BS 7655-0:2006

BRITISH STANDARD

Specification for insulating and sheathing materials for cables

Part 0: General introduction

ICS 29.035.20

Publishing and copyright information

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 7 and a back cover.

Foreword

Publishing information

This part of BS 7655 is published by BSI and came into effect on 31 July 2006. It was prepared by Subcommittee GEL/20/17 *Low voltage cables*, under the authority of Technical Committee GEL/20 *Electric cables*.

Supersession

This part of BS 7655 supersedes BS 7655-0:1997, which is withdrawn.

Relationship with other publications

BS 7655-0 provides a general introduction to the series of sections that make up BS 7655, together with a list of those sections currently published. In addition BS 7655-0 includes a complete list of the test methods which are called up in the sections of BS 7655, with a dated reference to the most recent edition of the standard in which each test method is given. The sections of BS 7655 give test methods but do not refer to a particular edition of the relevant standard. This information is given only in BS 7655-0, which needs to be consulted for each test.

BS 7655-0 is normative.

Information about this document

This new edition of BS 7655-0 incorporates the following changes to bring the standard up to date. It does not represent a full review or revision of the standard, which will be undertaken in due course.

a) The harmonized materials given in CENELEC Harmonization documents HD 21 and HD 22 have been deleted from Table 1. These materials are now given in the BS EN 50363 series, and the sections of BS 7655 in which they were specified have been amended or withdrawn. A new Annex A has been added to BS 7655-0 giving a list of the compounds previously in sections of BS 7655 which are now in the BS EN 50363 series.

b) Material type EI 2 has been deleted from Table 1. This material has been replaced by material type EM 9 which is specified in BS EN 50363-2-1, and BS 7655-2.2 has been withdrawn.

c) The materials given in BS 7655-1.6, -4.3 and -8.2 have been deleted from Table 1 as these materials are no longer required nationally. BS 7655-1.6, -4.3 and -8.2 have also been withdrawn.

d) Details of non-harmonized materials, which are given in the remaining sections of BS 7655 and which are specified in national product specifications for use in the UK, have been updated.

Hazard warnings

WARNING. This British Standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This Part of BS 7655 gives a general introduction to BS 7655, specifying those elements that are common to the subordinate parts and sections which are issued separately. It also includes a list of the test methods called up in the sections of BS 7655 with references to the current editions in which the relevant test methods are given.

The subordinate parts and sections of BS 7655 that require this part of BS 7655 to be read with them are listed in Table 1.

NOTE Annex A shows a list of those compounds previously in BS 7655 but now given in BS EN 50363.

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.

BS 903-A26:1995 including amendment 1:2001, *Physical testing of rubber – Part A26: Method for determination of hardness (hardness between 10 IRHD and 100 IRHD)*

BS 6469-99.1:1992 including amendments 1:1994, 2:1997, and 3:2006, *Common test methods for insulating and sheathing materials of electric cables – Part 99: Test methods used in the United Kingdom but not specified in BS EN 60811 – Section 99.1: Non-electrical tests*

BS 6469-99.2:1992 including amendment 1:2006, *Common test methods for insulating and sheathing materials of electric cables – Part 99: Test methods used in the United Kingdom but not specified in BS EN 60811 – Section 99.2: Electrical tests*

BS EN 50267-2-1:1999, *Common test methods for cables under fire conditions – Tests on gases evolved during combustion of material from cables – Part 2-1: Procedures – Determination of the amount of halogen acid gas*

BS EN 50396:2005, *Non-electrical test methods for low voltage energy cables*

BS EN 60811-1-1:1995 including amendment 1:2002, *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*

BS EN 60811-1-2:1995 including amendment 1:2002, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 1-2: General application – Thermal ageing methods*

BS EN 60811-1-3:1995 including amendment 1:2002, *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*

BS EN 60811-1-4:1995 including amendment 1:2002, *Insulating and sheathing materials of electric cables – Common test methods – Part 1-4: General application – Tests at low temperature*

