IEC 60598-2-20

Edition 5.0 2022-01
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Luminaires –
Part 2-20: Particular requirements – Lighting chains

IEC 60598-2-20:2022-01 RLV(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC 60598-2-20

Edition 5.0 2022-01
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Luminaires –
Part 2-20: Particular requirements – Lighting chains

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.40

ISBN 978-2-8322-4239-1

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

LUMINAIRES –

Part 2-20: Particular requirements – Lighting chains

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60598-2-20:2014. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60598-2-20 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lighting. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) specific provisions for temporarily installed protected lighting (TPL) chains have been added;
b) new terms and definitions have been added.

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

Draft	Report on voting
34D/1646/FDIS	34D/1651/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 2-20 is to be used in conjunction with the latest edition of IEC 60598-1 and its amendment(s). It was established on the basis of the ninth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this document, it refers to IEC 60598-1.

NOTE 2 In this document, the following print types are used:

– *compliance statements: in italic type.*

A list of all the parts in the IEC 60598 series, published under the general title *Luminaires* 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 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This new edition includes the following technical changes:

a) Inclusion of specific provisions for temporarily installed protected lighting (TPL) chains.

This form of lighting chain was not previously addressed with specific provisions in previous editions of the standard. A temporarily installed protected lighting chain is a physical impact protected rough service lighting chain intended for temporary installation on building sites during the construction or demolition phases of a building project.

a) Addition of terms and definitions

New terms and definitions have been added to include the expanded typology for lighting chains and to include a connector with breaking capacity (CBC).

b) Inclusion of graphical depictions of lighting chains

Graphical depictions have been added to clarify and differentiate the construction and installation configurations of the various different types of lighting chains. Word descriptions alone had limitations in clearly and precisely defining the characteristics of the numerous variants in this luminaire sector.

The illustrations show the three main types of lighting chains: permanently installed lighting chains, temporarily installed lighting chains and temporarily installed protected lighting (TPL) chains, as well as further differentiating by installation and/or fixing method where applicable.

LUMINAIRES –

Part 2-20: Particular requirements – Lighting chains

20.1 Scope

This part of IEC 60598 specifies requirements for lighting chains fitted with series, parallel or a combination of series/parallel connected light sources for use either indoors or outdoors on supply voltages not exceeding 250 V.

For combinations where rope lights (also known as sealed lighting chains) are included, see IEC 60598-2-21.

Lighting chains provided with fixed or detachable attachments for example ornamental or decorative, are considered to be covered by this document.

For lighting chains fitted with lampholders of the push-in type, the appropriate requirements of this document applies.

~~NOTE 1 A Christmas tree lighting chain is an example of a lighting chain fitted with series or series/parallel connected lamps. A chain for illuminating ski-tracks or promenades is an example of a lighting chain fitted with parallel connected lamps.~~

This document covers the following lighting chains:

a) permanently installed lighting chains;

b) temporarily installed lighting chains;

c) temporarily installed protected lighting (TPL) chains.

NOTE 1 Festoon lighting chain – a lighting chain that is supported by the supply cable or fixed at the lampholder and is permanently connected to the fixed wiring. Festoon lighting chains are primarily suitable for permanent indoor or outdoor lighting applications.

NOTE 2 Decorative lighting chain – a lighting chain that is supported by the supply cable and is temporarily connected to the fixed wiring. Decorative lighting chains are primarily suitable for domestic, indoor or indoor/outdoor temporary lighting applications, see Figure 1 for examples.

NOTE 3 Temporarily installed protected lighting (TPL) chain – a lighting chain where each lampholder is fixed to the building or structure and the light source is enclosed by a protective enclosure and is temporarily connected to the fixed wiring. Temporarily installed protected lighting chains are primarily suitable for use in rough service lighting applications.

For lighting chains with non-standardized lamps (e.g. lamps of the push-in type) the lamps are regarded as a part of the lighting chain and consequently included in the testing.

NOTE 4 For products where the lighting chain is permanently fixed to a frame or pre-lit Christmas tree the relevant clauses of IEC 60598-2~~-4 and/or IEC 60598-2-7~~ can also apply.

NOTE 5 In some countries the term "strings" is used instead of "chains".

NOTE 6 Candlestick luminaries are tested according to IEC 60598-2-4.

20.2 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 60227-5:2011, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*

IEC 60238:2016, *Edison screw lampholders*
IEC 60238:2016/AMD1:2017
IEC 60238:2016/AMD2/2020

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

IEC 60309-1, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

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 60906 (all parts), *IEC system of plugs and socket-outlets for household and similar purposes*

IEC 61184:2017, *Bayonet lampholders*
IEC 61184:2017/AMD1:2019

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 4046-4:~~2002~~2016, *Paper, board, pulps and related terms – Vocabulary – Part 4: Paper and board grades and converted products*

20.3 Terms and definitions

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

20.3.1
lighting chain
luminaire comprising an assembly of series-connected lamps, parallel-connected lamps or series/parallel-connected lamps and interconnecting insulated conductors

Note 1 to entry: For lighting chains with non-standardized lamps (e.g. lamps of the push-in type) the lamps are regarded as part of the chain.

