

ПІДТВЕРДЖУВАЛЬНЕ ПОВІДОМЛЕННЯ

**Державне підприємство
«Український науково-дослідний і навчальний центр
проблем стандартизації, сертифікації та якості»
(ДП «УкрНДНЦ»)**

Наказ від 13.12.2018 № 486

EN 60598-1:2015/A1:2018

**Luminaires —
Part 1: General requirements and tests**

**прийнято як зміну до національного стандарту
методом підтвердження за позначенням**

**ДСТУ EN 60598-1:2017 (EN 60598-1:2015; AC:2015; AC:2016; AC:2017, IDT;
IEC 60598-1:2014, MOD; COR1:2015; COR2:2015; COR3:2017, IDT)/ Зміна № 1:2018
(EN 60598-1:2015/A1:2018, IDT; IEC 60598-1:2014/A1:2017, IDT)**

**Світильники.
Частина 1. Загальні вимоги та випробування**

З наданням чинності від 2018–12–17

Відповідає офіційному тексту

**З питань придбання офіційного видання звертайтеся
до національного органу стандартизації
(ДП «УкрНДНЦ» <http://uas.org.ua>)**

English Version

**Luminaires - Part 1: General requirements and tests
(IEC 60598-1:2014/A1:2017)**

Luminaires - Partie 1: Exigences générales et essais
(IEC 60598-1:2014/A1:2017)

Leuchten - Teil 1: Allgemeine Anforderungen und
Prüfungen
(IEC 60598-1:2014/A1:2017)

This amendment A1 modifies the European Standard EN 60598-1:2015; it was approved by CENELEC on 2017-10-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European foreword

The text of document 34D/1292/FDIS, future IEC 60598-1:2014/A1, prepared by SC 34D "Luminaires" of IEC/TC 34 "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60598-1:2015/A1:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2018-08-23
national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2021-02-23
the document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60598-1:2014/A1:2017 was approved by CENELEC as a European Standard without any modification.

In the Bibliography of EN 60598-1:2015, the following note has to be added for the standard indicated:

IEC 60664 Series

NOTE Harmonized as EN 60664 Series.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
<i>In Annex ZA of EN 60598-1:2015 add the following new references:</i>				
IEC 60228	2004	Conductors of insulated cables	EN 60228	2005
IEC 60664-4	2005	Insulation coordination for equipment within low-voltage systems -- Part 4: Consideration of high-frequency voltage stress	EN 60664-4	2006
IEC 60998-2-1 (mod)	-	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	EN 60998-2-1	2004
IEC 60998-2-2 (mod)	-	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	EN 60998-2-2	2004

Annex ZZ
(informative)

**Relationship between this European standard and the safety objectives of
Directive 2014/35/EU [2014 OJ L96] aimed to be covered**

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

**Table ZZ.1 – Correspondence between this European standard and Annex I of Directive
2014/35/EU [2014 OJ L96]**

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1. General conditions		
a) the essential characteristics, the recognition and observance of which will ensure that electrical equipment will be used safely and in applications for which it was made, shall be marked on the electrical equipment, or, if this is not possible, on an accompanying document;	Section 3	To be used in conjunction with relevant part 2
b) the electrical equipment, together with its component parts, shall be made in such a way as to ensure that it can be safely and properly assembled and connected;	Section 4	To be used in conjunction with relevant part 2
c) the electrical equipment shall be so designed and manufactured as to ensure that protection against the hazards set out in points 2 and 3 is assured, providing that the equipment is used in applications for which it was made and is adequately	See item 2 and 3 of this table	

