

INTERNATIONAL STANDARD



Luminaires – Part 1: General requirements and tests



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LUMINAIRES –

Part 1: General requirements and tests

FOREWORD

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International Standard IEC 60598-1 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

This ninth edition cancels and replaces the eighth edition published in 2014 and Amendment 1:2017. This edition constitutes a technical revision.

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

- a) Revision of Clause 4.30, Fixing cover live parts of non-user replaceable light source;
- b) Subclause 4.24.2, Blue Light Hazard: removal of Risk Group 0;
- c) Subclause 5.2.16: additional requirements for AC mains appliance inlets related to IEC 61984;
- d) Addition of Subclause 3.3.25, UV protection of cable;
- e) Addition of Clause 4.34, Inclusion of EMF safety requirements (IEC 62493);
- f) Revision of the requirements for functional earth and protective earth;
- g) Addition of Clause 4.35, Protection against fast rotating parts;
- h) Revision of Clause 3.2, Rated voltage marking;
- i) Revision of Subclause 5.2.10, Cord anchorage;
- j) Revision of Annex G for touch current and protective conductor current test set-up;
- k) Addition of requirements for constant light output function and programmable current output;
- l) Revision of Subclause 8.2.3 c), touch voltage limits for interrupted DC voltage;
- m) Introduction of PELV;
- n) Introduction of Ethernet power supply connection for luminaires (PoE);
- o) Section 9, Introduction of IPX9;
- p) Addition of Subclause 3.3.26 for wall mounted luminaires;
- q) Revision of Annex D introducing alternative thermal tests for luminaires with t_a marking higher than 25°C;
- r) Revision of Table 10.3 and Subclause 3.3.19 for protective conductor current limits;
- s) Track-mounted luminaires: cross reference to Annex A of IEC 60570:2003/AMD2:2019;
- t) Revision of Subclause 10.2.2, alternative DC electric strength test;
- u) Revision of Annex D for recessed luminaires;
- v) Subclause 4.12.5: revision of Table 4.2 for torque test on metal glands;
- w) Revision of use of bridging capacitors in luminaires;
- x) Revision of electrical connection to class III plugs.

The major changes which may affect certification are given in Annex R.

Annex R shows where a new text has been included which contains more serious/critical requirements requiring products to be re-tested.

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

FDIS	Report on voting
34D/1546/FDIS	34D/1560/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 60598 series, published under the general title *Luminaires*, can be found on the IEC website.

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

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

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LUMINAIRES –

Part 1: General requirements and tests

SECTION 0: GENERAL INTRODUCTION

0.1 Scope

This Part 1 of IEC 60598 specifies general requirements for luminaires, incorporating electric light sources for operation from supply voltages up to 1 000 V. The requirements and related tests of this document cover: classification, marking, mechanical construction, electrical construction and photobiological safety.

Each section of this Part 1 is read in conjunction with this Section 0 and with other relevant sections to which reference is made.

Each part of IEC 60598-2 details requirements for a particular type of luminaire or group of luminaires on supply voltages not exceeding 1 000 V. These parts are published separately for ease of revision and additional sections will be added as and when a need for them is recognized.

The presentation of photometric data for luminaires is under consideration by the International Commission on Illumination (CIE) and is not, therefore, included in this Part 1.

Requirements are included in this Part 1 for luminaires incorporating ignitors with nominal peak values of the voltage pulse not exceeding those of Table 11.2. The requirements apply to luminaires with ignitors built into ballasts and to luminaires with ignitors separate from ballasts. For luminaires with ignitors built into lamps, the requirements are under consideration.

Requirements for semi-luminaires are included in this Part 1.

In general, this Part 1 covers safety requirements for luminaires. The object of this Part 1 is to provide a set of requirements and tests which are considered to be generally applicable to most types of luminaires and which can be called up as required by the detail specifications of IEC 60598-2. This Part 1 is thus not regarded as a specification in itself for any type of luminaire, and its provisions apply only to particular types of luminaires to the extent determined by the appropriate part of IEC 60598-2.

The parts of IEC 60598-2, in making reference to any of the sections of Part 1, specify the extent to which that section is applicable and the order in which the tests are ~~to be~~ performed; they also include additional requirements as necessary.

The order in which the sections of Part 1 are numbered has no particular significance as the order in which their provisions apply is determined for each type of luminaire or group of luminaires by the appropriate part of IEC 60598-2. All parts of IEC 60598-2 are self-contained and therefore do not contain references to other parts of IEC 60598-2.

Where the requirements of any of the sections of Part 1 are referred to in the parts of IEC 60598-2 by the phrase "The requirements of section... of IEC 60598-1 apply", this phrase is ~~to be~~ interpreted as meaning that all the requirements of that section of Part 1 apply except those which are clearly inapplicable to the particular type of luminaire covered by that part of IEC 60598-2.

For explosion proof luminaires, as covered by IEC 60079, the requirements of IEC 60598 (selecting the appropriate parts 2) are applied in addition to the requirements of IEC 60079. In the event of any conflict between IEC 60598 and IEC 60079, the requirements of IEC 60079 take priority.

~~Attention is drawn to lamp performance standards which contain “information for luminaire design”; this should be followed for proper lamp operation; however, this standard does not require the testing of lamp performance as part of the type test approval for luminaires.~~

Improvements in safety to take into account the state of the art technology are incorporated in the standards with revisions and amendments on an ongoing basis. Regional standardization bodies ~~may~~ can include statements in their derived standards to cover products which have complied with the previous document as shown by the manufacturer or standardization body. The statements may require that for such products, the previous standard may continue to apply to production until a defined date after which the new standard shall apply.

0.2 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 60061 (all parts), *Lamp caps and holders together with gauges for the control of interchangeability and safety* (available at <http://std.iec.ch/iec60061>)

IEC 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders* (available at <http://std.iec.ch/iec60061>)

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3: Gauges* (available at <http://std.iec.ch/iec60061>)

IEC 60065:2001/2014, *Audio, video and similar electronic apparatus – Safety requirements Amendment 1:2005*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-31:2008, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60238:2016, *Edison screw lampholders*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

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

~~IEC 60357, Tungsten halogen lamps (non-vehicle) – Performance specifications~~

IEC 60360, *Standard method of measurement of lamp cap temperature rise*

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

~~IEC 60400, Lampholders for tubular fluorescent lamps and starterholders~~

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60432-1:1999, *Incandescent lamps – Safety specifications – Part 1: Tungsten filament lamps for domestic and similar general lighting purposes*

IEC 60432-1:1999/AMD1:2005

IEC 60432-1:1999/AMD2:2011

IEC 60432-2:1999, *Incandescent lamps – Safety specifications – Part 2: Tungsten halogen lamps for domestic and similar general lighting purposes*

IEC 60432-2:1999/AMD1:2005

IEC 60432-2:1999/AMD2:2012

~~IEC 60432-3, Incandescent lamps – Safety specifications – Part 3: Tungsten halogen lamps (non-vehicle)~~

~~IEC 60449:1973, Voltage bands for electrical installations of buildings
Amendment 1:1979~~

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

IEC 60570:2003, *Electrical supply track systems for luminaires*

IEC 60570:2003/AMD1:2017

IEC 60570:2003/AMD2:2019

IEC 60598-2 (all parts), *Luminaires – Part 2: Particular requirements*

IEC 60598-2-4:2017, *Luminaires – Part 2-4: Particular requirements – Portable general purpose luminaires*

IEC 60603 (all parts), *Connectors for frequencies below 3 MHz for use with printed boards*

IEC 60662, *High-pressure sodium vapour lamps – Performance specifications*

~~IEC 60682, Standard method of measuring the pinch temperature of quartz-tungsten-halogen lamps~~

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60684 (all parts), *Flexible insulating sleeving*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

~~IEC 60838 (all parts), *Miscellaneous lampholders*~~

IEC 60989, *Separating transformers, autotransformers, variable transformers and reactors*

IEC 60990:~~1999~~, *Methods of measurement of touch current and protective conductor current*

IEC 60998-2-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units*

IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1:2000¹, *Switches for appliances – Part 1: General requirements*

IEC 61167, *Metal halide lamps – Performance specification*

~~IEC 61184, *Bayonet lampholders*~~

~~IEC 61199, *Single-capped fluorescent lamps – Safety specifications*~~

IEC 61249 (all parts), *Materials for printed boards and other interconnecting structures*

IEC 61347 (all parts), *Lamp controlgear*

IEC 61347-1:2015, *Lamp controlgear – Part 1: General and safety requirements*
IEC 61347-1:2015/AMD1:2017

IEC 61347-2-9, *Lamp controlgear – Part 2-9: Particular requirements for electromagnetic controlgear for discharge lamps (excluding fluorescent lamps)*

IEC 61535:2009 ², *Installation couplers intended for permanent connection in fixed installations*

IEC 61558 (all parts), *Safety of power transformers, power supplies, reactors and similar products*

IEC 61558-1:2005 ³, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

¹ Withdrawn.

² Withdrawn.

³ Withdrawn.

~~IEC 61558-2 (all parts), Safety of power transformers, power supplies, reactors and similar products – Part 2: Particular requirements and tests~~

~~IEC 61558-2-5, Safety of transformers, reactors, power supply units and combinations thereof – Part 2-5: Particular requirements and test for transformer for shavers, power supply units for shavers and shaver supply units~~

IEC 61558-2-6, Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers

IEC 61643-11, Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and tests ~~methods~~

IEC 61984:2008, Connectors – Safety requirements and tests

~~IEC 62031, LED modules for general lighting – Safety specifications~~

~~IEC 62035: Discharge lamps (excluding fluorescent lamps) – Safety specifications~~

IEC 62368-3:2017, Audio/video, information and communication technology equipment – Part 3: Safety aspects for DC power transfer through communication cables and ports

IEC 62493:2015, Assessment of lighting equipment related to human exposure to electromagnetic fields

IEC 62680 (all parts), Universal serial bus interfaces for data and power

IEC TR 62778, Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

IEC 80416-1, Basic principles for graphical symbols for use on equipment – Part 1: Creation of graphical symbol ~~originals~~ for registration

0.3 General requirements

0.3.1 Luminaires shall be so designed and constructed that in normal use they function safely and cause no danger to persons or surroundings. In general, compliance is checked by carrying out all the tests specified.