Note 2 to entry: For lighting chains with non-removable lamps, the lamps are regarded as part of the chain.

Note 3 to entry: A lighting chain may incorporate control devices (e.g. flasher units, see 20.7.8).

Note 4 to entry: Unless otherwise stated, references to lamps within this document also refer to LEDs.

20.3.2
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: Rope lights are covered by IEC 60598-2-21.

20.3.3
connector with breaking capacity
CBC
connector specially designed to be engaged or disengaged in normal use when live or under load

[SOURCE: IEC 60050-581:2008, 581-27-72]

20.3.4
permanently installed lighting chain
lighting chain that is supported by the supply cable or attached at the lampholder and is permanently connected to the fixed wiring

EXAMPLE Lighting chain for illuminating ski-tracks or promenades.

Note 1 to entry: Permanently installed lighting chains are primarily suitable for permanently installed indoor or outdoor lighting applications, see Figure 1 a) for examples.

Note 2 to entry: In some countries permanently installed lighting chains are called festoon lighting chains.

20.3.5
temporarily installed lighting chain
lighting chain that is supported by the supply cable and is temporarily connected to the fixed wiring

EXAMPLE Christmas tree lighting chain.

Note 1 to entry: Temporarily installed lighting chains are suitable for domestic, indoor or indoor/outdoor temporarily installed lighting applications, see Figure 1 b) for examples.

Note 2 to entry: In some countries temporarily installed lighting chains are called decorative lighting chains.

20.3.6
temporarily installed protected lighting (TPL) chain
lighting chain where each lampholder is attached to the building or structure and the light source is enclosed by a protective enclosure and is temporarily connected to the fixed wiring

EXAMPLE Construction site lighting chain.

Note 1 to entry: Temporarily installed protected lighting chains are primarily suitable for use in rough service lighting applications, see Figure 1 c) for example.

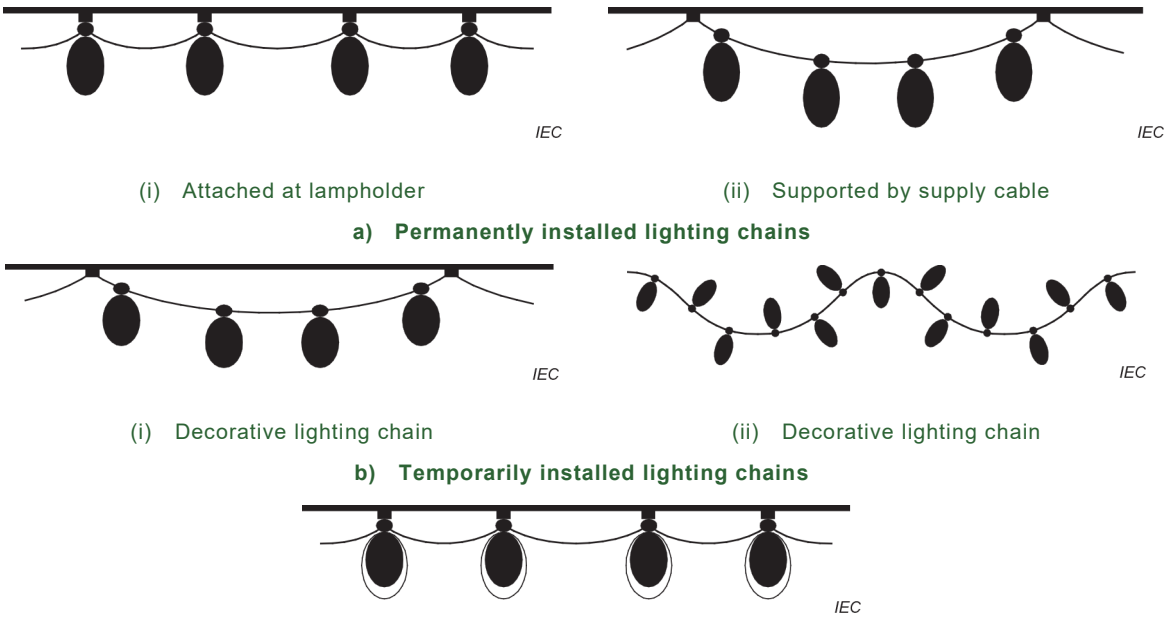

Figure 1 – Examples of different types of lighting chains

20.4 General test requirements

The provisions of Section 0 of Part 1 apply. The tests described in each appropriate section of Part 1 shall be carried out in the order listed in this document.