maintained.		
2. Protection against hazards arising from the electrical equipment Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that:		
a) persons and domestic animals are adequately protected against the danger of physical injury or other harm which might be caused by direct or indirect contact;	Section 4 Section 7 Section 14 and 15 Section 5 Section 8	All to be used in conjunction with relevant part 2
b) temperatures, arcs or radiation which would cause a danger, are not produced;	Section 4 Section 11 Section 12 Section 10	EMF is not covered All to be used in conjunction with relevant part 2
c) persons, domestic animals and property are adequately protected against non-electrical dangers caused by the electrical equipment which are revealed by experience;	Section 4 Section 10 Section 11	All to be used in conjunction with relevant part 2
d) the insulation is suitable for foreseeable conditions.	Section 9 Section 10	All to be used in conjunction with relevant part 2
3. Protection against hazards which may be caused by external influences on the electrical equipment Technical measures shall be laid down in accordance with point 1, in order to ensure that the electrical equipment:		
a) meets the expected mechanical requirements in such a way that persons, domestic animals and property are not endangered;	Section 3 Section 4	All to be used in conjunction with relevant part 2
b) is resistant to non-mechanical influences in expected environmental conditions, in such a way that persons, domestic animals and property are not endangered;	Section 9 Section 13	All to be used in conjunction with relevant part 2
c) does not endanger persons, domestic animals and property	Section 4	All to be used in conjunction with relevant part 2

in foreseeable conditions of overload.	Section 12	
--	------------	--

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

IEC 60598-1

INTERNATIONAL STANDARD

NORME INTERNATIONALE



AMENDMENT 1
AMENDEMENT 1

Luminaires –
Part 1: General requirements and tests

Luminaires –
Partie 1: Exigences générales et essais

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.40

ISBN 978-2-8322-4746-4

FOREWORD

This amendment has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

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

FDIS	Report on voting
34D/1292/FDIS	34D/1298/RVD

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

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

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

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

0.1 Scope

Delete the existing 12th paragraph starting with "Attention is drawn ...".

0.2 Normative references

Add the following new references:

IEC 60228:2004, *Conductors of insulated cables*

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

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*

0.4 General test requirements and verification

0.4.2

Delete the existing fourth paragraph starting with "In accordance with IEC guidelines ..."

0.6 List of parts of IEC 60598-2

Add, after the existing Clause 0.6, a new Clause 0.7 as follows:

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 to this standard.

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 to this standard. Testing of light source performance is not required as part of the type test approval for luminaires.

1.2 Terms and definitions

Add, after 1.2.11, the following new entry:

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.

Add, after 1.2.12, the following new entry:

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.

Add, after 1.2.43, the following new entries:

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.]

1.2.88.1

replaceable light source

In the definition, delete the words "according to IEC 60061"

Add, at the end of Clause 1.2, the following new entries:

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

3.2 Marking on luminaires

Table 3.1 – Marking

Add, in the second column, after marking 3.2.21, the following new markings:

3.2.25 Rated input constant voltage^f**3.2.26 Rated input constant current and value of U_{out} ^g**

Add, after table footnote "e", the following new table footnotes:

^f 3.2.25 for constant voltage operation of the luminaire.

^g 3.2.26 for constant current operation of the luminaire.

Insert, in the second column, between markings 3.2.7 and 3.2.9, the following new marking:

3.2.8.2 Rated input power**3.2.2**

Add, at the end of 3.2.2, the following new text:

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

3.2.8

Replace 3.2.8 with the following new Subclause 3.2.8:

3.2.8 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 standard does not specify a test for the input power.

3.2.8.3 For all other luminaires, the 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.

3.2.12

Replace the existing paragraph between NOTE 2 and NOTE 3 with the following new text:

Leads (tails) and terminations used for the connection to extra low voltage d.c. supplies shall indicate their intended connection choosing one of the below mentioned combination:

Table 3.2 – Identification of extra low voltage d.c. leads and terminations

Positive	Negative
*+	*-
Colour coded red *	Colour coded black *
* Use of labels or sleeving fixed to the leads to give one of the above identification is acceptable.	

3.2.23

Replace the last paragraph with the following new text:

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 condition 'a' of Clause 3.2 and Table 3.1.

Add. at the end of Clause 3.2 the following new subclauses:

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.

3.3 Additional information

3.3.4

Delete the text of 3.3.4 and replace it with:

Not used

3.3.21

Delete. in the second dashed list item, the symbol IEC 60417-6042 and its associated text

Add. at the end of Clause 3.3, the following new subclauses:

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 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."

4.7 Terminals and supply connections

4.7.3

Replace the second paragraph with the following new text:

Connecting leads (tails) shall comply with the requirements of Clause 5.3.