0.3.2 A luminaire shall comply with a part of IEC 60598-2. If, however, an appropriate part of IEC 60598-2 does not exist for a particular luminaire or group of luminaires, the nearest applicable part of IEC 60598-2 may be used as a guide to the requirements and tests.

Where the design of a luminaire is such that two or more parts of IEC 60598-2 are applicable, the luminaire shall comply with both or all of the appropriate sections.

0.3.3 Semi-luminaires should be regarded as luminaires for test purposes.

0.4 General test requirements and verification

0.4.1 Tests according to this document are type tests. For the definition of a "type test", see Section 1.

The requirements and tolerances permitted by this document are related to testing of a type test sample submitted for that purpose. Compliance of the type test sample does not ensure compliance of the whole production of a manufacturer. Compliance for production is the

responsibility of the manufacturer and may include routine tests and quality assurance in addition to type testing.

0.4.2 Except where otherwise specified in the sections of this document or relevant part of IEC 60598-2, luminaires shall be tested as delivered, and installed as for normal use, in an ambient temperature of between 10 °C and 30 °C, having regard to the manufacturer's installation instructions. The lamp (or lamps) is (are) not included except where essential for the test.

Luminaires cannot be regarded as meeting the requirements of this document unless all internal wiring is complete.

In general, the tests are made on a single sample luminaire or, where a range of similar luminaires is involved, on a single luminaire of each rated wattage in the range or on a representative selection from the range as agreed with the manufacturer (see Annex S). This selection shall include the luminaire, together with any attachments, which represents the most unfavourable combination from a testing point of view.

~~In accordance with IEC guidelines, new IEC standards are divided into those covering either safety or performance. In the lamp safety standards, "information for luminaire design" is given for the safe operation of lamps; this shall be regarded as normative when testing luminaires to this standard.~~

Each sample luminaire shall comply with all the relevant tests. In order to reduce the time of testing and to allow for any tests which may be destructive, the manufacturer may submit additional luminaires or parts of luminaires, provided that these are of the same materials and design as the original luminaire and that the results of the test are the same as if carried out on an identical luminaire. Where the test for compliance is shown as being "by inspection", this shall include any necessary handling.

For track-mounted luminaires the manufacturer shall provide, together with the luminaire, a sample of the appropriate track, connector and adaptors for the luminaire to be connected.

Combination luminaires are tested for safety requirements with that assemblage of parts which gives the most unfavourable result.

Certain parts of luminaires, such as joints, raising and lowering devices, may be tested separately provided that the design of these parts is such that their performance is not dependent upon the other parts of the luminaires.

Luminaires intended to be used with supply cords are tested with the flexible supply cord connected to the luminaire.

For luminaires intended to be used with a shade, but not normally supplied with a shade, the manufacturer shall provide a shade, typical of the type that might be used with the luminaire.

0.4.3 Verification and tests

Luminaires for testing to the requirements of this document may have earlier test reports updated in accordance with this document by submitting a new sample for test together with the previous test reports.

Full type testing need not generally be necessary and the product and the previous test results shall be reviewed only against any amended clauses marked "R" and scheduled in Annex R.

NOTE Clauses marked "R" and scheduled in Annex R will be included in future amendments/editions.

0.5 Components of luminaires

0.5.1 Components, other than integral components, shall comply with the requirements of the relevant IEC standards, if any.

Components which comply with the requirements of the relevant IEC standard and marked with individual ratings are checked to establish that they suit the conditions which may occur in use. Aspects of use not covered by the respective standard shall require them to satisfy the additional relevant requirements of this document.

Compliance is checked by inspection and the relevant tests.

Integral components shall comply as far as is reasonable with the IEC component standards, as part of the luminaire.

NOTE 1 This does not imply that components need to be separately tested before approval of the luminaire.

NOTE 2 Guidance on the selection of components in different kinds of luminaires can be found in Annex L.

Internal wiring of a luminaire shall comply with the requirements in 5.3.

NOTE 3 This does not exclude the use of standardized cables.

0.5.2 Components complying with the requirements of their own standard and used in accordance with their intended use, shall only be tested to the requirements of this document where there are no requirements in the component standard (covering the requirement heading of this document).

A valid test report is considered adequate to show compliance.

Lampholders and starterholders shall additionally comply with the gauging and interchangeability requirements of the appropriate IEC component standard where applicable after building into the luminaire.

For terminal blocks with an integrated screwless **protective** earthing contact for direct connection to the luminaire or to parts of the body, special requirements apply according to Annex V.

0.5.3 Components for which no appropriate IEC standard exists shall satisfy the relevant requirements of this luminaire standard as part of the luminaire. Lampholders and starterholders shall additionally comply with the gauging and interchangeability requirements of the appropriate IEC component standard where applicable.

NOTE Examples of components are lampholders, switches, transformers, ballasts, flexible cables and cords and plugs.

0.5.4 Compliance with this document can only be ensured if protective shields of identical specification are used.

0.6 List of parts of IEC 60598-2

- Part 2-1 Fixed general purpose luminaires
- Part 2-2 Recessed luminaires
- Part 2-3 Luminaires for road and street lighting
- Part 2-4 Portable general purpose luminaires
- Part 2-5 Floodlights

- Part 2-6 Luminaires with built-in transformers for tungsten filament lamps ~~(See Note.)~~ ⁴
- Part 2-7 Portable luminaires for garden use⁵
- Part 2-8 Handlamps
- Part 2-9 Photo and film luminaires (non-professional)⁶
- Part 2-10 Portable luminaires for children
- Part 2-11 Aquarium luminaires
- Part 2-12 Mains socket-outlet mounted nightlights
- Part 2-13 Ground recessed luminaires
- Part 2-14 Luminaires for cold cathode tubular discharge lamps (neon tubes) and similar equipment
- Part 2-15 Not used at present
- Part 2-16 Not used at present
- Part 2-17 Luminaires for stage lighting, television and film studios (outdoor and indoor)
- Part 2-18 Luminaires for swimming-pools and similar applications
- Part 2-19 Air-handling luminaires (safety requirements)
- Part 2-20 Lighting chains
- Part 2-21 ~~Sealed lighting chains~~⁷ Rope lights
- Part 2-22 Luminaires for emergency lighting
- Part 2-23 Extra-low-voltage lighting systems for filament lamps
- Part 2-24 Luminaires with limited surface temperatures
- Part 2-25 Luminaires for use in clinical areas of hospitals and health care buildings

~~NOTE — In this edition of IEC 60598-1 all requirements listed in IEC 60598-2-6 have been incorporated. As a consequence, IEC 60598-2-6 will be withdrawn after publication of this standard. For this reason, compliance to IEC 60598-2-6 for luminaire with built-in transformer or controlgear, is not required when tested according to this edition of IEC 60598-1.~~

0.7 Information for luminaire design in light sources standards

0.7.1 In accordance with IEC guidelines, IEC standards are divided into those covering either safety or performance.

0.7.2 In light source safety standards, "information for luminaire design" is given for the safe operation of light sources; this shall be regarded as normative when testing luminaires in accordance with this document.

0.7.3 In light source performance standards, "information for luminaire design" is given for the correct performance of light sources; this shall be regarded as informative when testing luminaires in accordance with this document. Testing of light source performance is not required as part of the type test approval for luminaires.

⁴ Withdrawn.

⁵ Withdrawn.

⁶ Withdrawn.

~~⁷ To be published.~~

SECTION 1: TERMS AND DEFINITIONS

1.1 General

This section gives general definitions applicable to luminaires.

1.2 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>

NOTE 1 Other definitions related to lamps ~~are to~~ can be found in the relevant lamp standards.

NOTE 2 Where the terms "voltage" and "current" are used, they imply the RMS values unless otherwise stated.

1.2.1

luminaire

apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes all the parts necessary for supporting, fixing and protecting the lamps, but not the lamps themselves, and where necessary, circuit auxiliaries together with the means for connecting them to the supply

Note 1 to entry: A luminaire with integral non-replaceable lamps is regarded as a luminaire, except that the tests are not applied to the integral lamp or integral self ballasted lamp.

1.2.2

main part of luminaire

part that ~~which~~ is fixed to the mounting surface or is directly suspended from it or standing on it

Note 1 to entry: It may or may not carry the lamps, lampholders and auxiliary gear.

Note 12 to entry: In luminaires for tungsten filament lamps, the part carrying the lampholder is normally the main part.

1.2.3

ordinary luminaire

luminaire providing protection against accidental contact with live parts but without any other special protection against dust, solid objects or moisture

1.2.4

general purpose luminaire

luminaire which is not designed for a special purpose

Note 1 to entry: Examples of general purpose luminaires include pendants, some spotlights and certain fixed luminaires for surface or recessed mounting. Examples of special purpose luminaires are those for rough usage, photo and film applications and swimming-pools.

1.2.5

adjustable luminaire

luminaire, the main part of which can be turned or moved by means of joints, raising and lowering devices, telescopic tubes or similar devices

Note 1 to entry: An adjustable luminaire may be fixed or portable.

1.2.6**basic luminaire**

smallest number of assembled parts that can satisfy the requirements of any of the parts of IEC 60598-2

1.2.7**combination luminaire**

luminaire consisting of a basic luminaire in combination with one or more parts which may be replaced by other parts, or used in a different combination with other parts and changed either by hand or with the use of tools

1.2.8**fixed luminaire**

luminaire which cannot easily be moved from one place to another, either because the fixing is such that the luminaire can only be removed with the aid of a tool, or because it is intended for use out of arms reach

Note 1 to entry: In general, fixed luminaires are designed for permanent connection to the supply, but connection may also be made by means of a plug or similar device.

