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## Luminaires

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Part 2-13: Particular requirements — Ground recessed luminaires

## National foreword

This British Standard is the UK implementation of EN 60598-2-13:2006/A11:2021. It is derived from IEC 60598-2-13:2006, incorporating amendment 1:2021. It supersedes BS EN 60598-2-13:2006+A2:2016, which will be withdrawn by 19 May 2024.

The UK participation in its preparation was entrusted to Technical Committee CPL/34/4, Luminaires.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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NORME EUROPÉENNE

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English Version

**Luminaires - Part 2-13: Particular requirements - Ground recessed luminaires**Luminaires - Partie 2-13 Exigences particulières -  
Luminaires encastrés dans le planLeuchten - Teil 2-13: Besondere Anforderungen -  
Bodeneinbauleuchten

This amendment A11 modifies the European Standard EN 60598-2-13:2006; it was approved by CENELEC on 2021-05-19. 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.

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**EN 60598-2-13:2006/A11:2021 (E)**

**European Foreword**

This document (EN 60598-2-13:2006/A11:2021) has been prepared by CLC/TC 34 "Lighting"

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-05-19
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2024-05-19

This document amends EN 60598-2-13:2006/A2:2016.

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

## 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60598-1	-	Luminaires - Part 1: General requirements and tests	EN 60598-1	2015

**EN 60598-2-13:2006/A11:2021 (E)****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 harmonisation 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]**

<b>Safety objectives of Directive 2014/35/EU</b>	<b>Clause(s) / subclause(s) of this EN</b>	<b>Remarks / Notes</b>
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;	13.5	
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;	All	
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 maintained.	See item 2 and 3 of this table	

## EN 60598-2-13:2006/A11:2021 (E)

Safety objectives of Directive 2014/35/EU	Clause(s) / subclause(s) of this EN	Remarks / Notes
<p><b>2. Protection against hazards arising from the electrical equipment</b></p> <p>Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that:</p>		
<p>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;</p>	<p>13.4 13.7 13.8 13.9 13.10</p>	
<p>b) temperatures, arcs or radiation which would cause a danger, are not produced;</p>	<p>13.6 13.7 13.12 13.14</p>	
<p>c) persons, domestic animals and property are adequately protected against non-electrical dangers caused by the electrical equipment which are revealed by experience;</p>	<p>13.2 13.6 13.14 13.7</p>	
<p>d) the insulation is suitable for foreseeable conditions.</p>	<p>13.7 13.13 13.14</p>	
<p><b>3. Protection against hazards which may be caused by external influences on the electrical equipment</b></p> <p>Technical measures shall be laid down in accordance with point 1, in order to ensure that the electrical equipment:</p>		
<p>a) meets the expected mechanical requirements in such a way that persons, domestic animals and property are not endangered;</p>	<p>13.5 13.6</p>	
<p>b) is resistant to non-mechanical influences in expected environmental conditions, in such a way that persons, domestic animals and property are not endangered;</p>	<p>13.3 13.5 13.6</p>	
<p>c) does not endanger persons, domestic animals and property in foreseeable conditions of overload.</p>	<p>13.6 13.12 13.15</p>	

**EN 60598-2-13:2006/A11:2021 (E)**

**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.

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## LUMINAIRES –

Part 2-13: Particular requirements –  
Ground recessed luminaires**13.1 Scope**

This Part 2 of IEC 60598 specifies requirements for ground recessed luminaires incorporating electric light sources for operation from supply voltages up to 1 000 V, for indoor or outdoor use, e.g. in gardens, yards, carriageways, parking lots, cycleways, footways, pedestrian areas, swimming pools areas outside zones for SELV, nurseries and similar applications.

This part does not cover ground recessed luminaires for motorised roads and for airfields already specified in IEC 61827<sup>2</sup>.

**13.1.1 Normative references**

The references of Section 0 of IEC 60598-1 apply.

**13.2 General test requirements**

The provisions of Section 0 of IEC 60598-1 apply.