4.14 Suspensions, fixings and means of adjustment

4.14.1

Replace the eighth paragraph ("Test E: For clip-mounted luminaires") with the following new text:

Test E: For clip-mounted luminaires: A pull is applied to the cable without jerk for 1 min in the most unfavourable direction in normal use. During the test, the clip is mounted on standard test "shelves" made of ordinary window glass, one with a nominal thickness of 10 mm and one with the maximum thickness onto which the clip can be mounted. For this test, the thickness of the test shelf is increased by multiples of 10 mm. The clip shall not fall off the glass at a pull of 20 N.

4.16 Luminaires for mounting on normally flammable surfaces

Add, at the end of Clause 4.16. the following new text:

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.

5.2 Supply connection and other external wiring

5.2.1

Replace, in the first paragraph, the four dashed list items with the following new text:

a) fixed luminaires:

- devices for the connection of luminaires;
- terminals; plugs for engagement with socket-outlets;
- connecting leads (tails);

Where the luminaire is delivered with connecting leads (tails) and without a means of connection to the supply, the manufacturer of the luminaire shall specify which terminal block may be used which shall conform to IEC 60993-2-1 or IEC 60998-2-2; either the terminal block to be used shall be specified or the following shall be defined:

- the type of terminal (screw/screwless);
- number of terminals;
- rated voltage,

- rated connecting capacity;
- any necessary preparation of the ends of conductors
- any fixing method.

The requirements of 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 shall be applied.

- supply cords;
 - adapters for engagement with supply tracks;
 - appliance inlets;
 - installation couplers;
- b) portable luminaires:
- supply cords; with pugs; appliance inlets;
- c) track-mounted luminaires:
- adaptors or connectors;
- d) semi-luminaires:
- Edison screw or bayonet cap.

Replace the second paragraph with the following new text:

Portable luminaires intended for wall mounting and incorporating a junction box and cord anchorage may be delivered without a supply cord, if instructions for mounting are enclosed with the luminaire.

5.2.2

Replace Table 5.1 with the following new Table 5.1:

Table 5.1 – Supply cord

Luminaire	Rubber	PVC	No insulation
Ordinary class I luminaires	60245 IEC 89 ^c	60227 IEC 52 ^c	
Ordinary class II luminaires	60245 IEC 53 ^c	60227 IEC 52 ^c	
Luminaires other than ordinary class I and II	60245 IEC 57 ^c	60227 IEC 52 ^{a c}	
Portable rough service luminaires	60245 IEC 66 ^c		
Class III or with SELV circuits luminaires a.c.: $U \leq 25 \text{ V}$ d.c.: $U \leq 60 \text{ V}$			Un-insulated conductor ^b
Class III or with SELV circuits luminaires a.c.: $25 \text{ V} < U \leq 50 \text{ V}$ d.c.: $60 \text{ V} < U \leq 120 \text{ V}$	Unsheathed basic insulated conductor		
^a For indoor use only.			
^b In accordance with IEC 60364 uninsulated conductors are not allowed in certain special installations and locations e.g. IEC 60364-7-701 "Locations containing a bath or shower".			
^c For supply voltages greater than 250 V, higher voltage grade cables and cords than those given in the above table may be necessary.			

Replace the existing fourth paragraph with the following new text:

To provide adequate mechanical strength, the nominal cross-sectional area of the conductors of external wiring, for example supply cord and inter-connecting cables, shall be not less than specified in Table 5.3.