1.2.9**portable luminaire**

luminaire which, in normal use, can be moved from one place to another while connected to the supply

Note 1 to entry: Luminaires for wall mounting provided with a supply cord for connection to a plug and luminaires which may be fixed to their support by means of a wing screw, a clip or a hook so that they can easily be removed from their support by hand, are considered to be portable luminaires.

1.2.10**recessed luminaire**

luminaire intended by the manufacturer to be fully or partly recessed into a mounting surface

Note 1 to entry: The term applies both to luminaires for operation in enclosed cavities and to luminaires for mounting through a surface such as a suspended ceiling.

1.2.11**rated voltage**

supply voltage or voltages assigned to the luminaire by the manufacturer

1.2.11.1**rated constant input voltage**

input voltage or voltages assigned by the manufacturer for luminaires not equipped with controlgear

Note 1 to entry: The rated constant input voltage of the luminaire corresponds to the rated output voltage of the constant voltage controlgear.

1.2.12**supply current**

current at the supply terminals when the luminaire has stabilized in normal use at the rated voltage and frequency

1.2.12.1**rated constant input current**

input current or currents assigned by the manufacturer for luminaires not equipped with controlgear

Note 1 to entry: The rated constant input current of the luminaire corresponds to the rated output current for constant current controlgear.

1.2.13

rated wattage

number and rated wattage of the lamps for which the luminaire is designed

1.2.14

supply cord

external flexible cable or cord, for supply purposes, that is fixed to the luminaire

Note 1 to entry: Luminaires may be provided with the supply cord or designed for attachment of a supply cord e.g. type X or Y attachment.

Note 2 to entry: It is the intention to amend each Part 2 of IEC 60598 to align with this modification; however, this will be done when each Part 2 is amended for other reasons. In the meantime, therefore, wherever a Part 2 makes reference to a "non-detachable flexible cable or cord" read "supply cord".

1.2.15

live part

conductive part which may cause an electric shock in normal use

Note 1 to entry: The test to determine whether or not a conductive part is a live part which may cause an electric shock is given in Annex A.

Note 2 to entry: The neutral conductor is, however, regarded as a live part.

1.2.16

basic insulation

insulation applied to live parts to provide basic protection against electric shock

Note 1 to entry: Basic insulation does not necessarily include insulation used exclusively for functional purposes.

1.2.17

supplementary insulation

independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation

1.2.18

double insulation

insulation comprising both basic insulation and supplementary insulation

1.2.19

reinforced insulation

single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: The term "insulation system" does not imply that the insulation ~~must~~ needs to be one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation.

1.2.20

protective impedance device

component or assembly of components used to bridge double or reinforced insulation and the impedance and construction of which are such as to ensure that steady state touch current and charge are limited to a non-hazardous level

1.2.21

~~class 0 luminaire (applicable to ordinary luminaires only)~~

~~luminaire in which protection against electric shock relies upon basic insulation~~

~~This implies that there are no means for the connection of accessible conductive parts, if any, to the protective conductor in the fixed wiring of the installation, reliance in the event of a failure of the basic insulation being placed on the environment. For the application of Class 0, see Annex T for reference to test requirements.~~

~~Note 1 to entry:—Class 0 luminaires may have either an enclosure of insulating material which forms a part or the whole of the basic insulation or a metal enclosure which is separated from live parts by at least basic insulation.~~

~~Note 2 to entry:—If a luminaire with an enclosure of insulating material has provision for earthing internal parts, it is class I.~~

~~Note 3 to entry:—Class 0 luminaires may have parts with double insulation or reinforced insulation.~~

~~Note 4 to entry:—In Japan, Class 0 is applicable only to ordinary luminaires for use with a supply voltage from 100 V to 127 V.~~

(Void)

1.2.22

class I luminaire

luminaire in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of accessible conductive parts to the protective (earthing) conductor in the fixed wiring of the installation in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation

Note 1 to entry: For a luminaire intended for use with a flexible cord or cable, this provision includes a protective conductor as part of the flexible cord or cable.

Note 2 to entry: Class I luminaires may have parts with double insulation or reinforced insulation.

Note 3 to entry: Class I luminaires may have parts in which protection against electric shock relies on operation at safety extra-low voltage (SELV) or protective extra-low voltage (PELV).

1.2.23

class II luminaire

luminaire in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions such as double insulation or reinforced insulation are provided, there being no provision for protective earthing or reliance upon installation conditions

Note 1 to entry: Such a luminaire may be of one of the following types:

- A luminaire having a durable and substantially continuous enclosure of insulating material which envelops all metal parts with the exception of small parts such as nameplates, screws and rivets which are isolated from live parts by insulation at least equivalent to reinforced insulation. Such a luminaire is called an insulation encased class II luminaire.
- A luminaire having a substantially continuous enclosure of metal, insulated from live parts by insulation at least equivalent to double or reinforced insulation. Such a luminaire is called a metal-encased class II luminaire.
- A luminaire which is a combination of types a) and b) above.

Note 2 to entry: The enclosure of an insulation-encased class II luminaire may form a part or the whole of the supplementary insulation or the reinforced insulation.

Note 3 to entry: If functional earthing is provided to assist starting, or for EMC reasons, but is not connected to an accessible metal part, the luminaire may still be deemed to be of class II. Accessible metal parts in compliance with the appropriate IEC lamp specification and other metal parts not normally earthed and not normally accessible during normal use are not regarded to be conductive parts which may cause an electric shock unless the tests of Annex A show them to be live parts.

Note 4 to entry: If a luminaire with double insulation and/or reinforced insulation throughout has a protective earthing terminal or a protective earthing contact, it is a class I construction. However, a fixed class II luminaire may have an internal terminal or contact for maintaining the electrical continuity (e.g. for looping in or through wiring) of a protective earthing conductor, provided that the terminal is insulated from accessible metal parts by class II insulation.

Note 5 to entry: Class II luminaires may have parts in which protection against electric shock relies on operation at safety extra-low voltage (SELV) or protective extra-low voltage (PELV).

1.2.24

class III luminaire

luminaire in which protection against electric shock relies on supply at safety extra-low voltage (SELV) or protective extra-low voltage (PELV) and in which voltages higher than those of SELV or PELV are not generated

Note 1 to entry: An ES1 PSE fulfilling the requirements of IEC 62368-3:2017 can be regarded as SELV.

1.2.25

rated maximum ambient temperature

t_a

temperature assigned to a luminaire by the manufacturer to indicate the highest sustained temperature in which the luminaire may be operated under normal conditions

Note 1 to entry: This does not preclude temporary operation at a temperature not exceeding $(t_a + 10) ^\circ\text{C}$.

1.2.26

rated maximum operating temperature

t_c

<of a controlgear or capacitor> highest permissible temperature which may occur on the outer surface (at the indicated place if marked) of the component under normal operating conditions at the rated voltage or maximum of the rated voltage range

1.2.27

rated maximum operating temperature

t_w

<of a lamp controlgear winding> winding temperature assigned by the manufacturer as the highest temperature at which 50/60 Hz lamp controlgear may be expected to have a service life of at least 10 years continuous operation

1.2.28

ballast

unit inserted between the supply and one or more discharge lamps which, by means of inductance, capacitance or resistance, single or in combination, serves mainly to limit the current of the lamp(s) to the required value

Note 1 to entry: It may also include means for transforming from the supply voltage and arrangements which help to provide starting voltage and preheating current, prevent cold starting, reduce stroboscopic effect, correct the power factor and suppress radio interference.

1.2.29

independent lamp controlgear

lamp controlgear consisting of one or more separate elements so designed that it, or they, can be mounted separately outside a luminaire with protection according to the marking on the lamp controlgear and without any additional enclosure

1.2.30

built-in lamp controlgear

lamp controlgear designed to be built into a luminaire and not intended to be mounted outside a luminaire without special precautions

1.2.31

integral lampholder

part of a luminaire which supports the lamp and provides electrical contact with it and which is designed as part of the luminaire

1.2.32

~~(Not used at present)~~ (Void)

1.2.33

translucent cover

light-transmitting parts of the luminaire which may also protect the lamps and other component parts including diffusers, lens panels and similar light-control elements

1.2.34**fixed wiring**

cable which is part of the fixed installation to which the luminaire is connected

Note 1 to entry: Fixed wiring may be brought into the luminaire and connected to terminals, including terminals of lampholders, switches and the like.

1.2.35**appliance coupler**

means enabling a flexible cable to be connected at will to the luminaire consisting of two parts: a connector provided with contact tubes which is the part integral with or designed to be attached to the flexible cable connected to the supply and an appliance inlet, provided with contact pins, which is the part incorporated in or fixed to the luminaire

1.2.36**external wiring**

wiring generally outside the luminaire but delivered with it

Note 1 to entry: External wiring may be used for connecting the luminaire to the supply, to other luminaires, or to any external ballast.

Note 2 to entry: External wiring is not necessarily outside the luminaire for its full length.

1.2.37**internal wiring**

wiring generally inside the luminaire and delivered with it, which forms the connection between terminations for external wiring or supply cords and terminations of lampholders, switches and similar components

Note 1 to entry: Internal wiring is not necessarily inside the luminaire for its full length.

1.2.38**normally flammable material**

material having an ignition temperature of at least 200 °C and which will not deform or weaken at this temperature

EXAMPLE Wood and materials based on wood of more than 2 mm thickness.

Note 1 to entry: The ignition temperature and the resistance of normally flammable materials to deformation or weakening are based on widely accepted values determined during a test period of 15 min.

