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Edition 1.0 2014-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Luminaires – Part 2-21: Particular requirements – Rope lights

Luminaires – Partie 2-21: Exigences particulières – Cordons lumineux

IEC 60598-2-21:2014-11(en-fr)

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International Standard IEC 60598-2-21 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
34D/1146/FDIS	34D/1154/RVD

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

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

This standard is intended to be read in conjunction with IEC 60598-1 Luminaires – Part 1: General requirements and tests.

A list of all the parts in the IEC 60598 series, published under the general title *Luminaires* can be found on the IEC website.

In this standard, the following print types are used:

– requirements: in roman type;
– *test specifications: in italic type;*
– notes: in small roman type.

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

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- withdrawn,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

The contents of the Corrigendum 1of December 2016 have been included in this copy.

LUMINAIRES –

**Part 2-21: Particular requirements –
Rope lights**

21.1 Scope

This part of IEC 60598 specifies requirements for rope lights (sealed lighting chains) fitted with non-replaceable series- or parallel- or a combination of series/parallel-connected light sources for use either indoors or outdoors on supply voltages not exceeding 250 V.

NOTE 1 In some countries the term “sealed lighting chain” is used instead of "rope light".

NOTE 2 For products where the rope light is fixed to a frame or the like as ornaments like Santa Claus, snowman and similar, relevant clauses of IEC 60598-2-4 and/or IEC 60598-2-7 can also apply.

Rope lights provided with, fixed or detachable, extra attachments of different kinds, e.g. ornamental element in temporary decorative configurations due to festivals, celebrations, etc. or in two or three dimensional reproductions of persons or animals (real or imaginary) are considered to be covered by this standard.

21.2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60227-5:2011, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*

IEC 60245-4:2011, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60811-504:2012, *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 60811-506:2012, *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 60811-508:2012, *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 60906 (all parts), *IEC system of plugs and socket-outlets for household and similar purposes*

IEC 61347-2-11, *Lamp controlgear – Part 2-11: Particular requirements for miscellaneous electronic circuits used with luminaires*

IEC 61347-2-13, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules*

IEC 61984:2008, *Connectors – Safety requirements and tests*

ISO 4064-4:2002, *Paper, board, pulps and related terms – Vocabulary – Part 4: paper and board grades and converted products*

21.3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 60598-1 as well as the following apply.

21.3.1
lighting chain
luminaire comprising an assembly of series-connected lampholders, parallel-connected lampholders or series/parallel-connected lampholders and interconnecting insulated conductors

[SOURCE: IEC 60598-2-20:2010, 20.4.1]

21.3.2
rope light
sealed lighting chain
lighting chain with non-replaceable light sources enclosed in a rigid or flexible insulating translucent pipe or tube, sealed at the ends, with or without joints

Note 1 to entry: A rope light may incorporate control devices (e.g. flasher units, see 21.7.4).

21.4 General test requirements

The provisions of Section 0 of IEC 60598-1 apply. The tests described in each appropriate section of IEC 60598-1 shall be carried out in the order listed in this part of IEC 60598.

21.5 Classification of luminaires

21.5.1 General

Rope lights shall be classified in accordance with the provisions of Section 2 of IEC 60598-1 together with the requirements of 21.5.2 and 21.5.3.

21.5.2 Protection against electric shock

Rope lights shall be classified as Class II or Class III.

21.5.3 Protection against dust, solid objects and moisture

Rope lights for outdoor use shall be classified at least IP 44.

21.6 Marking

21.6.1 General

To provisions of Section 3 of IEC 60598-1 apply together with the requirements of 21.6.2 to 21.6.4.

21.6.2 Rope light marking

The following information shall be marked on the rope light:

– rated voltage of the complete rope light,

– rated wattage of the complete rope light.

Where the information is on the cable, it shall be marked on a durable non-removable sleeve or label.

21.6.3 Rope light and packing marking

The following marking shall be placed on the rope light and on the accompanying packing of rope lights for indoor use only.

– “FOR INDOOR USE ONLY”

– As an alternative to the text, the rope light can be marked with the symbol  [SOURCE: IEC 60417-5957 (2004-12)]. The symbol shall be explained in the instructions.

21.6.4 Packing or instruction marking

The following or similar marking shall be placed on the accompanying packing or instructions.

a) For all rope lights where the packing has not been adapted for display purposes:
   - “Do not connect the rope light to the supply while it is in the packing or wound onto a reel”;
   - “Do not use the rope light when covered or recessed into a surface”;
   - minimum allowed bending radius, if applicable;
   - “Do not open or cut the rope light”.

b) For rope lights which rely on gaskets to provide the specified degree of protection against dust, solid objects and moisture:
   - “WARNING – THIS ROPE LIGHT MUST NOT BE USED WITHOUT ALL GASKETS BEING IN PLACE”.

c) For rope lights intended for interconnection:
   - “Do not connect this rope light to another manufacturer’s product”;
   - “Interconnection shall be made only by the use of the supplied connectors. Any open ends must be sealed-off before use”;
   - maximum system length that may be interconnected;
   - maximum wattage that may be interconnected.

d) For rope lights incorporating lamp bridging device(s):
   - information stating that the rope light is fitted with a bridging device(s).

e) For class III rope lights delivered without a supply source:
   - relevant information concerning the required supply source.

