INTERNATIONAL STANDARD

IEC 60245-8

Edition 1.1
2004-01

Edition 1:1998 consolidated with amendment 1:2003

Rubber insulated cables – Rated voltages up to and including 450/750 V –

Part 8: Cords for applications requiring high flexibility

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RUBBER INSULATED CABLES – RATED VOLTAGES UP TO AND INCLUDING 450/750 V –

Part 8: Cords for applications requiring high flexibility

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60245-8 has been prepared by subcommittee 20B: Low-voltage cables, of IEC technical committee 20: Electric cables.

This consolidated version of IEC 60245-8 consists of the first edition (1998) [documents 20B/259/FDIS and 20B/269/RVD] and its amendment 1 (2003) [documents 20/580/CDV and 20/662/RVC].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

IEC 60245 consists of the following parts, under the general title: *Rubber insulated cables – Rated voltages up to and including 450/750 V*:

– Part 1:1994, General requirements
– Part 2:1994, Test methods
– Part 3:1994, Heat resistant silicone insulated cables
– Part 4:1994, Cords and flexible cables
– Part 5:1994, Lift cables
– Part 6:1994, Arc welding electrode cables
– Part 7:1994, Heat resistant ethylene-vinyl-acetate rubber insulated cables
– Part 8:1997, Cords for applications requiring high flexibility

Parts 3 to 8 are for particular types of cables and should be read in conjunction with part 1 and part 2. Further parts may be added as other types are standardised.

Annexes A and B form an integral part of this standard.

The committee has decided that the contents of the base publication and its amendment 1 will remain unchanged until 2009. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

RUBBER INSULATED CABLES – RATED VOLTAGES UP TO AND INCLUDING 450/750 V –

Part 8: Cords for applications requiring high flexibility

1 General

1.1 Scope

This part of IEC 60245 details the particular specifications for rubber or cross-linked polyvinyl chloride insulated and rubber or cross-linked polyvinyl chloride sheathed cords of rated voltage 300/300 V, for use in applications where high flexibility is required, for example for iron cords.

All cables should comply with the appropriate requirements given in IEC 60245-1 and the individual types of cables should each comply with the particular requirements of this part.

1.2 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.

IEC 60228:1978, *Conductors of insulated cables*

IEC 60245-1, *Rubber insulated cables – Rated voltages up to and including 450V/750 V – Part 1: General requirements*

IEC 60245-2, *Rubber insulated cables – Rated voltages up to and including 450V/750 V – Part 2: Test methods*

IEC 60332-1:1993, *Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable*

IEC 60719:1992, *Calculation of the lower and upper limits for the average outer dimensions of cables with circular copper conductors and of rated voltages up to and including 450/750 V*

IEC 60811-1-1:1993, *Common test methods for insulating and sheathing materials of electric cables – Part 1-1: Methods for general application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

IEC 60811-1-2:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1-2: Methods for general application – Thermal ageing methods*

IEC 60811-1-4:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1-4: Methods for general application – Tests at low temperature*

IEC 60811-2-1:1986, *Common test methods for insulating and sheathing materials of electric cables – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance test – Hot set test – Mineral oil immersion test*

IEC 60811-3-1:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 3-1: Methods specific to PVC compounds – Pressure test at high temperature – Tests for resistance to cracking*

IEC 60811-3-2:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 3-2: Methods specific to PVC compounds – Loss of mass test – Thermal stability tests*

2 Rubber insulated and sheathed cords for applications requiring high flexibility

2.1 Code designation

60245 IEC 86

2.2 Rated voltage

300/300 V

2.3 Construction

2.3.1 Conductor

Number of conductors: two or three.

The conductors shall be in accordance with the requirements given in IEC 60228 for class 6 conductors. The wires may be plain or tinned.

2.3.2 Separator

A separator of suitable material may be applied around each conductor.

2.3.3 Insulation

The insulation shall be a rubber compound of type IE4 applied around each conductor.

The insulation shall be applied by extrusion.

The insulation thickness shall comply with the specified value given in column 2 of table 1.

2.3.4 Assembly of cores and filler, if any

The cores shall be twisted together.

