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INTERNATIONAL STANDARD

Halogen-free thermoplastic insulated and sheathed flexible cables of rated voltages up to and including 300/300 V – Part 1: General requirements and cables

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HALOGEN-FREE THERMOPLASTIC INSULATED AND SHEATHED FLEXIBLE CABLES OF RATED VOLTAGES UP TO AND INCLUDING 300/300 V –

Part 1: General requirements and cables

FOREWORD

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International Standard IEC 63010-1 has been prepared by IEC technical committee 20: Electric cables.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
20/1760/FDIS	20/1773/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 63010 series, published under the general title *Halogen-free thermoplastic insulated and sheathed flexible cables of rated voltages up to and including 300/300 V*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

HALOGEN-FREE THERMOPLASTIC INSULATED AND SHEATHED FLEXIBLE CABLES OF RATED VOLTAGES UP TO AND INCLUDING 300/300 V –

Part 1: General requirements and cables

1 Scope

This part of IEC 63010 applies to cables with insulation and sheaths based on halogen-free thermoplastic compounds for use with small devices and for short connections to desktop electrical appliances where flexibility is of prime importance. These cables have a voltage rating U_0/U up to and including 300/300 V. Maximum operating temperature for the cables in this document is 70 °C.

NOTE 1 For these types of flexible cables the term cord is also used.

NOTE 2 Unlike other cables that are described as “halogen-free” as part of an overall fire performance capability, cables conforming to IEC 63010 have no requirements relating to evolution of smoke.

NOTE 3 Not to be used for fixed installation, extension leads or completed cordsets longer than four meters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60227-2:1997, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 2: Test methods*
IEC 60227-2:1997/AMD1:2003

IEC 60228:2004, *Conductors of insulated cables*

IEC 60332-1-2:2004, *Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame*

IEC 60684-2, *Flexible insulating sleeving - Part 2: Methods of test*

IEC 60754-1, *Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content*

IEC 60754-2, *Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity*

IEC 60811-401, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 401: Miscellaneous tests - Thermal ageing methods - Ageing in an air oven*

IEC 60811-501, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 501: Mechanical tests - Tests for determining the mechanical properties of insulating and sheathing compounds*

IEC 60811-502, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 502: Mechanical tests - Shrinkage test for insulations*

IEC 60811-504, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 504: Mechanical tests - Bending tests at low temperature for insulation and sheaths*

IEC 60811-505, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 505: Mechanical tests - Elongation at low temperature for insulations and sheaths*

IEC 60811-506, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 506: Mechanical tests - Impact test at low temperature for insulations and sheaths*

IEC 60811-508, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 508: Mechanical tests - Pressure test at high temperature for insulation and sheaths*

IEC 62440, *Electric cables with a rated voltage not exceeding 450/750 V - Guide to use*

IEC 63010-2:2017, *Halogen-free thermoplastic insulated and sheathed cables of rated voltage up to and including 300/300 V – Part 2: Test methods*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Definitions relating to insulating and sheathing materials

3.1.1
halogen-free compound
compound, in which the polymer is a polyolefin or equivalent synthetic polymer not containing halogens, which meets the requirements given in this document

3.1.2
type of compound
category in which a compound is placed according to its properties, as determined by specific tests

Note 1 to entry: The type designation is not directly related to the composition of the compound.

3.2 Definitions relating to the tests

3.2.1
type tests
T
test required to be carried out, before supplying a type of cable covered by this document on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: Type tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials or design, which might change the performance characteristics.

3.2.2
sample tests
S
test carried out on samples of completed cable or components taken from a completed cable, adequate to verify that the finished product meets the design specifications

3.2.3
routine test
R
test carried out by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements

4 Code designation

IEC 63010 IEC 111 for circular cables and IEC 63010 IEC 111f for flat cables.

5 Rated voltage

The rated voltage of a cable is the reference voltage for which the cable is designed.

The rated voltage in an alternating current system is expressed by the combination of two values U_0/U, expressed in volts, where:

a) U_0 is the r.m.s. value between any insulated conductor and "earth" (metal covering of the cable or the surrounding medium);
b) U is the r.m.s. value between any two phase conductors of a multicore cable or of a system of single core cables.

In an alternating current system, the rated voltage of a cable or cord shall be at least equal to the nominal voltage of the system for which it is intended. This condition applies to the values of both U_0 and U.

The maximum permanent operating voltage of the system (AC or DC) is stated in Table 1.

Table 1 – Examples of maximum permitted voltages against rated voltage of cable

Rated voltage of cable	Maximum permanent permitted operating voltage of the system		
	AC	DC	
U_0/U	Conductor-earth	Conductor-earth	Conductor-conductor
V	U_0 max (V)	V	V
300/300	320	410	410

6 Marking

6.1 Indication of origin and cable identification and cable type

Cables shall be provided with an indication by the manufacturer, which shall be either an identification thread or a repetitive marking of the manufacturer's name or trademark.

The cables shall be marked IEC 63010 IEC 111 for circular cables and IEC 63010 IEC 111f for flat cables.

Marking may be executed by printing or by reproduction in relief on, or in, the insulation or sheath.

6.2 Continuity of marks

Each specified mark shall be regarded as continuous if the distance between the end of the mark and the beginning of the next identical mark does not exceed:

– 550 mm if the marking is on the outer sheath of the cable;
– 275 mm if the marking is on the insulation or on a tape within the sheathed cable.

6.3 Durability

Printed markings shall be durable. Compliance with this requirement shall be checked by carrying out the test given in 1.8 of IEC 60227-2:1997.

6.4 Legibility

All markings shall be legible.

The colours of the identification threads shall be easy to recognize or easily made recognizable, if necessary, by cleaning with petrol or another suitable solvent.

7 Core identification

7.1 General requirements

Each core shall be identified with colours. Identification of the cores of a cable shall be achieved by the use of coloured insulation or other suitable method.

Each core of a cable shall have only one colour, except the core identified by a combination of the colours green and yellow.

The colours green and yellow, when not in combination, shall not be used for any multicore cable.

The colours red and white should preferably be avoided.

7.2 Colour scheme

The preferred colour scheme:

–	two-core cable:	no preferred colour scheme;
–	three-core cable:	either green-and-yellow, blue, and brown; or
		brown, black, grey
–	four-core cable:	either green-and-yellow, brown, black, and grey; or
		blue, brown, black, grey.

The colours shall be clearly identifiable and durable. Durability shall be checked by carrying out the test given in 1.8 of IEC 60227-2:1997.

7.3 Colour combination green-and-yellow

The distribution of the colours for the green-and-yellow-coloured core shall comply with the following condition: for every 15 mm length of core, one of these colours shall cover at least 30 % and not more than 70 % of the surface of the core, the other colour covering the remainder.