20.5 Classification of luminaires

20.5.1 General

Lighting chains shall be classified in accordance with the provisions of Section 2 of Part 1 together with the requirements of 20.5.2 and 20.5.3.

20.5.2 Protection against electric shock

Lighting chains shall be classified as Class II or Class III.

20.5.3 Protection against dust, solid objects and moisture

Lighting chains for outdoor use shall have a protective index IP 44 or higher.

20.6 Marking

20.6.1 General

The provisions of Section 3 of Part 1 apply together with the requirements of 20.6.2 to 20.6.4.

20.6.2 Lighting chain marking

The following information shall be marked on the lighting chain:

– rated voltage of the complete chain;

– rated wattage of the complete chain.

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

20.6.3 Lighting chain and ~~packing~~ packaging marking

The following marking shall be placed on the lighting chain and on the accompanying ~~packing~~ packaging of lighting chains for indoor use only.

– "FOR INDOOR USE ONLY".

– As an alternative to the text, the lighting chain can be marked with the symbol IEC 60417-5957 (2004-12). The symbol shall be explained in the instructions.

NOTE In some countries (UK and Australia) national requirements are such that a plug must be fitted to a portable appliance. In situations where this plug does not provide the same ingress protection of the lighting chain, information concerning the location of the plug/transformer may be given e.g. "Plug/transformer for indoor use only".

20.6.4 ~~Packing~~ Packaging or instructions marking

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

a) For all lighting chains where the ~~packing~~ packaging has not been adapted for display purposes:
   – "Do not connect the chain to the supply while it is in the ~~packing~~ packaging".

b) For lighting chains with replaceable lamps:
   – voltage and wattage or manufacturer's article number of replacement lamps;
   – "Do not remove or insert lamps while the chain is connected to the supply";
   – "Ensure that all lampholders are fitted with a lamp".

c) Lighting chains designed to be used without a lamp in every lampholder:
   – adequate information about required blanking plug(s).

d) For chains with replaceable series-connected lamps:
   – "Replace failed lamps immediately by lamps of the same type as delivered or of a type specified by the manufacturer".

e) For lighting chains with 'fuse' lamp(s):
   – "Do not replace a 'fuse' lamp with a non-'fuse' lamp"; in order to indicate the difference from 'ordinary' lamps, 'fuse' lamps shall be partly coloured white;
   – information indicating that the chain is provided with 'fuse' lamps and explanation of their function.

f) For lighting chains with non-replaceable lamps:
   – "The lamps are not replaceable".

g) For class II lighting chains with non-replaceable lamps, the substance of the following:
   – where breakage or damage to lamps occurs the chain must not be used or energized but disposed of safely.

h) For lighting chains which rely on gaskets to provide the specified degree of protection against dust, solid objects and moisture:
   – "WARNING – THIS LIGHTING CHAIN MUST NOT BE USED WITHOUT ALL GASKETS BEING IN PLACE."

i) For lighting chains intended for interconnection:
   – "Do not interconnect parts of this lighting chain with parts of another manufacturer's lighting chain";
   – "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 number of lamps or maximum system wattage that may be interconnected.
j) For lighting chains incorporating lamp bridging device(s):
   – information stating that the chain is fitted with a bridging device(s).
k) For class III lighting chains delivered without a supply source:
   – relevant information concerning the required supply source.
l) For mains voltage lighting chains with series connected lamps:
   – "WARNING – RISK OF ELECTRIC SHOCK IF LAMPS ARE BROKEN OR MISSING. DO NOT USE."

20.7 Construction

20.7.1 General

The provisions of Section 4 of Part 1 apply together with the requirements of 20.7.~~2~~1 to 20.7.~~11~~12.

Temporarily installed protected lighting (TPL) chains shall comply with the requirements for rough service luminaires as defined in Part 1.

20.7.2 Lampholders

In lighting chains where non-standardized lampholders (e.g. of the push-in type) are used, the lampholders are regarded as parts of the lighting chain and tested accordingly.

Edison screw lampholders E5, E10, E14 and E27 shall meet the requirements of IEC 60238.

Bayonet lampholders shall meet the requirements of IEC 61184.

Insulation piercing terminals on lampholders are acceptable only if used in the SELV circuit of lighting chains or as permanent, non-rewireable connections in class II chains.

E5 and E10 lampholders and similar small lampholders of the push-in type shall be used only if the rated voltage of each lamp does not exceed:

– for E5 and similar small lampholders	25 V
– for series connected E10 lampholders	60 V
– for parallel connected E10 lampholders	250 V

Compliance is checked by inspection.

Lampholders shall have a body of insulating material.

Compliance is checked by inspection.

20.7.3 Terminal blocks

Clause 4.6 of Part 1 referring to terminal blocks does not apply.