**13.3 Definitions**

The definitions of Section 1 of IEC 60598-1 apply together with the following:

**13.3.1****ground recessed luminaire**

luminaire suitable to be installed in the ground, having the supply connections and electrical components located below ground level

**13.3.2****rated maximum surface temperature** **$T$** 

the highest temperature on the accessible outer surface, under normal operating conditions according to 13.12

**13.4 Classification**

Luminaires shall be classified in accordance with Section 2 of IEC 60598-1.

**13.5 Marking**

The provisions of Section 3 of IEC 60598-1 apply together with the requirements of 13.5.1 to 13.5.3

**13.5.1** Rated load in N, according to 13.6.1 (in the manufacturer's instructions).

<sup>2</sup> IEC 61827: *Electrical installation and beaconing of aerodromes – Characteristics of inset and elevated luminaires used in aerodromes.*

**13.5.2** Rated maximum surface temperature  $T$  in °C;  $T$  marking to be given on the luminaire according to second column (B) of Table 3.1 of IEC 60598-1 and/or in the manufacturer's instructions and catalogues.

**13.5.3** Information, in the manufacturer's instructions, concerning the external connecting box, if necessary.

*Compliance is checked by inspection.*

### 13.6 Construction

The provisions of Section 4 of IEC 60598-1 apply together with the requirements of 13.6.1 to 13.6.5

NOTE More samples could be necessary to perform all the tests, some of them possibly being destroyed.

#### 13.6.1 Resistance to static load

Luminaires shall withstand the minimum static load according to the manufacturer's instructions.

*Compliance is checked by the following test:*

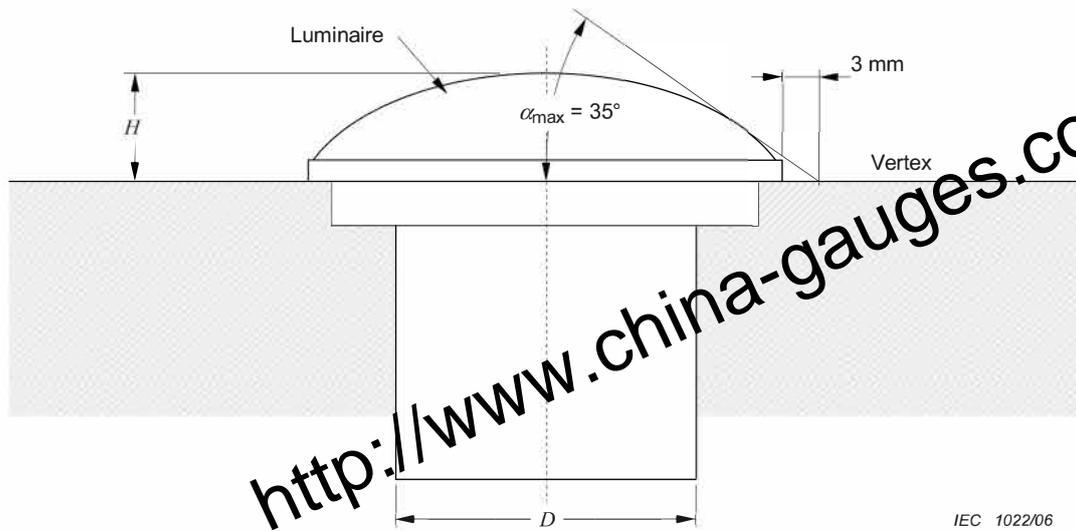
*The sample is mounted as in normal use, in accordance with the manufacturer's instructions. The test load, to be maintained with a tolerance of  $\pm 3\%$ , shall be applied to the top side of the luminaire by a cylindrical rubber punch having the following characteristics:*

- diameter = 50 mm, or luminaire diameter  $D$  (see Figure 1) if smaller than 50 mm;
- hardness "shore A" =  $65 \pm 5$ ;
- thickness  $\cong 50$  mm

*It shall be set in such a way that, during the test, the vertical axis is perpendicular and coincides with the geometrical centre of the translucent cover (see Figure 2).*