Table 5.3 – Wiring dimension

Condition	Minimum nominal conductor cross-section (mm ²) ⁱ	
	Ordinary luminaire	Other than ordinary luminaire
General	0,75	1,0
Declared to be "For indoor use only", in accordance with 3.3.18.	0,75	0,75
When luminaire is provided with a 10/16 A socket-outlet.	1,5	1,5
Class III luminaires or SELV circuits connections between parts of other luminaire types, with 2 A maximum rated current.	0,4 ^{a,c}	0,4 ^{a,c}
Class III luminaires or SELV circuits connections between parts of other luminaire types, with 2 A maximum rated current, consisting of cables with two or more conductors.	0,2 ^{a,b,c}	0,2 ^{a,b,c}
Conductors connected to SELV control gear that limits output current to maximum 2 A.	< 0,2 (No minimum) ^{d,e,g,h}	< 0,2 (No minimum) ^{d,f,g,h}
^a provided that current-carrying capacity and mechanical properties are adequate. ^b able to withstand the normal and short circuit current provided by the associated control gear. ^c compliance is checked by inspection and by the test in 5.2.10. ^d selected in relation to maximum available current, compliance is checked by the test in 5.4.1. ^e control gear output voltage under load does not exceed 25 V r.m.s. or 60 V ripple free DC and no-load voltage does not exceed 35 V peak or 60 V ripple free DC. ^f control gear output voltage not exceeding 12 V r.m.s. or 30 V ripple free DC. ^g to check mechanical properties, the conductor assembly, fixed to the luminaire, shall be subjected to the test in 5.2.10.3. ^h the minimum insulation thickness shall be selected to withstand the voltage stress occurring, see Table X.1. ⁱ IEC 60228 specifies that the requirement associated with nominal conductor cross-section is a maximum resistance value not a physical measure of the area. For nominal sizes of 0,5 mm ² and above, these values are listed in the standard. For lower cross-sections the resistance value needs to be calculated accordingly.		

5.3 Internal wiring

5.3.1.1

Replace the first paragraph with the following new text:

For wiring including connecting leads (tails) which is directly connected to the fixed wiring, for example via a terminal block, and where the disconnection from the mains is relied upon by the external protection device(s), the following is applicable:

Replace, in the second paragraph, the introductory sentence to the list with the following new text:

For normal operating currents 2 A and higher:

5.3.1.2

Replace the first dashed list item with the following new text:

- the minimum cross-sectional area may be less than 0,4 mm² if overheating of the wire conductor insulation is prevented under normal and short circuit operating conditions in accordance with the tests of 5.4;

Add, at the end of the second dashed list item, the following new text:

, see Table X.1.

Add. at the end of 5.3.1.2, the following new text:

- the current limit rating of the protection device shall be a proven characteristic of the device used.

NOTE See also Clause 0.5.

5.3.7

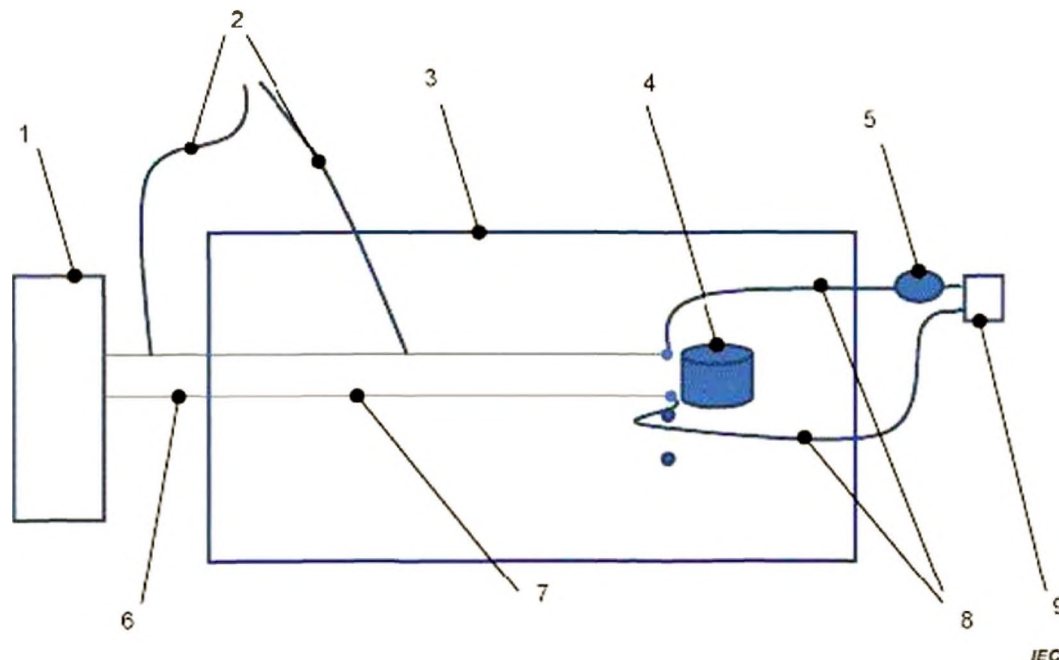
Add. at the end of 5.3.7, the following new Clause 5.4:

5.4 Test to determine suitability of conductors having a reduced cross-sectional area

To determine suitability of conductors having a reduced cross-sectional area, connected to controlgear that limits the current to 2 A, the following test shall be conducted:

- a) disconnect the conductors being evaluated as close as practical to the lights source in the luminaire and attach a resistive load using minimum 1 mm² cross section test leads; these leads shall be routed out of the luminaire in a manner that will have the least impact on temperatures within the luminaire;
- b) adjust the resistive load to measure the maximum output current of the control gear; maximum measured current shall not exceed 2.5 A;
- c) with the resistive load set to draw maximum output current, conduct the thermal test in accordance with 12.4. (see Figure 33);
- d) the resistive load is then set to 0 Ω (short circuit) and the thermal test repeated in accordance with 12.4 (see Figure 33);

In no case shall the temperature of the luminaire wiring insulation exceed the limits stated in Table 12.2 nor shall there be any indication of damage to luminaire wiring.



IEC

Key

- | | |
|---|-------------------|
| 1 Control gear | 6 External wiring |
| 2 Thermocouple thermal measuring system | 7 Internal wiring |
| 3 Luminaire | 8 Test leads |
| 4 Lightsource | 9 Resistive load |
| 5 Current meter | |

NOTE Control gear can be internal to the luminaire.

Resistive load is adjustable and capable of presenting 0 Ω resistance.

Figure 33 – Test to determine suitability of conductors having a reduced cross-sectional area

9.2 Tests for ingress of dust, solid objects and moisture

9.2.3

Replace 9.2.3 with the following new Subclause 9.2.3:

9.2.3 Drip-proof luminaires

9.2.3.1 Drip-proof luminaires (second characteristic IP numeral 1) are subjected for 10 min to an artificial rainfall of $1^{+0.5}_0$ mm/min, falling vertically from a height of 200 mm above the top of the luminaire.

9.2.3.2 Drip-proof luminaires (second characteristic IP numeral 2) are subjected for 10 min to an artificial rainfall of $3^{+0.5}_0$ mm/min, falling vertically from a height of 200 mm above the top of the luminaire, when the luminaire is in the most onerous position and tilted at any angle up to 15° on either side of the vertical.

SECTION 11

Replace Section 11 with the following new Section 11:

SECTION 11: CREEPAGE DISTANCES AND CLEARANCES

11.1 General

Section 11 specifies minimum requirements for creepage distances and clearances in luminaires.

NOTE 1 The way in which creepage distances and clearances are measured is specified in IEC 60664-1.

NOTE 2 The calculation method and the structure of the creepage distances and clearances are taken from IEC 60664-1:2007 and IEC 60664-4.

NOTE 3 Annex U provides information about values for impulse withstand category III.

11.2 Creepage distances and clearances

11.2.1 General

Parts detailed in Table M.1 shall be adequately spaced. Creepage distances and clearances shall be not less than the values given in Tables 11.1.A, 11.1.B and 11.2. Creepage distances shall not be less than the required minimum clearance.

No values are specified for working voltages below 25 V r.m.s. and 60 V d.c. as the test voltage of Table 10.2 is considered sufficient.

Distances between current-carrying parts of opposite polarity shall comply with the requirements for basic insulation.

The minimum distances specified are based on the following parameters:

- for use up to 2 000 m above sea level;
- pollution degree 2 where normally only non-conductive pollution occurs, but occasionally a temporary conductivity caused by condensation is to be expected;
- equipment of impulse withstand category II which is energy-consuming equipment to be supplied from the fixed installation.

For details of pollution degrees or impulse withstand categories, IEC 60664-1 should be consulted.

Compliance is checked by measurements made with and without conductors of the largest cross section connected to the terminals of the luminaires. Internal wiring terminals of luminaires shall be checked with actual conductors supplied with the luminaire fitted.

The contribution to the creepage distance of any groove less than 1 mm wide is limited to its width.

A creepage or a clearance distance may be split into several parts. Any air gap less than 1 mm wide is ignored in calculating the total distances, unless the total clearance is less than 3 mm where one third of the air gap width shall be taken into account.

