IEC 60598-1

Edition 8.0 2017-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 1
AMENDEMENT 1

Luminaires –
Part 1: General requirements and tests

Luminaires –
Partie 1: Exigences générales et essais

IEC 60598-1:2014-05/AMD1:2017-09(en-fr)

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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- withdrawn,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.

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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 ≤ 750 µs (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:

"$n \times$ 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 [a]	Colour coded black [a]
[a] 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 60998-2-1 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 plugs; 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.: $U \leq 25$ V d.c.: $U \leq 60$V			Un-insulated conductor [b]
Class III or with SELV circuits luminaires a.c.: 25 V < $U \leq 50$ V d.c.: 60 V < $U \leq 120$ 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 mm2 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 mm^2 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:

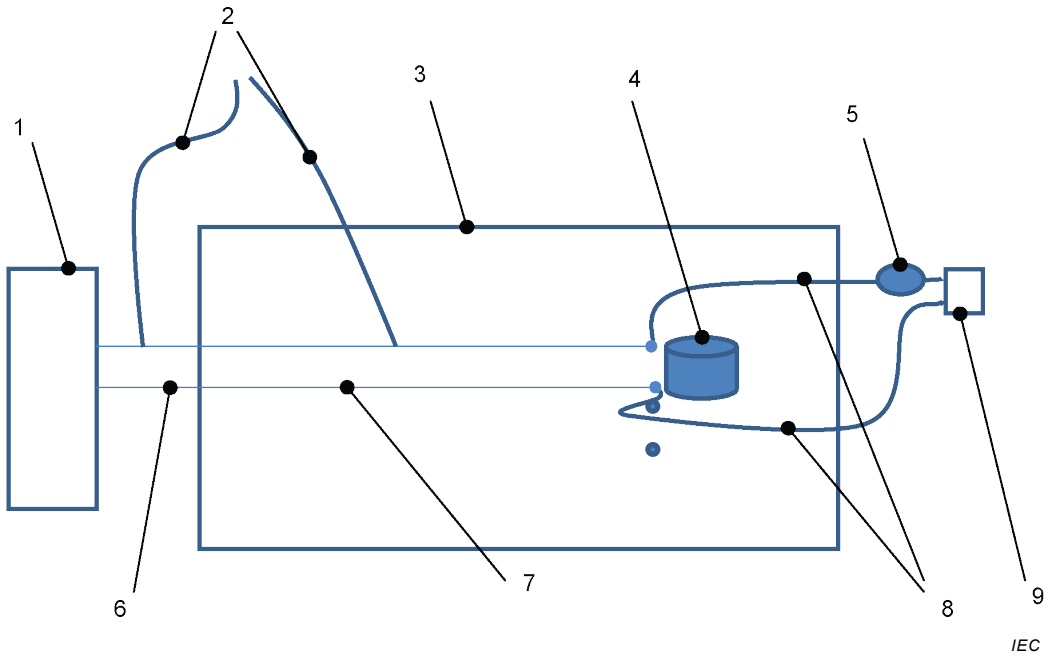
a) disconnect the conductors being evaluated as close as practical to the lights source in the luminaire and attach a resistive load using minimum 1 mm^2 cross section test leads; these leads shall be routed out of the luminaire in a manner that will have the least impact on temperatures within the luminaire;

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.



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.