21.7 Construction

21.7.1 General

The provisions of Section 4 of IEC 60598-1 apply together with the requirements of 21.7.2 to 21.7.5.

21.7.2 Terminal blocks

Clause 4.6 of Section 4 of IEC 60598-1 referring to terminal block does not apply.

21.7.3 Terminals and supply connections

Clause 4.7 of Section 4 of IEC 60598-1 referring to terminals and supply connections applies together with the following requirement.

Interconnecting connectors for rope lights shall, in addition, comply with the requirements and modifications given in Annex A

Compliance is checked by inspection and by carrying out the tests of this standard.

21.7.4 Control units

Control units and similar devices forming an integral part of the rope light shall be enclosed in non-flammable insulating material. In addition they shall be securely fixed to the rope light or the cable.

Compliance shall be checked by inspection and, for the non-flammability of the insulating material, by the tests of Clause 21.16.

Any electronic control device (e.g. flasher units) shall, in addition to the requirements of this standard, comply with the requirements of IEC 61347-2-11.

LED-drivers shall comply with the requirements of IEC 61347-2-13.

Compliance shall be checked by carrying out the relevant tests.

21.7.5 Mechanical strength

Rope lights shall have adequate mechanical strength.

Compliance is checked by the following tests:

a) For rigid rope lights, compliance is checked by subjecting the pipe to each of the following tests carried out in turn.

   1) A pull of 60 N, the stress being applied to the ends of the pipe, 45 times without jerks, each time for 1 s.

   2) A torque of 0,15 Nm, the stress being applied to the ends of the pipe in the most unfavorable direction (alternatively in cases of doubt) without jerks for 1 min.

   During and after the above test tests, the conductors shall not have moved noticeably in the terminals and the pipe shall not be damaged.

b) For flexible rope lights, compliance is checked by the tests of 1) and 2) above followed by the additional tests 3) and 4) below.

   3) Wind the pipe in full test length (1 m) on a cylinder of 150 mm diameter with a pull of 60 N for the number of operations and at the ambient temperature given below:

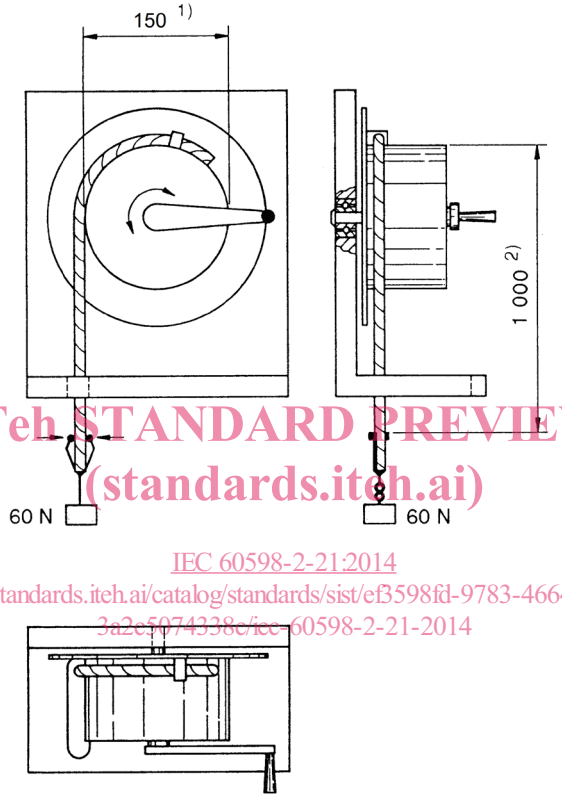
– for rope lights having an IP number 20
10 times at 25 °C ± 2 °C

– for rope lights having an IP number over X0
10 times at 25 °C ± 2 °C followed by 10 times at –15 °C ± 2 °C

Before the low temperature tests the pipe is kept for 16 h in the low temperature cabinet at a temperature of –15 °C ± 2 °C.

NOTE 1 An example of a test device suitable for winding a flexible pipe is given in Figure 1

Dimensions in millimetres



Key

1) Diameter of wooden cylinder.

2) Distance between the fixing point of the flexible pipe and the weight prior to commencement of the test.

Figure 1 – Example of test device suitable for winding a flexible pipe

4) After test 3), with the test specimen at room temperature, the pipe is wound on a mandrel of between 4 and 5 times the diameter of the test piece and then is placed in the low temperature cabinet (-15 °C ± 2 °C) for 16 h.

After this time period the sample is wound around the mandrel for two turns in the cabinet.

There shall be no cracks.

NOTE 2 An example of a test apparatus suitable for winding a flexible pipe is given in Figure 2 (corresponding to Figure 1 in IEC 60811-504:2012).