1.2.39**readily flammable material**

material which cannot be classified as either normally flammable or non-combustible

EXAMPLE Wood fibre and materials based on wood of up to 2 mm thickness.

1.2.40**non-combustible material**

material incapable of supporting combustion

Note 1 to entry: For the purposes of this document, materials such as metal, plaster and concrete are regarded as non-combustible materials.

1.2.41**flammable material**

material which does not comply with the glow-wire test requirements of 13.3.2

1.2.42**ELV****extra-low voltage**

voltage which does not exceed 50 V AC RMS or 120 V ripple free DC between conductors, or between any conductor and earth (voltage band I of IEC 60449)

Note 1 to entry: "Ripple free" is conventionally defined for sinusoidal ripple voltage as a ripple content of not more than 10 % RMS: the maximum peak value does not exceed 140 V for a nominal 120 V ripple-free DC system, respectively 70 V for a nominal 60 V ripple-free DC system, and 35 V for a nominal 30 V ripple-free system.

Note 2 to entry: For interrupted DC, for frequencies between 10 Hz and 200 Hz, this document applies a maximum 50 V peak limit for ELV, this limit includes a possible ripple. For frequencies outside this frequency range, the limits of direct current apply.

Note 3 to entry: The requirements for the frequency range between 10 Hz and 200 Hz comes from a 1936 research paper, entitled "Electric Shock Effects of Frequency", authored by W.B. Kouwenhoven, D.R. Hooker and E.L. Lotz.

1.2.42.1

FELV

functional extra-low voltage

ELV in a circuit ~~having ELV voltage~~ provided for functional ~~reason~~ purposes and not fulfilling the requirements for SELV (or PELV)

1.2.42.2

SELV system

safety extra-low-voltage system

~~ELV in a circuit which is insulated from the mains supply by an insulation not less than that between the primary and secondary circuits of a safety isolating transformer according to IEC 61558-2-6 or equivalent~~

electric system in which the voltage cannot exceed the value of extra-low voltage

- under normal conditions and
- under single fault conditions, including earth faults in other electric circuits

Note 1 to entry: In this document the term "SELV" is used when a SELV system is meant.

Note 2 to entry: Maximum voltage lower than 50 V AC RMS or 120 V ripple free DC may be specified in particular requirements, especially when direct contact with current-carrying parts is allowed.

[SOURCE: IEC 60050-826:2004, 826-12-31, modified – The notes have been added.]

1.2.42.3

PELV system

protective extra-low-voltage system

electric system in which the voltage cannot exceed the value of extra-low voltage

- under normal conditions and
- under single fault conditions, except earth faults in other electric circuits

Note 1 to entry: In this document the term "PELV" is used when a PELV system is meant.

[SOURCE: IEC 60050-826:2004, 826-12-32, modified – The note has been added.]

1.2.43

working voltage

highest RMS voltage which may occur across any insulation at rated supply volts, transients being neglected, in open-circuit conditions or during normal operation

1.2.43.1

maximum working peak output voltage

$\hat{U}_{out}$

maximum repetitive occurring peak working voltage between the output terminals or between the output terminals and earth, during normal or abnormal operating condition and with transients neglected

[SOURCE: IEC 61347-1:2015, 3.45]

1.2.43.2**ignition voltage**

peak voltage applied to ignite a discharge lamp

[SOURCE: IEC 61347-1:2015, 3.46]

1.2.43.3**ignition pulse voltage**

peak ignition voltage with a total duration of $\leq 750 \mu\text{s}$ (summation of all pulses durations) within 10 ms with the duration time (width) of each pulse being measured at the level of 50 % of the maximum absolute peak value

Note 1 to entry: Ignition pulse waveforms, which are considered as ignition pulse voltage, should not contain any dominant frequency above 30 kHz or should be usually highly damped (after 20 μs the peak voltage level should be less than one half of the maximum peak voltage). For the assessment of the dominant frequency IEC 60664-4:2005, Annex E should be consulted.

[SOURCE: IEC 61347-1:2015, 3.46.1]

1.2.43.4**equivalent transformed peak voltage**

U_p

transformed output peak voltage, which is converted for the worst case peak voltage with its related frequency into an ignition pulse voltage

Note 1 to entry: The value of the declared equivalent transformed output peak voltage is the essential parameter for selecting the associated components.

Note 2 to entry: See 1.2.43.3.

[SOURCE: IEC 61347-1:2015, 3.47, modified – Notes 3 and 4 have been deleted.]

1.2.44**type test**

test or series of tests made on a type test sample, for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard

1.2.45**type test sample**

sample consisting of one or more similar units submitted by the manufacturer or the responsible vendor for the purpose of a type test

1.2.46**by hand**

not requiring the use of a tool

1.2.47**terminal**

that part of a luminaire or component which is necessary to make electrical connection to a conductor

Note 1 to entry: See Sections 14 and 15.

1.2.48**looping-in**

system of mains supply connection to two or more luminaires where each supply conductor is taken into and out of the same terminal

Note 1 to entry: A supply conductor may be cut to facilitate connections to a terminal (see Figure 20).

**1.2.49
through wiring**

wiring which passes through the luminaire intended for interconnection of a row of luminaires

Note 1 to entry: Some countries do not permit joints in through wiring.

Note 2 to entry: The luminaire may or may not be electrically connected to the through wiring (see Figure 20).

**1.2.50
starting device**

apparatus that, by itself or in combination with other components in the circuit, provides the appropriate electrical conditions to start a discharge type of lamp

**1.2.51
starter**

starting device, usually for fluorescent lamps, that provides for the necessary preheating of the electrodes and in combination with the series impedance of the ballast, causes a surge in the voltage applied to the lamp

**1.2.52
ignitor**

starting device that generates voltage pulses to start a discharge lamp and that does not provide for preheating of electrodes

**1.2.53
terminal block**

assembly of one or more terminals in or on a housing or body of insulating material to facilitate interconnection between conductors

**1.2.54
rough service luminaire**

luminaire designed to withstand severe mechanical handling

Note 1 to entry: The luminaire may:

- be permanently fixed, or
- be temporarily fixed on a construction or stand, or
- incorporate an integral stand or handle.

Note 2 to entry: Such luminaires are for use where normally rough circumstances occur, or where temporary lighting is required, for example on building sites, in engineering workshops and similar applications.

**1.2.55
electro-mechanical contact system**

connection system within a luminaire by which the main part carrying the lampholder is electrically and mechanically connected to the base plate or suspension device

SEE: Figure 31 describes an electro-mechanical contact system as defined in 1.2.55. As such the requirements of 4.11.6 and 7.2.1 apply. Because, in the situation described, the base and gear tray are unique and non-interchangeable, the base plate does not require marking with the rated current of the electrical connection, as specified in 3.2.

Note 1 to entry: The system can incorporate an adjusting device.

Note 2 to entry: The system can be dedicated to a specific luminaire design or can provide for connection of a variety of luminaire types.

**1.2.56
(Not used at present)**

1.2.57**mounting surface**

part of any building, furniture or other structure which a luminaire may in any way be attached to, suspended from, stood on or placed upon in normal use and which will or is intended to support the luminaire

1.2.58**integral component**

component which forms a non-replaceable part of a luminaire and which cannot be tested separately from the luminaire

1.2.59**self-ballasted lamp**

unit which cannot be dismantled without being permanently damaged, provided with a lamp cap and incorporating a light source and any additional elements necessary for starting and stable operation of the light source

Note 1 to entry: The light source component of a self-ballasted lamp is not replaceable.

Note 2 to entry: The ballast component is part of the self-ballasted lamp; it is not part of the luminaire. It is discarded at the end of the life of the unit.

Note 3 to entry: For test purposes, self-ballasted lamp units should be regarded as conventional lamps.

Note 4 to entry: For examples and further information, see IEC 60972.

1.2.60**semi-luminaire**

unit similar to a self-ballasted lamp but designed to utilize a replaceable light source and/or starting device

Note 1 to entry: The light source component and/or starting device of a semi luminaire is readily replaceable.

Note 2 to entry: The ballast component is not replaceable and is not disposed of each time a light source is replaced.

Note 3 to entry: A lampholder is required for a supply connection.

Note 4 to entry: For examples and further information, see IEC 60972.

1.2.61~~**plug-ballast/transformer**~~~~ballast or transformer incorporated in an enclosure provided with an integral plug as the means of connection to the electrical supply~~**plug-in independent controlgear**

independent controlgear provided with an integral plug as the means of connection to the electrical supply

1.2.62**mains socket-outlet-mounted luminaire**

luminaire provided with an integral plug as the means of both mounting and connection to the electrical supply

1.2.63**clip-mounted luminaire**

integral assembly of a luminaire and resilient spring clip, securing the luminaire in position on its mounting surface by a single hand action

1.2.64**lamp connectors**

set of contacts specially designed to provide a means of electrical contact but not to support the lamp

1.2.65

mains socket-outlet

accessory having socket-contacts designed to engage with the pins or blades of a mains plug and having terminals for the connection of cables or cords

1.2.66

~~(Not used at present)~~ (Void)

1.2.67

~~(Not used at present)~~ (Void)

1.2.68

lamp controlgear

devices employed for the control of lamps, for example ballasts, transformers and step-down convertors

Note 1 to entry: The definition does not include devices for the switching of lamps or the control of brightness such as dimmers and daylight sensors.

1.2.69

~~(Not used at present)~~ (Void)

1.2.70

dummy lamp

device incorporating a cap which is in compliance with the requirements of IEC 60061 (all parts) where applicable

1.2.71

self-shielded lamp

tungsten halogen lamp or metal halide lamp for which the luminaire needs no protective shield for protection against UV emission or lamp shattering

1.2.72

external flexible cable or cord

flexible cable or cord for external connection to the input or output circuit, fixed to or assembled with, the luminaire according to ~~one of the following methods~~ a type X (1.2.72.1), Y (1.2.72.2) or Z (1.2.72.3) method of attachment

1.2.72.1

type X attachment

method of attachment of the cable or cord such that it can be easily replaced

Note 1 to entry: The flexible cable or cord may be specially prepared and only available from the manufacturer or his service agent.