For luminaires provided with an appliance inlet, the measurements are made with an appropriate connector inserted.

Distances through slots or openings in external parts of insulating material are measured with metal foil in contact with the accessible surface. The foil is pushed into corners and similar

places by means of the standard test finger specified in IEC 60529, but it is not pressed into openings.

Reductions for creepage distances and clearances are allowed for luminaires which are (or have parts) protected against pollution by the use of coating or potting, if the requirements given in Annex P of IEC 61347-1:2015 are fulfilled.

The values in Table 11.1.A and 11.1.B do not apply to components for which separate IEC publications exist, but do apply to mounting and accessibility distances to the component when it is incorporated in the luminaire.

Creepage distances at a supply terminal shall be measured from the live part in the terminal to any accessible metal parts, and the clearance shall be measured between incoming supply wiring and accessible metal parts, i.e. from a bare conductor of the largest cross section to the metal parts which can be accessible. At the internal wiring side of the terminal, the clearance shall be measured between live parts of the terminal and accessible metal parts (see Figure 24).

NOTE The measurements of the clearances from supply and from internal wiring differ because the luminaire manufacturer does not have control over the length of insulation removed from the supply wiring by the installer.

When creepage distances and clearances are determined at bushings, cord anchorages, wire carriers or clips, the measurement shall be made with the cable fitted.

11.2.2 Creepage distances

The minimum values for creepage distances are listed in Table 11.1.A

For the dimensioning of the creepage distances the r.m.s. values of the working voltage shall be taken into account. In the case of an insulated circuit the requirements of Clause 4.31 and Annex X shall be taken into consideration to find the working voltage.

The values of Table 11.1.A are valid for voltages with a frequency below 30 kHz. For higher frequencies the following requirements shall apply.

- If the voltage and/or frequency requires higher creepage distances, the information provided by the control gear manufacturer shall be followed, see footnote “c” of Table 11.1.A.
- If the luminaire is used in combination with or together with components or devices other than controlgear covered by the IEC 61347 series and which produces frequency above 30 kHz, the requirements of IEC 60664-4 shall be applied.

Table 11.1.A – Minimum creepage distances for a.c. sinusoidal voltages up to 30 kHz (to be used in conjunction with Annex M)

Distances mm	RMS working voltage not exceeding V					
	50	150	250	500	750	1 000
Creepage distances ^{b c}						
– Basic or supplementary insulation PTI ^a						
≥ 600	0.6	0.8	1.3	2.5	3.8	5.0
< 600	1.2	1.6	2.5	5	7.6	10
– Reinforced insulation PTI ^a ≥ 600	- ^d	1.6	2.6	5.0	7.6	10
< 600	- ^d	3.2	5.0	10	16	20
^a PTI (proof tracking index) in accordance with IEC 50112. ^b For creepage distances, the equivalent d.c. voltage is equal to the r.m.s. value of the sinusoidal a.c. voltage. Linear interpolation between columns is allowed. ^c In the case of combination of voltage and frequency which require higher creepage than the values required in this table, the control gear is marked with the details of this combination ($\dot{U}_{out}$ and frequency $f_{U_{out}}$) – see IEC 61347-1: 2015, 7.1, item w). For details and the required values for creepage see IEC 61347-1:2015, 16.2.2. ^d Values under consideration.						

In the case of creepage distances to parts not energized, or not intended to be earthed, where tracking cannot occur, the values specified for material with PTI ≥ 600 shall apply for all materials (independent of the real PTI).

For creepage distances subjected to working voltages of less than 60 s duration, the values specified for materials with PTI ≥ 600 shall apply for all materials.

For creepage distances not liable to contamination by dust or moisture, the values specified for material with PTI ≥ 600 shall apply (independent of the real PTI).