BS EN 60811-2-1:1998 including amendment 1:2002, *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*

BS EN 60811-3-1:1995 including amendments 1:1997 and 2:2002, *Insulating and sheathing materials of electric cables – Common test methods – Part 3: Methods specific to PVC compounds – Section 3.1: Pressure test at high temperature – Tests for resistance to cracking*

BS EN 60811-3-2:1995 including amendment 2:2004, *Insulating and sheathing materials of electric cables – Common test methods – Part 3: Methods specific to PVC compounds – Section 2: Loss of mass test – Thermal stability test*

BS EN 60811-4-1:2004, *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 content in polyethylene using a microscope*

3 Terms and definitions

For the purposes of the parts and sections of BS 7655 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 the median is the middle value if the number of available values is odd and is the mean of the two middle values if the number is even

4 Testing

4.1 General

The test methods called up in the particular sections of BS 7655 are listed in Table 2.

4.2 Sampling

4.2.1 Insulation

Unless otherwise stated in the British 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. The samples shall be taken not less than 16 h after extrusion for thermoplastic materials and not less than 16 h after extrusion and cross-linking for thermosetting materials.

4.2.2 Sheath

Samples shall be taken not less than 16 h after extrusion for thermoplastic materials and not less than 16 h after extrusion and cross-linking for thermosetting materials.

4.3 Ambient temperature

Unless otherwise specified in the details for the particular test, tests shall be made at an ambient temperature of (20 ± 15) °C.

5 Requirements

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

Table 1 **Titles or status of parts and sections of BS 7655**

Part/Section no.	Title/status	Compounds included
Part 0	*General introduction*	
Part 1	*Cross-linked elastomeric insulating compounds*	
Section 1.1	Withdrawn	—
Section 1.2	*General 90 °C application*	GP 4, GP 5, GP 6, GP 7
Section 1.3	*XLPE*	GP 8
Section 1.4	*Oil resisting types*	OR 1
Section 1.5	*Flame retardant composites*	FR 1, FR 2
Section 1.6	Withdrawn	—
Part 2	*Cross-linked elastomeric sheathing compounds*	
Section 2.1	Withdrawn	—
Section 2.2	Withdrawn	—
Section 2.3	*General application*	RS 2, RS 3, RS 4, RS 6
Section 2.4	*Welding cable covering*	RS 5
Section 2.5	Spare	—
Section 2.6	*Sheathing compounds for ships' wiring and offshore applications*	SW 1, SW 2, SW 3, SW 4
Part 3	*PVC insulating compounds*	
Section 3.1	Withdrawn	—
Section 3.2	*Hard grade types*	Type 2
Part 4	*PVC sheathing compounds*	
Section 4.1	Withdrawn	—
Section 4.2	*General application*	Type 5, Type 6, Type 9, Type 10
Section 4.3	Withdrawn	—

Table 1 **Titles or status of parts and sections of BS 7655** *(continued)*

Part/Section no.	Title/status	Compounds included
Part 5	*Cross-linked insulating compounds having low emission of corrosive gases, and suitable for use in cables having low emission of smoke when affected by fire*	
Section 5.1	Withdrawn	—
Part 6	*Thermoplastic sheathing compounds having low emission of corrosive gases, and suitable for use in cables having low emission of smoke when affected by fire*	
Section 6.1	*General application thermoplastic types*	LTS 1, LTS 2, LTS 3, LTS 4
Part 7[A)]	Spare	—
Part 8	*Cross-linked sheathing compounds having low emission of corrosive gases, and suitable for use in cables having low emission of smoke when affected by fire*	
Section 8.1	Withdrawn	—
Section 8.2	Withdrawn	—
Part 9[A)]	Spare	—
Part 10	*Polyethylene sheathing compounds*	
Section 10.1	*Thermoplastic medium density polyethylene (MDPE) sheathing compound*	TS 2
Part 11	*Miscellaneous insulating compounds*	
Section 11.1	Withdrawn	—
Part 12	*Miscellaneous sheathing compounds*	
Section 12.1	Withdrawn	—
Section 12.2	Withdrawn	—

[A)] For future use.