Note 2 to entry: A specially prepared cable or cord may also include a part of the luminaire.

1.2.72.2

type Y attachment

method of attachment of the cable or cord such that any replacement can only be made by the manufacturer, his service agent or similarly qualified person

Note 1 to entry: Type Y attachment may be used either with an ordinary or a special flexible cable or cord.

1.2.72.3

type Z attachment

method of attachment of the cable or cord such that it cannot be replaced without breaking or destroying the luminaire

1.2.73 earthing

1.2.73.1 protective earthing

earthing of a point or points in a system or in an installation or in equipment, for purposes of electrical safety

[SOURCE: IEC 60050-195:2001, 195-01-11]

1.2.73.2 functional earthing

earthing of a point in a system or in an installation or in equipment, which is necessary for the proper function, but does not form part of the protection against electric shock

1.2.74 inter-connecting cable

wiring or wiring assembly between two main parts of a luminaire as supplied by the luminaire manufacturer and which can be regarded as being part of the luminaire

Note 1 to entry: A wiring assembly may contain a combination of different wiring, e.g. to feed through the supply voltage, to provide earthing, to supply starting and working voltages and wiring providing functional connection. Examples of applications are: between a luminaire and a controlgear box, a mounting box or a connector fitting to a track system.

1.2.75 ferrule

mechanical fixture, generally a rigid tube, used to confine the stripped end of a cable

1.2.76 impulse withstand category overvoltage category

numeral defining a transient overvoltage condition

Note 1 to entry: Impulse withstand categories I, II, III and IV are used.

Note 2 to entry: The following explanation is taken from IEC 60364-4-443 (withdrawn).

a) Purpose of classification of impulse withstand categories

Impulse withstand categories are to distinguish different degrees of availability of equipment with regard to required expectations on continuity of service and on an acceptable risk of failure.

By selection of impulse withstand levels of equipment insulation, coordination can be achieved in the whole installation reducing the risk of failure to an acceptable level providing a basis for overvoltage control.

A higher characteristic numeral of an impulse withstand category indicates a higher specific impulse withstand of the equipment and offers a wider choice of methods for overvoltage control.

The concept of impulse withstand categories is used for equipment energized directly from the mains.

b) Description of impulse withstand categories

Equipment of impulse withstand category I is equipment which is intended to be connected to the fixed electrical installations of buildings. Protective means are taken outside the equipment – either in the fixed installation or between the fixed installation and the equipment – to limit transient overvoltages to the specific level.

Equipment of impulse withstand category II is equipment to be connected to the fixed electrical installations of buildings.

Equipment of impulse withstand category III is equipment which is part of the fixed electrical installations and other equipment where a higher degree of availability is expected.

Equipment of impulse withstand category IV is for use at or in the proximity of the origin of the electrical installations of buildings upstream of the main distribution board.

1.2.77 circuits and circuit characteristics

1.2.77.1

primary circuit

circuit that is directly connected to the AC mains supply

Note 1 to entry: It includes, for example, the means for connection to the AC mains supply, the primary windings of transformers, motors and other loading devices.

[SOURCE: IEC 60950-1:2005, 1.2.8.4, modified – Additional information has been transferred to a note to entry and the existing note has been deleted]

1.2.77.2

secondary circuit

circuit that has no direct connection to a primary circuit and derives its power from a transformer, converter or equivalent device, or from a battery

Note 1 to entry: In autotransformers, although having direct connection to a primary circuit, the tapped part of the transformer is also deemed to be a secondary circuit in the above sense.

Note 2 to entry: Mains transients in such a circuit are attenuated by the corresponding primary windings. Inductive ballasts also reduce the mains transient voltage height. Therefore, components located after a primary circuit or after an inductive ballast can be suited for an impulse withstand category of one step lower, see Annex U.

[SOURCE: IEC 60950-1:2005, 1.2.8.5, modified – ~~Two new notes to entry have been added replacing the existing note~~ – In the definition, the word "isolation" has been deleted from "equivalent isolation device" and the note has been replaced with the notes to entry.]

1.2.78

touch current

electric current passing through a human body or through an animal body when it touches one or more accessible parts of an installation or equipment

Note 1 to entry: In this document, the human body is represented by the networks in Figure G.2 or Figure G.3.

[SOURCE: IEC 60050-826:2004, ~~826.05.21~~ 826.11.12, modified – The word "electrical" has been deleted from "electrical installation or electrical equipment" and a note to entry has been added.]

1.2.79

protective conductor current

current which flows in a protective conductor

Note 1 to entry: This current may have an influence on the operation of RCDs (residual current protection devices) connected in the same circuit.

1.2.80

electric burn

burning of the skin or ~~of an organ, caused by passing an electric current across or through the surface~~ an organ caused by an electric current along its surface or through it

[SOURCE: ~~IEC 60050-604:1987, 604.04.18~~ IEC 60050-195:1998, 195-03-01]

1.2.81

means of adjustment

part of a luminaire, which may be the lamp compartment, obviously intended to be manipulated by the user during use of the luminaire, for example to redirect the light beam

1.2.82**arms arm's reach**

zone of accessibility to touch extending from any point on a surface where persons usually stand or move about to the limits which a person can reach with the hand, in any direction, without assistance

Note 1 to entry: IEC 60364-4-41 incorporates a drawing representing the zone of accessibility. In general terms, the height is 2,5 m from the floor, and the width is 1,25 m in all horizontal directions from the locations a person may be.

[SOURCE: IEC 60050-195:1998, 195.06.12, modified – The note to entry has been added.]

1.2.83**terminal block with integrated screwless protective earthing contact**

terminal with earthing connection performed by means of an integrated contact or by means of an auxiliary contact without additional assembly actions (e.g. screwing) when fitted

1.2.84**detachable cord**

flexible cable or cord, for supply or interconnection, intended to be connected to the luminaire by means of a suitable appliance connector

Note 1 to entry: A detachable cord is considered to be easily replaceable.

1.2.85**tool**

screwdriver, coin or other object that may be used to operate a screw or similar fixing means

1.2.86**specially prepared cord**

flexible cable or cord the replacement of which with another non-special cable or cord would create a hazard or diminish safety

1.2.87**settable luminaire**

fixed luminaire, the main part of which can be turned or moved by means of joints, raising and lowering devices, telescopic tubes or similar devices, but which has a locking device (or devices) operated by a tool and is not intended to be adjusted during use

1.2.88**light source**

lamp, provided with a lamp-cap, or module (LED) or other light source made in order to produce an optical visible radiation to be used or incorporated into the luminaire

1.2.88.1**replaceable light source**

lamp, provided with a lamp-cap ~~according to IEC 60061~~, or light source designed to be connected by terminals, connector or similar devices and designed to be replaced during normal use or during maintenance of the luminaire

EXAMPLE All kinds of lamps provided with lamp caps.

Note 1 to entry: Built-in LED modules according to IEC 62031 are normally considered as replaceable light sources unless the requirements for non-replaceable or non-user replaceable light sources are fulfilled.

1.2.88.2**non-replaceable light source**

light source which is a non-replaceable part of the luminaire either because it cannot be replaced without breaking or destroying the luminaire or because it is enclosed under a cover fixed by a screw or similar fixing means designed to be used only once and which is not possible to be opened

1.2.88.3

non-user replaceable light source

light source which can only be replaced by the manufacturer, his service agent, or similar qualified person

1.2.89

controllable luminaire

luminaire having a control terminal for the purpose of controlgear information exchange and/or setting of controlgear functions

1.2.90

control terminal

control terminal connections, other than power supply terminals to the electronic controlgear, which are used to exchange information with the controlgear

Note 1 to entry: The power supply terminals can also be used to exchange information with the controlgear.

1.2.91

LV supply

circuits, wiring or part of them connected to the low voltage (LV) public distribution network; ~~the voltage of these circuits~~ and whose voltage corresponds to the voltage band II of IEC 60449

EXAMPLE 230 V distribution network.

Note 1 to entry: SELV, PELV and FELV are not included in the definition given here for LV supply.

Note 2 to entry: High voltage (HV) supply corresponding to band III of IEC 60449 is not included in the definition given here for LV supply.

1.2.92

connecting leads tails

internal wiring of luminaires intended to be connected to fixed wiring through separate terminals which are to be enclosed inside the luminaire or connecting box

1.2.93

rated value

value of a quantity used for specification purposes, established under standard test conditions as declared by the manufacturer or responsible vendor

[SOURCE: IEC 62504:2014, 3.33, modified – the note has been deleted.]

1.2.94

input power

electrical power consumed by the luminaire

1.2.95

constant light output function

function where the current passing through a LED module is gradually increased through life to compensate for the gradual light output degradation of the LED module that could be expected to occur

Note 1 to entry: Constant light output functions can be controlled by a programmed software algorithm based on the expected gradual light output degradation or on feedback from a connected sensor such as a photocell.

1.2.96

interrupted DC voltage

DC voltage changing between zero and a DC level with a certain frequency, where the time of the signal being at the DC level can vary within one period

1.2.97**power sourcing equipment****PSE**

equipment generating power to supply other equipment through information technology communication cabling providing ES1 according to IEC 62368 (all parts)

Note 1 to entry: The IEEE 802.3-2012 standard provides a similar but different definition.

1.2.98**power over Ethernet****PoE**

powering of a device with a PSE according to IEC 62368-3, via twisted pair Ethernet cabling including the appropriate connectors

Note 1 to entry: Typical examples of cables are CAT 5 cables and CAT 7 cables.

1.2.99**universal serial bus****USB**

communication interface including appropriate connectors for communication and powering devices, according to IEC 62680 (all parts)

Note 1 to entry: A class III luminaire is an example of a device as given in the definition.

