Specification for

Insulating and sheathing materials for cables —

Part 1: Cross-linked elastomeric insulating compounds —

Section 1.1: Harmonized types

IMPORTANT NOTE This section of BS 7655 is to be read in conjunction with BS 7655-0.

ICS 29.035.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/3, Insulation and sheath, upon which the following bodies were represented:

Association of Consulting Engineers
British Approvals Service for Cables
British Cables Association
British Plastics Federation
British Rubber Manufacturers' Association Ltd.
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Electricity Association
ERA Technology Ltd.
GAMBICA (BEAMA Ltd.)
Institute of Fire Prevention Officers
London Underground Ltd.
Ministry of Defence
Queen Mary and Westfield College
Railtrack
Warrington Fire Research Centre

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Contents

Foreword

This section of BS 7655 has been prepared by Subcommittee GEL/20/3. It supersedes BS 7655-1.1:1997 which is withdrawn. It specifies the requirements for harmonized types of cross-linked elastomeric insulation compounds, in accordance with HD 22.1.

This revision brings this section of BS 7655 fully into line with BS 7655-0:1997, including amendment 1:2000, and with HD 22.1 S3:1997.

Test methods are specified in this section of BS 7655 by reference to the latest edition of standards in which they appear. A dated reference to the most recent edition of the relevant standard for each test method is given in BS 7655-0, which is to be read in conjunction with this section.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 5 and a back cover.

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1 Scope

This section of BS 7655 specifies the requirements for the harmonized cross-linked elastomeric insulating compounds listed in Table 1. The relevant test methods are given in BS EN 60811 and BS 6469.

This section is to be read in conjunction with BS 7655-0, which contains essential provisions for the application of this section of BS 7655.

Table 1 — Type of harmonized cross-linked elastomeric insulation

Type	Maximum material operating temperature °C	General application
EI 2	180	Ordinary duty silicone rubber
EI 3	110	Ordinary duty EVA rubber or equivalent
EI 4	60	Ordinary duty ethylene propylene rubber
EI 6	90	Ordinary duty ethylene propylene rubber or equivalent synthetic elastomer for cables requiring handling down to −40 °C
EI 7	90	Ordinary duty ethylene propylene rubber or equivalent synthetic elastomer

2 Normative references

For the purposes of this section of BS 7655, the requirements of BS 7655-0, **2.1** apply with regard to normative references.

The latest editions of the standards giving test methods are listed in the most recent edition of BS 7655-0.

3 Definitions

For the purposes of this section of BS 7655 the definitions given in BS 7655-0, clause **3** apply.

4 Requirements

The requirements specified for the compounds listed in Table 2 shall be met when the compound is tested using the test methods listed against each particular requirement.

NOTE For cross-references to the latest editions of the test method standards see BS 7655-0, Table 2.

Table 2 — Test requirements *(concluded)*

Test	Test method in accordance with BS EN 60811 unless otherwise stated		Requirements for compound type				
	Section	Clause	EI 2	EI 3	EI 4	EI 6	EI 7
Properties in the state as manufactured	1-1	**9.1**					
Minimum tensile strength (N/mm^2)			5	6.5	5	5	5
Minimum elongation at break (%)			150	200	200	200	200
Properties after ageing in air oven	1-2	**8.1**[1)]					
Temperature (°C)			200 ± 3	150 ± 2	100 ± 2	135 ± 2	135 ± 2
Duration (h)			10 × 24	10 × 24	7 × 24	7 × 24	7 × 24
Minimum tensile strength (N/mm^2)			4	—	4.2	5	5
Maximum variation (%)			—	30	25	30	30
Minimum elongation at break (%)			120	—	200	—	—
Maximum variation (%)			—	30	25	30	30
Properties after ageing in air bomb	1-2	**8.2**					
Temperature (°C)			—	150 ± 2	127 ± 2	127 ± 2	127 ± 2
Duration (h)			—	7 × 24	40	40	40
Minimum tensile strength (N/mm^2)			—	6	—	—	—
Maximum variation (%)			—	—	30	30	30
Maximum variation for elongation at break (%)			—	30[2)]	30	30	30
Bending test at low temperature	1-4	**8.1**					
Temperature (°C)			—	—	—	−50 ± 3	−35 ± 2
Requirement			—	—	—	no cracks	
Elongation test at low temperature	1-4	**8.3**					
Temperature (°C)			—	—	—	−50 ± 3	−35 ± 2
Minimum elongation without break (%)			—	—	—	30	30
Ozone resistance test	2-1	**8**					
Temperature (°C)			—	—	25 ± 2	25 ± 2	25 ± 2
Duration (h)			—	—	24	24	24
Ozone concentration (ppm)			—	—	250 to 300	250 to 300	250 to 300
Requirement			—	—	no cracks		
Alternative ozone resistance test (low concentration)	BS 6469-99.1, clause **13**						
Temperature (°C)			—	—	40 ± 2	40 ± 2	40 ± 2
Duration (h)			—	—	72	72	72
Ozone concentration (pphm)			—	—	200 ± 50	200 ± 50	200 ± 50
Requirement			—	—	no cracks		

Table 2 — Test requirements *(concluded)*

Test	Test method in accordance with BS EN 60811 unless otherwise stated		Requirements for compound type				
	Section	Clause	EI 2	EI 3	EI 4	EI 6	EI 7
Hot set test	2-1	**9**					
Temperature (°C)			250 ± 3	200 ± 3	200 ± 3	250 ± 3	250 ± 3
Duration (min)			15	15	15	15	15
Mechanical stress (N/mm^2)			0.2	0.2	0.2	0.2	0.2
Requirements							
Maximum elongation under load (%)			100	100	100	100	100
Maximum elongation after unloading (%)			25	25	25	25	25
Pressure test at high temperature	3-1	**8.1**					
Temperature (°C)			—	150 ± 2	—	—	—
Duration (h)			—	0.5	—	—	—
k value			—	1.0	—	—	—
Requirement							
Maximum penetration (%)			—	50	—	—	—

[1] Unless specified otherwise in the particular product standard EI 2 and EI 3 shall be tested in accordance with **8.1.3.1** and EI 4, EI 6 and EI 7 in accordance with **8.1.3.2**a). Where it is not possible to complete the test to **8.1.3.2**a), i.e. due to adhesion of the insulation to the conductor, the ageing shall be carried out with not more than 30 % of the conductor wires removed.

[2] Only a reduction in value is subject to verification.

Bibliography

See BS 7655-0, **2.2**.

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