11.2.3 Clearances

The minimum values for clearances are listed in Tables 11.1.B and 11.2. Table 11.1.B shall be applied to all circuits taking into consideration the transient coming from the mains supply. Table 11.2 is applicable to circuits where peak voltages are generated by the equipment (internally or externally)

The values of Tables 11.1.B and 11.2 are valid for voltages having a frequency below 30 kHz. For higher frequencies the following requirements shall apply:

- If the voltage and/or the frequency requires higher clearance than the value in Tables 11.1.B and 11.2, the equivalent peak voltage (U_p) provided by the control gear manufacturer shall be used. The U_p is directly comparable to the values given in Table 11.2. The U_p may be different for the evaluation of basic/supplementary and reinforced insulation.
- If luminaire is used in combination with or together with components or devices other than control gear covered by the IEC 61347 series and which produces frequency above 30 kHz, the requirements of IEC 60664-4 shall be applied.

**Table 11.1.B – Minimum clearance for working voltages
(to be used in conjunction with Annex M)**

Distances mm	RMS working voltage not exceeding V				
	50	150	300	600	1 000
Clearances with mains supply transients according to impulse withstand category II ^b					
– Basic or supplementary insulation	0,2	0,5	1,5	3	5,5
– Reinforced insulation	0,2	1,5	3	5,5	8
Clearances without mains supply transients ^{a b}					
– Basic or supplementary insulation	0,2	0,2	0,2	0,2	0,7
– Reinforced insulation	0,2	0,2	0,2	0,6	1,6
^a The values in this row are applicable to circuits where it is ensured that they are free from transient (e.g. battery circuits). ^b For clearances, the equivalent d.c. voltage is equal to the peak of the a.c. voltage. Interpolation between columns is not allowed, if transient according to the impulse withstand category II have to be considered for the main supply.					

Minimum clearance distances for ignition pulse voltages and equivalent peak voltage (U_p) are given in Table 11.2.

**Table 11.2 – Minimum distances for ignition pulse voltages
or equivalent peak voltage U_p**

	Rated ignition pulse voltage or equivalent peak voltage U_p								
	kV								
	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10	12
Minimum clearance in mm ^a (basic and supplementary insulation)	1	1,5	2	3	4	5.5	8	11	14
Minimum clearance in mm ^a (reinforced insulation)	2,2	3,0	3.8	6.0	8.0	10.4	15	19.4	24
	Rated ignition pulse voltage or equivalent peak voltage U_p								
	kV								
	15	20	25	30	40	50	60	80	100
Minimum clearance in mm ^a	18	25	33	40	60	75	90	130	170
Minimum clearance in mm ^a (reinforced insulation)	31,4	44	60	72	96	130	162	No values available	

NOTE The distances in Table 11.2 are derived from IEC 60664-1:2007, Table F2, case A, inhomogeneous field conditions.

^a Linear interpolation between columns is allowed.

For distances subjected to both sinusoidal voltage as well as non-sinusoidal pulses, the minimum required distance shall be not less than the highest value indicated in Tables 11.1.A, 11.1.B and 11.2.

12.3.1 Test

Add, at the end of item d), the following new text:

For luminaires for constant voltage or constant current operation not equipped with controlgear the test shall be performed with 1,1 times the rated input constant voltage or rated input constant current as appropriate.

12.4.1 Test

Add, at the end of item d), the following new text:

For luminaires for constant voltage or constant current operation not equipped with controlgear the test shall be performed with 1,1 times the rated input constant voltage or rated input constant current as appropriate.

12.5.1 Test

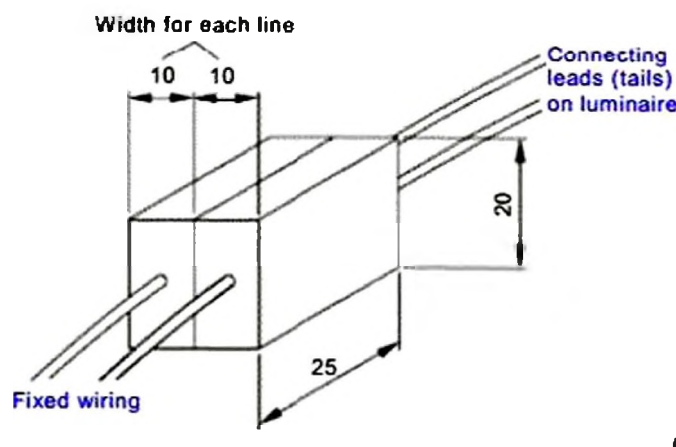
Add, at the end of item b), the following new text:

For luminaires for constant voltage or constant current operation not equipped with controlgear the test shall be performed with 1,1 times the rated input constant voltage or rated input constant current as appropriate.