Table 2 **Test methods**

Test	**Method (given in BS 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**
Water absorption (gravimetric)	1-3:1995	**9.2**	**—**
Bending test at low temperature	1-4:1995	**8.1**	**8.2**
Elongation test at low temperature	1-4:1995	**8.3**	**8.4**
Impact test at low temperature	1-4:1995	**—**	**8.5**
Ozone resistance test	2-1:1998	**8**	**—**
Hot set test	2-1:1998	**9**	**9**
Mineral oil immersion test	2-1:1998	**10**	**10**
Pressure test at high temperature	3-1:1995	**8.1**	**8.2**
Test for resistance to cracking	3-1:1995	**9.1**	**9.2**
Loss of mass test	3-2:1995	**8.1**	**8.2**
Carbon black content	4-1:2004	**—**	**11**
Test for tear resistance	BS 6469-99.1:1992	**—**	**9**
Hot deformation test	BS 6469-99.1:1992	**10**	**10**
Determination of linear swell after ageing in oil	BS 6469-99.1:1992	**—**	**12**
Alternative ozone resistance test (low concentration)	BS EN 50396:2005	**8.1.3**	**—**
Water immersion test on sheath	BS 6469-99.1:1992	**—**	**14**
Determination of UV stability for MDPE sheath	BS 6469-99.1:1992[A)]	**—**	**15**
Test for insulation resistance constant (K value)	BS 6469-99.2:1992	**8**	**8**
Test for power factor and permittivity	BS 6469-99.2:1992	**9**	**—**
Water absorption determined by the capacitance method	BS 6469-99.2:1992	**10**	**—**
Hardness	BS 903-A26:1995		
Halogen gas emission	BS EN 50267-2-1:1999		

[A)] It is intended that this test method will be included in a future revision of BS 7870-2.

Annex A (informative) List of parts of BS EN 50363 and of compounds transferred from BS 7655 to BS EN 50363

A list of parts of BS EN 50363 and of the compounds transferred from the BS 7655 series to the BS EN 50363 series is given in Table A.1.

Table A.1 **Parts of BS EN 50363 and compounds transferred from BS 7655 to BS EN 50363**

BS EN 50363 part number	Title	BS 7655 equivalent section number	Compounds now in BS EN 50363
0	*General introduction*	—	—
1	*Cross-linked elastomeric insulating compounds*	1.1	EI 2, EI 3, EI 4, EI 6, EI 7
2-1	*Cross-linked elastomeric sheathing compounds*	2.1	EM 2, EM 3, EM 4, EM 6, EM 7, EM 9
2-2	*Cross-linked elastomeric covering compounds*	2.4	EM 5
3	*PVC insulating compounds*	3.1	TI 1, TI 2, TI 3, TI 4, TI 5
4-1	*PVC sheathing compounds*	4.1	TM 1, TM 2, TM 3, TM 4, TM 5
4-2	*PVC covering compounds*	—	—
5	*Halogen-free, cross-linked insulating compounds*	5.1	EI 5, EI 8
6	*Halogen-free, cross-linked sheathing compounds*	8.1	EM 8, EM 10
7	*Halogen-free, thermoplastic insulating compounds*	—	—
8	*Halogen-free, thermoplastic sheathing compounds*	—	—
9-1	*Miscellaneous insulating compounds – Cross-linked polyvinyl chloride (XLPVC)*	11.1	XI 1
10-1	*Miscellaneous sheathing compounds – Cross-linked polyvinyl chloride (XLPVC)*	12.2	XM 1
10-2	*Miscellaneous sheathing compounds – Thermoplastic polyurethane*	12.1	TMPU

Bibliography

BS EN 50363 (all parts), *Insulating, sheathing and covering materials for low voltage energy cables*

CENELEC HD 21 (all parts), *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation*

CENELEC HD 22 (all parts), *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation*

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