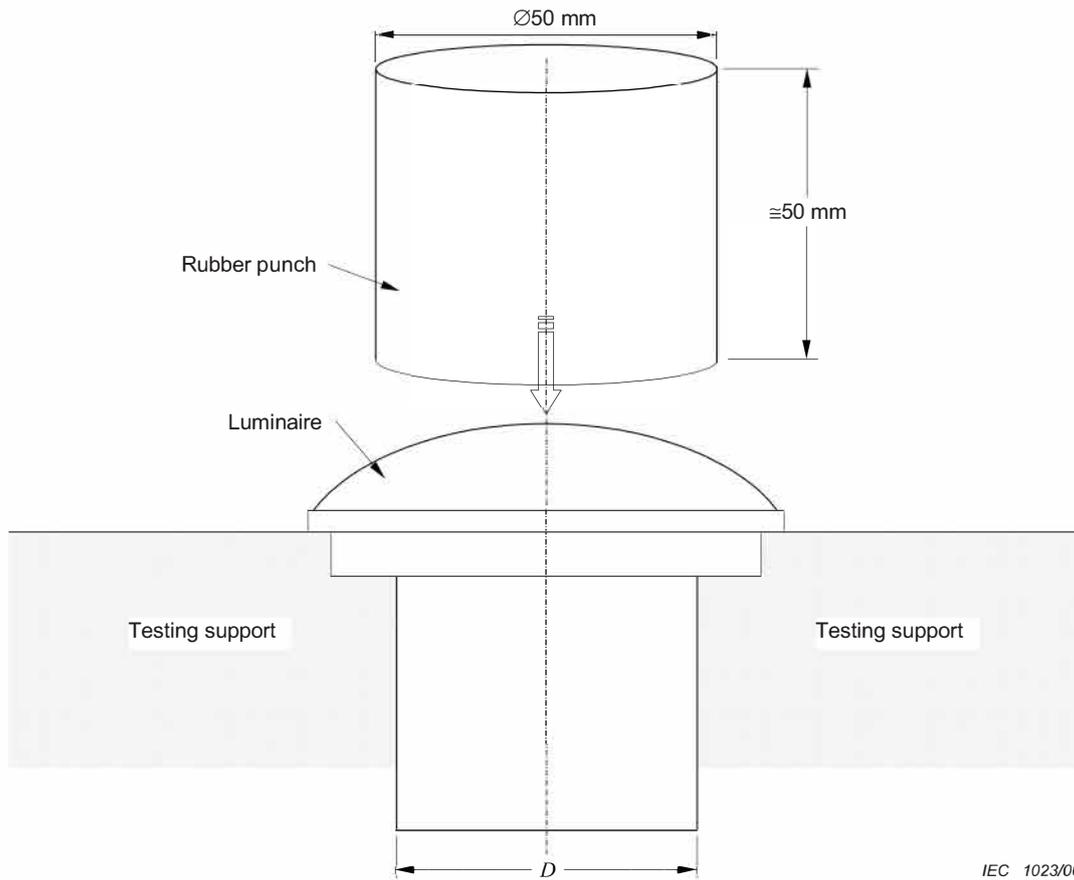
*The load shall then be applied uniformly by the rubber punch, at a rate not greater than 5 000 N/min. The maximum load shall be applied for 1 min.*

*After the test the sample shall comply with the conformity requirements of IEC 60598-1, Subclause 4.13.1 (i.e.: as applied following the mechanical impact test).*



IEC 1022/06

Figure 1 – Basic dimensions quoted in Annex A



IEC 1023/06

Figure 2 – Static load test apparatus

### 13.6.2 Resistance to torque and shear loads

Luminaires designed to be used in areas where motor vehicles may circulate, carriageways, parking areas, etc. (see items 3 and 4 in Table A.1) shall withstand the forces exerted by a turning, braking or accelerating tire.