The maximum length of lay is specified in column 3 of table 1. The direction of lay shall be the same for the conductors and for the cores.

A centre filler may be used.

2.3.5 Sheath

The sheath shall be a rubber compound of type SE3 applied around the cores.

The thickness of the sheath shall comply with the specified value given in column 4 of table 1.

The sheath shall be extruded in a single layer and applied in such a way that it fills the spaces between the cores.

The sheath shall be removable without damage to the cores.

2.3.6 Overall diameter

The mean overall diameter shall be within the limits given in columns 5 and 6 of table 1.

2.3.7 Outer marking

The cord shall have the marking 60245 IEC 86 printed on the outer surface of the cord. The marking shall meet the requirements of 3.1.1, 3.2 and 3.3 of IEC 60245-1.

2.4 Tests

Compliance with the requirements of 2.3 shall be checked by inspection and by the tests given in table 2.

For 2.3.4, the length of lay shall be determined by measuring the length of 10 pitches of a sample and dividing this length by 10. The result is the length of lay of laid-up cores.

2.5 Guide to use

Maximum conductor temperature in normal use: 60 °C.

NOTE – Other guidelines are under consideration.

Table 1 – Dimensions of type 60245 IEC 86

1	2	3	4	5	6
Number and nominal cross-sectional area of conductors	**Thickness of insulation Specified value**	**Maximum length of core lay**	**Thickness of sheath Specified value**	**Mean overall diameter [1)]**	
				Lower limit	**Upper limit**
mm^2	mm	mm	mm	mm	mm
2 × 0,75	0,6	35	0,8	5,7	7,4
2 × 1	0,6	35	0,8	5,9	7,8
2 × 1,5	0,7	40	0,8	6,8	8,9
3 × 0,75	0,6	35	0,8	6,0	7,9
3 × 1	0,6	40	0,8	6,3	8,3
3 × 1,5	0,7	45	0,9	7,2	9,4

[1)] The overall dimensions of the cables have been calculated in accordance with IEC 60719.

Table 2 – Tests for type 60245 IEC 86

1	2	3	4	
Refer-ence No.	Test	Category of test	Test method described in	
			IEC	clause/subclause
1	Electric tests			
1.1	Resistance of conductors	T,S	60245-2	2.1
1.2	Voltage test on cores according to specified insulation thickness:			
1.2.1	– at 1 500 V up to and including 0,6 mm	T	60245-2	2.3
1.2.2	– at 2 000 V exceeding 0,6 mm	T	60245-2	2.3
1.3	Voltage test on completed cable at 2 000 V	T,S	60245-2	2.2
2	Provisions covering constructional and dimensional characteristics		60245-1, 60245-2 and 60245-8	
2.1	Checking of compliance with constructional provisions	T,S	60245-1	Inspection and manual tests
2.2	Measurement of thickness of insulation	T,S	60245-2	1.9
2.3	Measurement of thickness of sheath	T,S	60245-2	1.10
2.4	Measurement of overall diameter:			
2.4.1	– mean value	T,S	60245-2	1.11
2.4.2	– ovality	T,S	60245-2	1.11
2.5	Measurement of core lay length	T,S	60245-8	2.4
3	Mechanical properties of insulation			
3.1	Tensile test before ageing	T	60811-1-1	9.1
3.2	Tensile test after ageing in the air oven	T	60245-2	4
3.3	Tensile test after ageing in an air bomb	T	60811-1-2	8.2
3.4	Hot set test	T	60811-2-1	9
3.5	Ozone resistance test	T	60811-2-1	8
4	Mechanical properties of sheath			
4.1	Tensile test before ageing	T	60811-1-1	9.2
4.2	Tensile test after ageing in the air oven	T	60811-1-2	8.1.3.1
4.3	Hot set test	T	60811-2-1	9
5	Mechanical strength of completed cable			
5.1	Three pulley flexing test followed, after immersion in water, by a voltage test on cores For voltages, see 1.2 above.	T	60245-2	3.5 and 2.3
5.2	Kink test followed, after immersion in water, by a voltage test on cores For voltages, see 1.2 above.	T	60245-2	3.6 and 2.3