BRITISH STANDARD

BS 5099:2004
Incorporating Amendment No. 1

Electric cables — Voltage levels for spark testing

ICS 29.060.20

BSI British Standards

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/17, Low voltage cables, upon which the following bodies were represented:

BEAMA Installation Ltd.

British Approvals Service for Cables

British Cables Association

British Plastics Federation

Chartered Institution of Building Services

Department of Trade and Industry — Consumer Safety Unit

Electricity Association

Energy Industries Council

Engineering Industries Association

ERA Technology Ltd.

Ministry of Defence — UK Defence Standardization

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The following BSI references relate to the work on this British Standard:
Committee reference GEL/20/17
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Foreword

This British Standard has been prepared by Subcommittee GEL/20/17. Together with BS EN 50356, it supersedes BS 5099:1992, which is withdrawn.

This new edition represents a full revision of the standard. It has been produced to take into account the publication by CENELEC of EN 50356, which has been implemented as BS EN 50356:2002. BS EN 50356 details the apparatus and protocol for spark testing, but gives only limited and informative guidance as to the voltages to be applied. This new edition of BS 5099 therefore provides the full range of applicable test voltages, but no longer gives details of the tests themselves. It has been necessary to revise the title of BS 5099 as a consequence.

This British Standard should be read in conjunction with BS EN 50356.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

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1 Scope

This British Standard specifies voltage test levels for spark testing of insulation or sheathing layers of electric cables in accordance with the method of test given in BS EN 50356.

2 Normative references

The following referenced document is 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 EN 50356, *Method for spark testing of cables*.

3 Application

The test voltages specified in this standard shall be applied at the stages of manufacture indicated by the relevant cable standard.

NOTE The test clauses of the appropriate cable standard give details of the components to which spark testing is applicable.

4 Equipment

The spark testing equipment shall conform to BS EN 50356.

NOTE BS EN 50356 specifies requirements for voltage waveform, procedure, equipment, safety, high voltage source, voltage monitoring equipment, fault indicator, electrodes, design of electrodes, sensitivity and calibration.

5 Test voltage

5.1 General

The supply to the test electrode shall be either alternating current (a.c.), direct current (d.c.), high frequency (h.f.) current or pulsed current as specified in BS EN 50356.

NOTE The relevant cable specification can limit the type of supply that is applicable for the cable that is to be tested.

For all types of testing, the conductor of the core under test, or the conductor, metallic sheath, screen or armour underlying the non-metallic layer to be tested, shall be continuously earthed.

5.2 Insulation

When spark testing of insulation is specified in the relevant cable standard, it shall be subjected to the spark test voltage values given by the potential difference between the test electrode and the conductor of the core or cable under test.

For cables having a rated voltage between 300 V and 3 300 V, the spark test voltage values shall be in accordance with Table 1 unless otherwise specified in the relevant cable standard.

For cables having a rated voltage greater than 3 300 V, the spark test voltage values shall be either 25 kV a.c. or 38 kV d.c. as specified in the relevant cable standard.

Table 1 — Spark test voltage values for insulation for cables having a rated voltage between 300 V and 3 300 V

Tabulated radial thickness of insulation[a]		Test voltage			
Above	Up to and including	a.c.	d.c.	h.f. (r.m.s.)	pulse
mm	mm	kV	kV	kV	kV
—	0.25	3	5	4	5
0.25	0.50	5	7	6	7
0.50	0.75	6	9	7	9
0.75	1.00	7	11	8	11
1.00	1.25	9	13	10[b]	13
1.25	1.50	10	15	11[b]	15
1.50	1.75	12	17	13[b]	17
1.75	2.00	13	20	14[b]	20
2.00	2.25	14	22	15[b]	—
2.25	2.50	16	24	17[b]	—
2.50	2.75	17	26	18[b]	—
2.75	3.00	19	28	20[b]	—
3.00	—	25	38	—	—

[a] The tabulated radial thickness is that specified in the relevant tables of the appropriate cable standard. Where more than one thickness is given, the minimum value shall be used.
[b] High frequency (h.f.) voltage testing for layer thickness greater than 1.0 mm should be limited to frequencies between 500 Hz and 4 kHz.

5.3 Insulation and sheath combined

When spark testing of a combination of insulation and sheath is specified in the relevant cable standard, it shall be subjected to the following spark test voltage values, unless otherwise specified in the cable standard:

a) a.c.: 6 kV per millimetre of the combined tabulated radial thickness of insulation and sheath, up to a maximum voltage of 25 kV;

b) d.c. and pulse: 9 kV per millimetre of the combined tabulated radial thickness of insulation and sheath, up to a maximum voltage of 38 kV for d.c. and 23 kV for pulse;

c) h.f.: 7 kV per millimetre of the combined tabulated radial thickness of insulation and sheath, up to a maximum voltage of 14 kV.

5.4 Sheath

When spark testing of sheath is specified in the relevant cable standard, it shall be subjected to the following spark test voltage values, unless otherwise specified in the cable standard:

a) a.c.: 6 kV per millimetre of the tabulated radial thickness of sheath, up to a maximum voltage of 25 kV;

b) d.c. and pulse: 9 kV per millimetre of the tabulated radial thickness of sheath, up to a maximum voltage of 38 kV for d.c. and 23 kV for pulse;

c) h.f.: 7 kV per millimetre of the tabulated radial thickness of sheath, up to a maximum voltage of 10.5 kV.

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