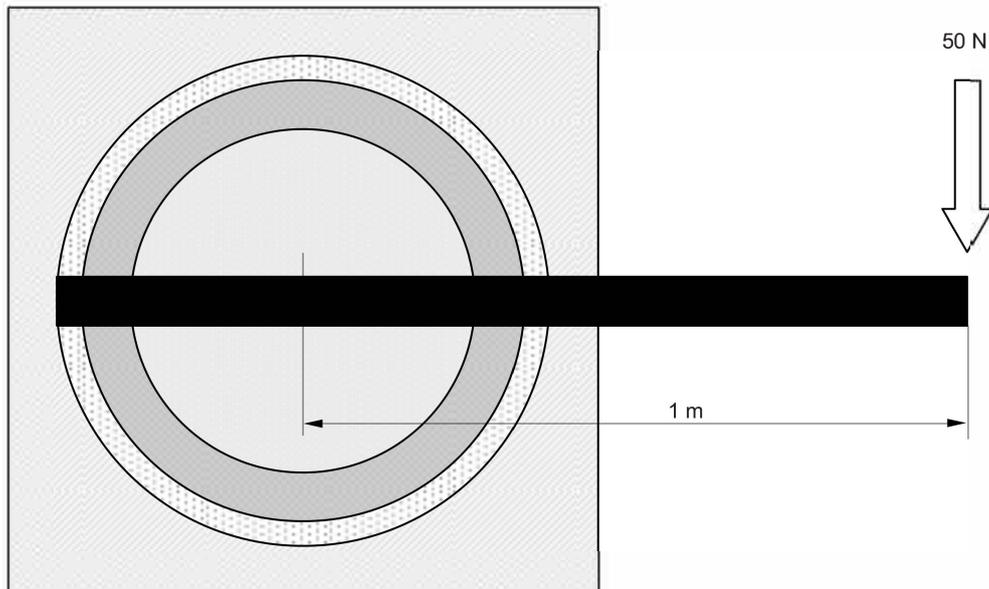
*Compliance is checked by the tests of 13.6.2.1 and 13.6.2.2*

#### 13.6.2.1 Torque test

Parts of luminaire that may be subjected to rotational force shall have adequate mechanical strength. The joints between these parts shall be subject to a 50 N torque force for one minute (see Figure 3). Each joint shall be tested separately.

*After the test, the sample shall comply with the conformity requirements of IEC 60598-1, Subclause 4.13.1 (i.e. as applied following mechanical impact test)*

NOTE The test is intended to check both the components fixing and the luminaire to ground fixing.



Push force applied to bar = 50 N/60 s (example)