15.6.3.2.5

Figure 2

Replace Figure 2 with the following new Figure 2:



IEC

Figure 2 – Terminal block arrangement for installation test for luminaires with connecting leads (tails)

Annex R

Replace Annex R with the following new Annex R:

Annex R

(normative)

Schedule of amended clauses and subclauses containing more serious/critical requirements which call for products to be retested

The schedule of clauses and subclause given in Annex R details the requirements of this amendment to IEC 60598-1 with respect to the previous edition (including all amendments). These requirements may call for products to be retested when updating product certification. Retesting may not be required in all cases.

Edition 7.0 (2008) to Edition 8.0 (2014)

Clause 4.28: Fixing of thermal sensing controls

Clause 10.3: Touch current, protective conductor current and electric burn

Subclause 12.5.2: Thermal test (abnormal condition) ignitors marked $t_c + x$

Subclause 3.2.12: Marking of earths

Subclauses 3.2.23 and 4.24.2: Retinal blue light hazard

Subclause 3.3.22, Clause 4.31: Insulation between circuits

Clauses 4.32 and 10.2: Over voltage protective devices

Subclause 8.2.1 and Annex M: Access to basic insulation

Edition 8.0 (2014) to Edition 8 (2014) and Amendment 1 (20XX)

Section 1: Creepage and clearance distances for high frequency (> 30 kHz) and pulse voltages

Section 3, Section 12: Luminaires delivered without controlgear

Subclause 3.2.8: Rated input power for luminaires used with non-replaceable or non-user replaceable light sources

Subclause 9.2.3: IPX2 luminaires

Annex T

Replace Annex T with the following new Annex T:

Annex T **(Void)**

Annex U

Replace Annex U with the following new Annex U:

Annex U (informative)

Creepage and clearance distances for luminaires with a higher degree of availability (impulse withstand category III)

U.1 General

Clearance limits detailed in Section 11 of this standard have been established with reference to the IEC 60664 series and based on impulse withstand category II. This level of impulse withstand category is considered appropriate to normal usage of luminaires covered under the scope of IEC 60598 standards. Annex U details the more onerous requirements of the IEC 60664 series which would allow luminaires to have a higher overvoltage capability for an impulse withstand category III should a higher degree of impulse withstand category be requested.

U.2 Requirements for impulse withstand category III

Increased clearance requirements for impulse withstand category III are given in Table U.1. These limits are applied in place of those given in Table 11.1.B should a rating of impulse withstand category III be requested.

Creepage limits remains those required in 11.2.2. taking into account that creepage distances shall not be less than the required minimum clearance.

For details of pollution degrees or impulse withstand categories, IEC 60664-1 should be consulted.

The minimum distances specified are based on the following parameters:

- for use up to 2 000 m above sea level;
- pollution degree 2 where normally only non-conductive pollution occurs but occasionally a temporary conductivity caused by condensation is to be expected;
- equipment of impulse withstand category III which is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements.

Table U.1 – Minimum clearance distances for a.c. sinusoidal working voltages Impulse withstand category III

Distances mm	RMS working voltage not exceeding V				
	50	150	300	600	1 000
Clearances with mains supply transients according to impulse withstand category III ^b					
– Basic and supplementary insulation	0,2	1,5	3,0	5,5	8,0
– Reinforced insulation	0,5	3,0	5,5	8,0	14
Clearances without mains supply transients ^{a b}					
– Basic or supplementary insulation	0,2	0,2	0,2	0,2	0,7
– Reinforced insulation	0,2	0,2	0,2	0,6	1,6
^a The values in this row are applicable to circuits where it is ensured that they are free from transient (e.g. battery circuits). ^b For clearances, the equivalent d.c. voltage is equal to the peak of the a.c. voltage. Interpolation between columns is not allowed.					

Annex X

In the first paragraph, replace "(see 4.30 and Figure X.1)" with the following new text:

(see 4.31 and Figure X.1)

Bibliography

Add the following new reference:

IEC 60664 (all parts), *Insulation coordination for equipment within low-voltage systems*