Note 2 to entry: Several versions exist (USB 1.0, 2.0, 3.0).

1.2.100**information technology communication cabling**

any cable, meant for data transfer, provided with a connector defined by an industry standard that permits DC power transfer between equipment, even if communication does not take place

Note 1 to entry: Examples are USB or Ethernet cables.

1.2.101**track-mounted luminaire**

luminaire designed to be used on a track system, for which the electrical and mechanical connection is ensured either with an adaptor or by a luminaire supply connector together with a luminaire suspension device

Note 1 to entry: Class I and Class II luminaires may be used with Class I track systems/sectors, Class III luminaires can only be used with Class III track systems/sectors.

Note 2 to entry: Track-mounted luminaires can have control interface facilities.

SECTION 2: CLASSIFICATION OF LUMINAIRES

2.1 General

This section describes the classification of luminaires.

Luminaires are classified according to the type of protection against electric shock, the degree of protection against ingress of dust, solid objects and moisture, the material of the supporting surface and the circumstances of use.

2.2 Classification according to type of protection against electric shock

Luminaires shall be classified according to the type of protection against electric shock provided, as class I, class II or class III (see definitions in Section 1).

Luminaires shall have only a single classification. For example, for a luminaire with a built-in extra-low-voltage transformer with provision for **protective** earthing, the luminaire shall be classified as class I and no part of the luminaire shall be classified as class III even though the lamp compartment is separated by a barrier from the transformer compartment.

Semi-luminaires shall comply with all relevant requirements for class II luminaires without being provided with the class II symbol.

Unless a luminaire has been specifically designed for use with semi-luminaires, the luminaire manufacturer is not responsible for continued IEC 60598 conformity in the situation where the user has replaced specified lamp types with semi-luminaires. The semi-luminaire manufacturer has a responsibility to provide information with respect to limitations of use.

NOTE The class II symbol is omitted in order to avoid the symbol being applied to the complete luminaire in which the semi-luminaire is used.

2.3 Classification according to degree of protection against ingress of dust, solid objects and moisture

Luminaires shall be classified in accordance with the "IP number" system of classification described in IEC 60529.

Tests for the degrees of protection are given in Section 9.

NOTE Luminaires classified as watertight are not necessarily suitable for operation under water. Pressure watertight luminaires can be used for such applications.

2.4 Classification according to material of supporting surface for which the luminaire is designed

Luminaires shall be classified according to whether they are suitable for direct mounting on normally flammable surfaces or are only suitable for mounting on non-combustible surfaces as follows:

Classification	Symbol
– Luminaires suitable for direct mounting on normally flammable surfaces	No symbol required
– Luminaires not suitable for direct mounting on normally flammable surfaces	Relevant symbol – see Figure 1

NOTE Readily flammable surfaces are not suitable for the direct mounting of luminaires. Requirements for luminaires classified as primarily intended for direct mounting on normally flammable surfaces are given in Section 4 and related tests in Section 12.

2.5 Classification according to the circumstances of use

Luminaires shall be classified according to whether they are intended for normal use or for rough service.

Classification	Symbol
– Luminaires for normal use	No symbol
– Luminaires for rough service	Symbol – see Figure 1

SECTION 3: MARKING

3.1 General

This section specifies the information to be marked on luminaires or given by instruction.

Any written instructions related to safety shall be in a language which is acceptable in the country in which the equipment is to be installed.

3.2 Marking on luminaires

The following information shall be distinctly and durably marked on the luminaire (see Table 3.1). Each marking in Table 3.1 shall be read with the corresponding subclause as detailed in the table.

- a) Marking to be observed when replacing lamps or other replaceable components, shall be visible on the outside of the luminaire (except the mounting side) or behind a cover which is removed during lamp or other component replacement and with the lamp removed.
- b) Marking to be observed during installation shall be visible during installation on the outside of the luminaire or behind a cover or part which is removed during installation.
- c) Marking to be observed after installation shall be visible with the luminaire assembled and installed as for normal use and with the lamp in place.

Marking may be on ballasts provided the conditions under a) or b) above, as appropriate, are fulfilled. See Table 3.1 for details.

Table 3.1 – Marking

Markings belonging to item a)	Markings belonging to item b)	Markings belonging to item c)
3.2.8 ^a Rated wattage	3.2.1 – 3.2.2 ^b	3.2.13 Lighted objects ^d
3.2.10 Special lamps	3.2.3 Ambient temperature	3.2.14 Rough service
3.2.11 Cool beam	3.2.4 – 3.2.5	3.2.20 Means of adjustment
3.2.15 Bowl mirror	3.2.6 IP number	3.2.23 Do not stare at light source ^e
3.2.16 Protective shield	3.2.7 Type reference	
3.2.18 Ignition warning	3.2.8.2 Rated input power	
3.2.19 Self-shielded lamp	3.2.9 Symbols	
3.2.22 Internal replaceable fuse(s)	Relevant symbol for luminaires not suitable for direct mounting on normally flammable surfaces	
3.2.23 Do not stare at light source ^e	3.2.12 Termination	
3.2.24 Symbol for electric shock risk	3.2.17 ^c Interconnected luminaires	
	3.2.21 Relevant symbol for luminaires not suitable for covering with thermally insulating material	
	3.2.25 Rated input constant voltage ^f	
	3.2.26 Rated input constant current and value of U_{out} ^g	
^a 3.2.8 Rated wattage. For luminaires for discharge lamps with remote controlgear, the marking may be replaced by the instruction: "For lamp designation, see controlgear". ^b 3.2.2 Rated voltage. For luminaires for discharge lamps, if the ballast is not built into the luminaire, the luminaire shall be marked with the working voltage instead of the mains voltage. ^c 3.2.17 Interconnected luminaires. For fixed luminaires, this information may alternatively be provided within the installation instructions. ^d 3.2.13 Lighted objects. Only the symbol shall be provided on the luminaire. The explanation of the symbol shall be provided in the instruction accompanying the luminaire, where not already provided on the luminaire. ^e 3.2.23 The different conditions of this marking for fixed, portable and handheld luminaires are given in 3.2.23. ^f 3.2.25 for constant voltage operation of the luminaire. ^g 3.2.26 for constant current operation of the luminaire.		

The earthing symbol referred to in 3.2.12 may be marked on the ballast, instead of the luminaire, if the ballast is of a non-replaceable type. The height of graphical symbols shall not be less than 5 mm, except for symbols for class II and class III classification which may be reduced to a minimum of 3 mm where the space available for marking is restricted. The height of letters and numerals either shown separately or with or as part of symbols shall not be less than 2 mm.

For combination luminaires where the type references or the rated inputs are different for different combinations, the main part and the alternative parts may be marked with a type reference or a rated input, as appropriate, provided that the type can be identified and the rated input of the complete unit may be established from a catalogue or a similar document.

For luminaires with electro-mechanical contact systems, the base plate shall be marked with the rated current of the electrical connection if the system can be used with a variety of different luminaire types.

3.2.1 Mark of origin (this may take the form of a trade mark, the manufacturer's identification mark or the name of the responsible vendor).

3.2.2 Rated voltage(s) in volts. ~~Luminaires for tungsten filament lamps shall be marked only if the rated voltage is different from 250 V.~~

Portable class III luminaires shall be marked with the rated voltage on the outside of the luminaire.

Luminaires with built-in transformers or convertors, shall be marked with the nominal voltage and/or current of the light source to ensure correct replacement. This marking shall be positioned in accordance with 3.2.8.

Where marking is provided in accordance with 3.2.25 or 3.2.26, additional marking of the rated voltage is not required.

Luminaires supplied via an external PSE shall have a marked rated voltage, which is within the voltage range of the values given in Table Y.2, for the chosen communication cable/connectors.

3.2.3 Rated maximum ambient temperature t_a , if other than 25 °C (see Figure 1).

3.2.4 Symbol for class II luminaires where applicable (see Figure 1).

For portable luminaires provided with a supply cord, the symbol for class II construction, if applicable, shall be on the outside of the luminaire.

The class II symbol shall not be applied to semi-luminaires.

3.2.5 Symbol for class III luminaires where applicable (see Figure 1).

3.2.6 Marking (if applicable) with IP numbers for degree of protection against ingress of dust, solid objects and moisture (see Figure 1 and Annex J). Where X is used in an IP number in Figure 1, it indicates a missing numeral in the example, but both of the appropriate numerals shall be marked on the luminaire.

In cases where different IP numbers apply to distinct parts of the luminaire, the lower number shall be marked on the type label on the luminaire, even if IP20, whereas the higher number shall be marked separately on the part concerned. In cases where shades or similar devices for upgrading are used, for example an IP20 luminaire to a higher IP rating when mounted, the IP20 marking shall be made invisible by the device in question without destroying the marking and the device shall visibly be provided with a new IP rating. The instruction sheet supplied with the luminaire shall include details of the IP numbers applying to the various parts of the luminaire. The use of different IP numbers on different parts of a luminaire or devices, to upgrade the IP rating, for example to a higher IP rating, is only applicable to fixed luminaires.

For recessed luminaires with two IP ratings, both ratings shall be visible during installation and it shall be obvious to which parts of the luminaire the ratings refer. The relevant information shall be provided even if the rating is IP20 or the lower rating is specified as ordinary

Marking of IP20 on ordinary luminaires is not required.

3.2.7 Maker's model number or type reference.

~~**3.2.8** Rated wattage or the designation as indicated on the lamp data sheet of the type or types of lamp for which the luminaire is designed. Where the lamp wattage alone is insufficient, the number of lamps and the type shall also be given.~~

Luminaires shall be marked with information for the maximum rated light source power or maximum input power according to 3.2.8.1, 3.2.8.2 and 3.2.8.3.