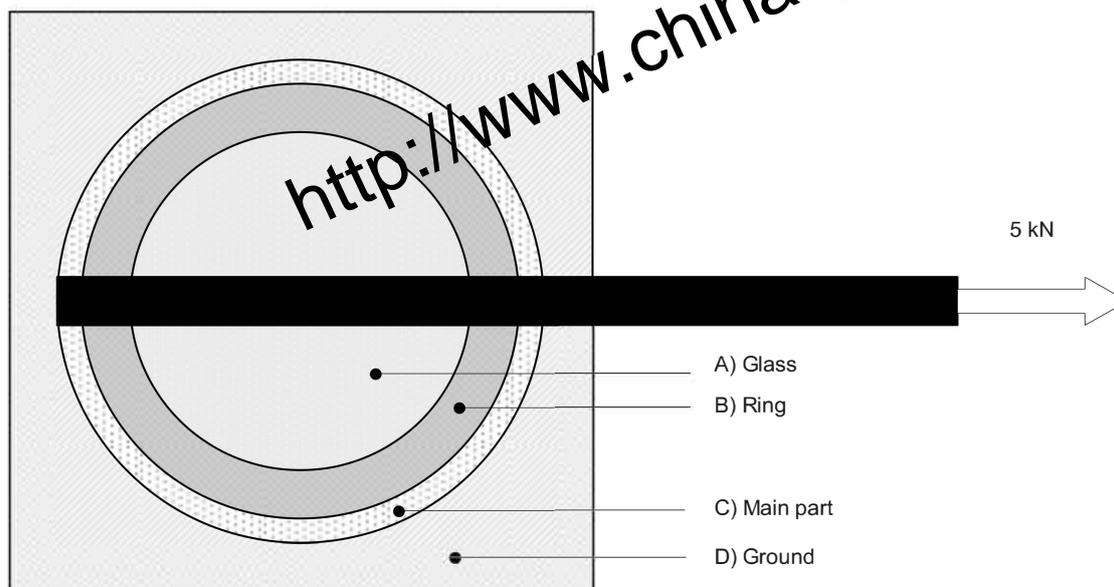
IEC 1024/06

**Figure 3 – Illustration of torque test**

### 13.6.2.2 Shear load test

With the same test arrangement of 13.6.2.1, a pull force of 5 kN shall be applied to the same parts progressively for not less than 5 s but not more than 10 s and released lengthwise to the end of the bar for 20 times (see Figure 4) in the direction of the carriage way centreline intended for the installation of the luminaire, if any.

After the test the sample shall comply with the conformity requirements of IEC 60598-1, Subclause 4.13.1 (i.e. as applied following mechanical impact test).



Pull force applied to bar = 5 kN/20 times

IEC 1025/06

Figure 4 – Illustration of shear load test

### 13.6.3 Resistance to thermal shock

Glass covers shall be resistant to the effect of thermal shock.

Compliance is checked by the following test:

The luminaire and glass cover shall be preconditioned by the thermal endurance test given in 13.12 of this standard.

The luminaire shall be positioned such that as far as possible its cover glass is horizontal and facing upwards. The luminaire is operated until the maximum glass cover temperature measured during thermal test is attained. The luminaire is then switched off and disconnected from the electrical supply. Immediately following the electrical disconnection, 1 litre of iced water (maximum 5°C) shall be poured from a height of approximately 1 m onto the glass cover. The time taken to pour the water shall not exceed 5 s.

NOTE This test can result in violent shattering of glass. Appropriate safety precautions should be taken to protect persons performing this test and the surrounding environment. For example: wear protective clothing and face visor, erect screens around the test luminaire to protect surrounding area and test personnel, use a long handle flask to pour water from distance.

Compliance is checked by visual inspection and the glass shall not be broken.

#### 13.6.4 Edges

All accessible edges shall be rounded to not less than 1,5 mm radius or equivalent chamfering.

Surfaces of the top assembly shall be smooth and free from burrs, flashes and the like.

*Compliance is checked by inspection.*

#### 13.6.5 Mechanical strength

The provisions of 4.13 of IEC 60598-1 apply with a new impact energy of 5 Nm.

#### 13.7 Creepage distances and clearances

The provisions of Section 7 of IEC 60598-1 apply.

#### 13.8 Provisions for earthing

The provisions of Section 7 of IEC 60598-1 apply

#### 13.9 Terminals

The provisions of Sections 14 and 15 of IEC 60598-1 apply.

NOTE In Denmark it is only allowed to bury flexible cables in the ground in temporary installations and construction site installations.

#### 13.10 External and internal wiring

The provisions of Section 5 of IEC 60598-1 apply together with the following:

For outdoor use, the cables for the connection to the supply, when provided by the luminaire manufacturer, shall be at least equal to the mechanical and electrical characteristics of the following types:

- 60245 IEC 57 or 60245 IEC 66: rubber insulated flexible cables with circular conductors and rated voltage not exceeding 750V.
- other rubber sheathed cables 450/750 V according to regional Wiring Rules (e.g. H07RN8-F, etc.)

*Compliance is checked by inspection and by fitting the proper cable into the luminaire.*

#### 13.11 Protection against electric shock

The provisions of Section 8 of IEC 60598-1 apply.

