50363 are listed in Table 2.

4.2 Sampling

4.2.1 Insulation

Unless otherwise stated in the standard for the particular cable, the tests on insulation shall be made on samples from each core if the cable has one, two or three cores; and on samples from three cores (of differing colours if any) if the cable has more than three cores, with samples taken not less than 16 h after extrusion, and crosslinking if appropriate.

4.2.2 Sheath

Samples shall be taken not less than 16 h after extrusion, and cross-linking if appropriate.

4.3 Ambient temperature

Tests shall be made at an ambient temperature within the range 5 °C to 35 °C unless otherwise specified in the details for the particular test.

5 Requirements

The requirements for the various types of compound have been drafted such that conformity can be checked by testing samples taken from finished cable.

NOTE In earlier standards for materials, requirements for compatibility and for resistance to impact at low temperature were included. These are now shown, as part of the requirements for the particular cable, for instance in EN 50525.

Table 2 — Test methods

Test	Method (given in EN 60811 unless otherwise stated)		
	Section	Clause	
		Insulation	Sheath
Properties in the state as manufactured: Tensile strength and elongation at break	1-1:1995	9.1	9.2
Properties after ageing in air oven: Tensile strength and elongation at break	1-2:1995	8.1	8.1
Properties after ageing in air bomb: Tensile strength and elongation at break	1-2:1995	8.2	8.2
Shrinkage test	1-3:1995	10	-
Bending test at low temperature	1-4:1995	8.1	8.2
Elongation test at low temperature	1-4:1995	8.3	8.4
Ozone resistance test	2-1:1998	8	8
Alternative ozone resistance test (low concentration)	EN 50396	8.1.3	8.1.3
Hot set test	2-1:1998	9	9
Mineral oil immersion test	2-1:1998	-	10
Pressure test at high temperature	3-1:1995	8.1	8.2
Test for resistance to cracking (Heat shock)	3-1:1995	9.1	9.2
Loss of mass test	3-2:1995	8.1	8.2
Thermal stability test	3-2:1995	9	9
Carbon black content	4-1:1995	-	11
Test for insulation resistance constant	EN 50395	8	-
Water resistance test	EN 50525-3-11	-	Annex D
Mechanical properties after immersion in water (resistance to hydrolysis)	EN 50396	-	10.3
Test for tear resistance	EN 50396	-	10.2
Resistance against saponification	EN 50396	-	10.1
Assessment of halogens (HCl and HBr)	EN 50267-2-1		
Assessment of halogens (pH and conductivity)	EN 50267-2-2		
Assessment of halogens (HF)	EN 60684-2		

Bibliography

EN 50290-2-20 to -2-30, *Communication cables – Common design rules and construction*

EN 50525 (all parts), *Electric cables – Low voltage energy cables of rated voltages up to and including 450/750 V* (U_0/U)

HD 21 (all parts), *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation* (HD 21 will be superseded by the future EN 50525-1)

HD 22 (all parts), *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation* (HD 22 will be superseded by the future EN 50525-1)

HD 603, *Distribution cables of rated voltage 0,6/1 kV*

HD 604, *0,6/1 kV and 1,9/3,3 kV power cables with special fire performance for use in power stations*

HD 620, *Distribution cables with extruded insulation for rated voltages from 3,6/6 (7,2) kV up to and including 20,8/36 (42) kV*

HD 621, *Medium voltage impregnated paper insulated distribution cables*

HD 622, *Power cables having rated voltages from 3,6/6 (7,2) kV up to and including 20,8/36 (42) kV with special fire performance for use in power stations*

HD 626, *Overhead distribution cables of rated voltage U_0/U (Um): 0,6/1 (1,2) kV*

HD 627, *Multicore and multipair cables for installation above and below ground*

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