3.2.8.1 Luminaires for tungsten filament lamps shall be marked with the maximum rated wattage and number of lamps.

Marking of maximum rated wattage for luminaires for tungsten filament lamps with more than one lampholder may be in the form:

" $n \times \text{MAX... W}$ ", n being the number of lampholders.

3.2.8.2 Luminaires designed for non-replaceable or non-user replaceable light sources shall be marked with the rated input power of the luminaire.

NOTE The intention of the marking with the rated input power is to give guidance to installers. This document does not specify a test for the input power.

3.2.8.3 For all other luminaires, rated wattage of the lamp or the designation as indicated on the lamp data sheet of the type or types of lamp for which the luminaire is designed. Where the lamp wattage alone is insufficient, the number of lamps and the type shall also be given.

3.2.9 Where applicable, relevant symbol (see Figure 1) for luminaires not suitable for direct mounting on normally flammable surfaces. The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire. See Table N.1. The minimum size of the symbol shall be 25 mm for each side.

3.2.10 Information concerning special lamps, if applicable.

In particular, this applies to the symbols (see Figure 1) for luminaires for use with high-pressure sodium lamps having either an internal starting device or requiring an external ignitor where the lamp is required to be marked with the same symbol according to IEC 60662.

3.2.11 Symbol (see Figure 1), if applicable, for luminaires for lamps of similar shape to "cool beam" lamps but where the use of a dichroic reflectorized "cool beam" lamp might impair safety.

3.2.12 Except for type Z attachments, terminations shall be marked to identify live, neutral and earth in case of connection of the luminaire to the supply mains to ensure safe and satisfactory operation.

Symbols, when applied, indicating mains supply terminations shall be according to IEC 60417.

The earthing termination shall be marked by the relevant symbol of IEC 60417 only.

NOTE 1 Appropriate symbols from IEC 60417 are: Earth (IEC 60417-5017:2006-08), Functional earthing (IEC 60417-5018-(2006-10:2011-07) and Protective earth (IEC 60417-5019:2006-08).

Where terminals are provided in a Class II luminaire for the continuity or termination of a protective earth conductor, such terminals shall be marked with the letter E.

NOTE 2 Examples of such terminals are those used for looping or through wiring.

~~Leads (tails) used for the connection to extra low voltage d.c. supply, shall be colour coded red to indicate its intended connection to the positive termination, and shall be colour coded black to indicate its intended connection to the negative termination. Fixed terminations, when applied, shall be marked with the "+" sign to indicate the positive connection, and shall be marked with the "-" sign to indicate the negative connection.~~

Leads (tails) and terminations used for the connection to extra-low voltage DC supplies shall indicate their intended connection choosing one of the below mentioned combination (see Table 3.2):

Table 3.2 – Identification of extra-low-voltage DC leads and terminations

Positive	Negative
"+"	"–"
Colour coded red ^a	Colour coded black ^a
^a Use of labels or sleeving fixed to the leads to give one of the above identification is acceptable.	

NOTE 3 Terminations can be found at leads (tails), connection or terminal blocks and terminals of another construction.

Luminaires with supply cords which are not fitted with a plug shall include with the manufacturer's instructions any information necessary to ensure safe connection, for example deviations from the national standardized colour coding of the cores where this does not create the possibility of an unsafe situation during installation, use or maintenance.

NOTE 4 In some countries, luminaires with supply cords which are intended to be connected to the supply via a socket-outlet and which are not fitted with a plug are not permitted.

3.2.13 Symbol (see Figure 1) for minimum distance from lighted objects, if applicable, for luminaires which might otherwise overheat the lighted objects due to, for example, the applied lamp type, the shape of the reflector, the adjustability of the mounting means or the location of mounting as indicated in the installations instructions.

The minimum distance marked shall be determined by the temperature test described in item j) of 12.4.1.

The distance is measured on the optical axis of the luminaire from that part of the luminaire or lamp which is nearest to the lighted object.

The symbol for minimum distance and explanation of its meaning shall also be given either on the luminaire or in the instructions with the luminaire.

3.2.14 Symbol (see Figure 1), if applicable, for rough service luminaires.

3.2.15 Symbol (see Figure 1), if applicable, for luminaires which are designed for use with bowl mirror lamps.

NOTE Separate bowls for attachment to GLS lamps without reference to luminaire testing are not within the scope of this document.

3.2.16 Luminaires incorporating a protective shield shall be marked either with:

- "Replace any cracked protective shield", or
- the relevant symbol (see Figure 1).

3.2.17 The maximum number of luminaires that may be interconnected or the maximum total current that may be drawn by means of couplers provided for looping-in connection to the mains supply. For fixed luminaires, this information may alternatively be provided within the installation instructions.

3.2.18 A warning symbol or notice for luminaires with ignitors intended for use with double-ended high pressure discharge lamps and luminaires with double-capped Fa8 tubular lamps if the voltage measured according to Figure 26 exceeds 34 V peak:

- a) warning symbol in accordance with IEC 60417-5036:2002-10 visible during replacement of the lamp. The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire, or
- b) a warning notice near to the holder of a replaceable ignitor or replaceable switching element, if any: "Attention, remove replaceable device before replacement of lamp. After lamp-replacement reinsert replaceable device".

3.2.19 Symbol (see Figure 1) for luminaires which are designed to be used only with self-shielded tungsten halogen lamps or self-shielded metal halide lamps.

3.2.20 Where necessary, the means of adjustment where not obvious, needs to be identified.

NOTE Appropriate marking includes symbols (e.g. arrows) to indicate direction of movement, descriptive text or colours.

3.2.21 Relevant symbol (see Figure 1) for luminaires not suitable for covering with thermally insulated material. The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire. See Table N.1 The minimum size of the symbol shall be 25 mm for each side.

~~A warning notice and symbol is required when a luminaire is not suitable for covering with thermally insulated material.~~

3.2.22 Symbol (see Figure 1) if applicable, for luminaires with internal replaceable fuses. Such a luminaire shall, in addition, be provided with information regarding the rated current (in A or mA) of the fuse. Where the time/current characteristic of the fuse is important for safety, the rating and type of every fuse shall be marked on the holder or in the proximity of the fuse in accordance with what is stated in the relevant fuse standard.

3.2.23 Warning symbol "Do not stare at the operating light source" (see Figure 1) for portable and handheld luminaires that have been classified as having a threshold illuminance E_{thr} in accordance with IEC TR 62778. This marking shall be visible as detailed by condition 'c' of Clause 3.2 and Table 3.1. In addition, the symbol should be positioned so that it can be read without looking into the operating light source. This requirement is applicable only when E_{thr} is reached at a distance further than 200 mm from the luminaire.

For fixed luminaires that have been classified as having a threshold illuminance E_{thr} in accordance with IEC TR 62778, the manufacturer's instructions provided with the luminaire shall give the following text, where x m is the distance at which the threshold illuminance E_{thr} condition occurs. This requirement is applicable only when E_{thr} is reached at a distance further than 200 mm from the luminaire.

"The luminaire should be positioned so that prolonged staring into the luminaire at a distance closer than x m is not expected".

NOTE 1 According to IEC TR 62778, x m is the distance d_{thr} between the light source and the eyes of the viewer and it is calculated from the lighting distribution measurement of the luminaire.

NOTE 2 Prolonged staring is not expected due to the natural aversion response to bright light sources. Momentary exposure is not considered as prolonged staring.

NOTE 3 According to IEC 62471:2006, 6.1.3, "the philosophical basis for the Risk Group 2 (Moderate-Risk) classification is that the lamp does not pose a hazard due to the aversion response to very bright light sources (...)".

NOTE 4 The above marking requirements have been established following IEC TR 62471-2:2009.

In addition, luminaires incorporating replaceable or non-user replaceable light sources that have been classified as having a threshold illuminance E_{thr} condition in accordance with IEC TR 62778 and which are directly visible during luminaire maintenance shall be marked with the warning symbol "Do not stare at the operating light source" (see Figure 1). This marking shall be visible as detailed by conditions 'a' and 'c' of Clause 3.2 and Table 3.1.

3.2.24 Where required for protection against electric shock, covers fixed over non-user replaceable light sources shall be marked with the 'caution, risk of electric shock' symbol given by IEC 60417-6042:2011-112010-11. The minimum height of this symbol shall be 15 mm (see Figure 1).

3.2.25 Rated constant input voltage when a luminaire is operated from a constant voltage controlgear not provided with the luminaire.

3.2.26 Rated constant input current when the luminaire is operated from a constant current controlgear not provided with the luminaire. Luminaires supplied with constant current shall also be marked with the highest allowed U_{out} value of the controlgear.

3.2.27 For luminaires operating a LED light source and containing built-in controlgear, the maximum rated electrical output characteristics from the controlgear (e.g. current for constant current controlgear), for which the luminaire has been designed, shall be marked as required in the first column of Table 3.1 belonging to item a). For luminaires incorporating a constant light output function, this marking shall indicate the maximum operating conditions for which the luminaire has been designed. For luminaires using external independent controlgear delivered with the luminaire, this marking shall be visible according to the second column of Table 3.1 belonging to item b).

NOTE This marking is additional to any information already marked on the controlgear.

3.3 Additional information

In addition to the above marking, all details which are necessary to ensure proper installation, use and maintenance shall be given either on the luminaire, semi-luminaire or on built-in ballasts or in the manufacturer's instructions provided with the luminaire for instance:

3.3.1 For combination luminaires, the permissible ambient temperature, the class of protection or the protection against ingress of dust, solid objects and moisture of an alternative part if not at least equal to that of the basic luminaire.

3.3.2 Nominal frequency in hertz.

3.3.3 Operating temperatures:

- a) The rated maximum operating temperature (of a winding) t_w in degrees Celsius.
- b) The rated maximum operating temperature (of a capacitor) t_c in degrees Celsius.
- c) The maximum temperature to which the insulation of supply cables and interconnecting cables will be subjected within the luminaire under the most unfavourable conditions of normal operation, if in excess of 90 °C (see footnote c to Table 12.2 relating to unsleeved fixed wiring). The symbol to indicate this requirement is given in Figure 1.
- d) Spacing requirements to be observed during installation.