#### 13.12 Endurance test and thermal test

The provisions of Section 12 and Annex D of IEC 60598-1 apply together with the following:

Ground recessed luminaires shall be subjected to the relevant tests of 12.4, 12.5, 12.6 and 12.7 of IEC 60598-1 after the test(s) of 9.2 but before the test(s) of 9.3 of Section 9 of IEC 60598-1 specified in 13.13

*For the tests of 12.3, 12.4, 12.5, 12.6 and 12.7 of IEC 60598-1, the luminaire is mounted in normal operating position and supplied according to IEC 60598-1 in a test recess base, according to Annex D of IEC 60598-1 for all applications; or for limited applications in accordance with the manufacturer's instructions.*

*For the tests of 12.4 and 12.5 the following applies:*

*If the light emitting surface is covered by a metal ribbing and, the temperature measurements shall be made on the translucent parts, if accessible to standard test finger; if not, on the external covering part.*

*By measurement, the temperatures of translucent covers and accessible metal parts shall not exceed the marked value according to 10.6.*

### **13.13 Resistance to dust, foreign objects and moisture**

The provisions of Section 9 of IEC 60598-1 apply, together with the following:

The order of the tests specified in Section 9 of IEC 60598-1 shall be replaced by the order given in 13.12

Luminaires shall meet at least both IP65 and IP67 requirements.

The tests shall be made with the luminaire in free air or mounted in accordance with the manufacturer's instructions.

For IP X5, the luminaire shall be placed on jet test apparatus complete with the mounting accessories (e.g. outer casing) or following the manufacturer's instructions, according to 9.2.6 of IEC 60598-1,

For IPX7, the luminaire shall be mounted as in normal use and operated until the maximum glass cover temperature measured during the thermal test is attained; then the luminaire shall be switched off and immediately immersed in water, according to 9.2.8 of IEC 60598-1. This test is not required if the manufacturer gives the clear indication that the luminaire is to be mounted in conjunction with drainage, then the luminaire has only to meet IP65,

For IP6X, the luminaire shall be placed in the dust chamber with the mounting accessories and the cable in place according to 9.2.2 of IEC 60598-1m

NOTE Facilities intended to prevent excessive internal pressure are allowed, provided that the luminaire has complied with the IP67 test.

*Compliance is checked by inspection.*

### **13.14 Insulation resistance and electric strength**

The provisions of Section 10 of IEC 60598-1 apply.

### **13.15 Resistance to heat, fire and tracking**

The provisions of Section 13 of IEC 60598-1 apply.

## Annex A (informative)

### Guide to good installation practice

This guide is intended to advise lighting system designers on specific luminaire applications, particularly regarding temperature limits, dimensions and resistance to static loads.

For all the choices regarding the modes of installation, preference has to be given to the National Wiring Rules.

**Table A.1 – Specific luminaire applications and temperature limits, dimensions and resistance to static loads**

Intended usage	Temperature <i>T</i> °C a	Height <i>H</i> mm b	Static load kN c
1) In normally non-accessible areas (according to Wiring Rules)	X	X	X
2 ) In restricted accessible areas (e.g. pedestrians and pedal cycles only)	100	0 d	5
3 ) In all other accessible areas (e.g. carriageways, parkings, etc.)	65 or 80 e	75	20
4 ) As above, but in areas for snow-ploughs and / or de-icing agents	65 or 80 e	0 d	20
5 ) In particular areas (where working temperatures may cause injuries, e.g. nurseries, swimming pools, etc.)	40	0 d	5
NOTE Care should be taken regarding the compatibility between particular environments and luminaire construction, e.g. for the presence of de-icing agents, salt atmosphere, etc.			
a Maximum value, see 13.3.2 and 13.12.			
b Maximum value, see Fig.1. From 0 to 75 mm, the top side protruding over the ground should have a slope of $\alpha_{\max} = 35^\circ$ , with vertex at 3 mm out of the edge (for a suitable chamfering).			
c Minimum value, see 13.6.1.			
d Up to 5 mm in these areas and up to 25 mm when installed in no-walking places, e.g. close to walls, buildings, etc.			
e 65°C for unprotected metal and 80°C for glass. Depending on the specific type of installation (in particular for the risk assessment).			

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