~~3.3.4 In case a luminaire is only suitable for direct mounting on non-combustible surfaces and the relevant symbol (see Figure 1) is not applied, a warning notice shall be attached to the luminaire or given in the manufacturer's instructions explaining that the luminaire can under no circumstances be mounted on normally flammable surfaces.~~

~~Because of their application, luminaires which are provided with an adaptor for mounting on a track shall meet the requirements for direct mounting on normally flammable surfaces.~~

3.3.4 Not used.

3.3.5 A wiring diagram, except where the luminaire is suitable for direct connection to the mains supply.

3.3.6 Special conditions for which the luminaire, including the ballast, is suitable, for instance, whether or not the luminaire is intended for looping-in.

3.3.7 Luminaires provided with metal halide lamps shall, if applicable, be provided with the following warning notice:

"The luminaire shall only be used complete with its protective shield".

3.3.8 The manufacturer of semi-luminaires shall supply information on limitations of use of such devices, particularly where overheating may be caused by the position or thermal distribution of the replaceable light source being different from the light sources they will replace.

3.3.9 In addition, the manufacturer shall be prepared to supply information on the power factor and the supply current.

For connections suitable for both resistive and inductive loads, the rated current for the inductive load shall be indicated between brackets and shall immediately follow the rated current for the resistive load. The marking may accordingly be as follows:

$$3(1)A\ 250\ V\ \text{or}\ 3(1)/250\ \text{or}\ \frac{3(1)}{250}$$

NOTE This marking is in accordance with IEC 61058-1.

The rated current values do not apply to circuits in general but only to the rating of the luminaire as a whole.

3.3.10 Suitability for use "indoors" including the related ambient temperature.

3.3.11 For luminaires using remote controlgear, the range of lamps for which the luminaire is designed.

3.3.12 For clip-mounted luminaires, a warning when the luminaire is not suitable for mounting on tubular material.

3.3.13 The manufacturer shall provide the specifications of all protective shields.

3.3.14 Where necessary for correct operation, the luminaire shall be marked with the symbol for nature of supply (see Figure 1).

3.3.15 The rated current at rated voltage shall be declared by the manufacturer for any socket outlet incorporated in the luminaire, if less than the rated value.

3.3.16 The information about rough service luminaires concerning:

- the connection to IPX4 rated socket outlets;
- the correct mounting taking into account the temporary installation;
- the correct fixing to a stand, and also where the stand is not supplied with the luminaire, the maximum height of a possible stand, and its required stability by the indication of the number and minimum length of the legs.

3.3.17 For luminaires with type X, Y or Z attachments, the mounting instructions shall contain the substance of the following information.

- For type X attachments having a specially prepared cord:
if the external flexible cable or cord of this luminaire is damaged, it shall be replaced by a special cord or cord exclusively available from the manufacturer or his service agent.
- For type Y attachments:
if the external flexible cable or cord of this luminaire is damaged, it shall be exclusively replaced by the manufacturer or his service agent or a similar qualified person in order to avoid a hazard.
- For type Z attachments:
the external flexible cable or cord of this luminaire cannot be replaced; if the cord is damaged, the luminaire shall be destroyed.

3.3.18 Luminaires which are other than ordinary, provided with a PVC supply cord, shall be provided with information about the intended use, i.e. "For indoor use only".

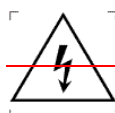
3.3.19 For Class I luminaires having a supply current > 20 A, which generate a protective conductor current greater than 10 mA and intended for permanent connection, the protective conductor current shall be clearly stated in the manufacturers' instructions.

NOTE In Australia and New Zealand there is no allowance for protective conductor current greater than 10 mA.

3.3.20 Wall mounted, settable and adjustable luminaires not intended to be mounted within arms arm's reach shall be provided with information to advise their correct installation, i.e. "Only to be installed outside-arms arm's reach".

3.3.21 For luminaires with non-replaceable and non-user replaceable light source, the instruction sheet shall contain the substance of the following information:

- For non-replaceable light sources:
"The light source of this luminaire is not replaceable; when the light source reaches its end of life the whole luminaire shall be replaced";
- For non-user replaceable light sources:
"The light source contained in this luminaire shall only be replaced by the manufacturer or his service agent or a similar qualified person".



Caution, risk of electric shock

(Source: IEC 60417-6042 (2011-11))

3.3.22 For controllable luminaires the classification of insulation that has been maintained between LV supply and control conductors shall be provided (e.g. basic insulation, reinforced insulation).

NOTE Maintenance of the declared insulation barrier for the luminaire can also be dependent on other external components/products connected to the same control bus. This is the responsibility of the control system designer, not the luminaire manufacturer.

3.3.23 Luminaires delivered without controlgear shall be provided with the necessary information for the selection of the appropriate component (in particular the maximum wiring distance and size between controlgear and luminaire), together with the highest allowed U_{out} value of the controlgear and the maximum U_p or equivalent peak voltage U_p where pulse voltages are used. In addition, the classification of insulation of the external controlgear that has been maintained between LV supply and secondary output shall be provided if there is a need for at least basic insulation.

- For luminaires that require no insulation between LV supply and output of the external controlgear no additional information is required.

- For luminaires that require basic insulation between the primary and secondary part of the controlgear the substance of the following information is required:
External controlgear shall provide at least basic insulation between LV supply and output.
- For luminaires that are not classified as Class III but require double or reinforced insulation between the primary and secondary part of the controlgear the substance of the following information is required:
External controlgear shall provide at least double or reinforced insulation between LV supply and output.
- For luminaires that are classified as Class III, an indication that the controlgear shall be SELV/PELV is required, except where exposed parts have a voltage higher than 12 V AC or 30 V DC, where an indication that the controlgear shall be SELV only is required.

3.3.24 Where the terminal block is not supplied with the luminaire, the packaging shall contain the following wording:

"Terminal block not included. Installation must be performed by a qualified person."

3.3.25 Luminaire manufacturers shall provide information about the protection for on-site mains wiring for luminaires employing light sources that emit UV on the mains wiring insulation. The information shall contain the substance of the following:

"For installation, the use of additional UV resistant sleeves is required for on-site mains supply cables which are not UV resistant (in particular some halogen-free low smoke cable)."

NOTE It is not expected that light sources for general lighting other than fluorescent, metal halide, high pressure mercury lamps will emit level of UV that could damage the insulation of the cables.

3.3.26 For fixed wall mounted and portable wall mounted luminaires using an external flexible cable or cord longer than 30 cm, the manufacturer's instructions shall include the substance of the following wording: "To reduce the risk of strangulation the flexible wiring connected to this luminaire shall be effectively fixed to the wall if the wiring is within arm's reach".

3.4 Test of marking

Compliance with the requirements of 3.2 and 3.3 is checked by inspection and by the following test:

The durability of the marking is checked by trying to remove it by rubbing lightly for 15 s with a piece of cloth soaked with water and, after drying, for a further 15 s with a piece of cloth soaked with petroleum spirit and by inspection after the tests detailed in Section 12 have been completed.

After the test, the marking shall be legible, marking labels shall not be easily removable and they shall show no curling.

NOTE The petroleum spirit used typically consists of a solvent hexane with a content of aromatics of maximum 0,1 % by volume, a value of 29 % for kauri-butanol, an initial boiling-point of approximately 65 °C, a dry-point of approximately 69 °C and a density of approximately 0,68 g/cm³.

SECTION 4: CONSTRUCTION

4.1 General

This section specifies general constructional requirements for luminaires. See also Annex L.

4.2 Replaceable components

Luminaires incorporating components or parts intended to be replaceable shall be so designed that there is sufficient space to permit replacement of such components or parts without difficulty and without impairing safety.

NOTE Sealed-in components and riveted parts are not replaceable components.

4.3 Wireways

Wireways shall be smooth and free from sharp edges, burrs, flashes and the like, which might cause abrasion of the insulation of the wiring. Parts such as metal set screws shall not protrude into wireways.

Compliance is checked by inspection and, if necessary, by dismantling and reassembling the luminaire.

4.4 Lampholders

4.4.1 The requirements for electrical safety of integral lampholders shall be those applicable to the luminaire as a whole with the lampholder and lamp in fully assembled position, as for normal use.

In addition, integral lampholders shall, when mounted in the luminaire, comply with the requirements concerning safety during insertion of the lamp as specified in the appropriate lampholder standard.

4.4.2 Connection of wiring to integral lampholder contacts may be made by any method giving reliable electrical contact over the service life of the lampholder.

4.4.3 Luminaires for tubular fluorescent lamps designed for end-to-end mounting shall be so designed that the lamp may be changed in the middle luminaire of a row without adjusting any other luminaire. In multi-lamp luminaires for tubular fluorescent lamps, the changing of any one lamp shall not impair the security of the other lamps.

Compliance with the requirements of 4.4.1 to 4.4.3 is checked by inspection.

4.4.4 Lampholders which are put into position by the user shall be capable of easy and correct positioning.

The distance between the pair of fixed lampholders for a fluorescent lamp intended to be set in a fixed position shall comply with the relevant standard sheet of IEC 60061-2 or (if IEC 60061-2 does not apply), the lampholder manufacturer's mounting instructions. Lampholders for tungsten filament lamps and lampholders for single-capped fluorescent lamps shall be adequately fixed to the body of the luminaire. The fixing device of lampholders shall have adequate mechanical strength so as to withstand such rough handling as may be expected in normal use. These requirements apply both to lampholders put in position by the user and to lampholders put in position by the luminaire manufacturer.

Compliance is checked by inspection, measuring and, if applicable, by the following mechanical tests.