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Luminaires – **iTeh STANDARD PREVIEW**
Part 2-3: Particular requirements – Luminaires for road and street lighting
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Luminaires –
Partie 2-3: Règles particulières – Luminaires d'éclairage public

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LUMINAIRES –

**Part 2-3: Particular requirements –
Luminaires for road and street lighting**

FOREWORD

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This consolidated version of IEC 60598-2-3 consists of the third edition (2002) [documents 34D/762/FDIS and 34D/772/RVD] and its amendment 1 (2011) [documents 34D/989/FDIS and 34D/1003/RVD]. It bears the edition number 3.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

This International Standard IEC 60598-2-3 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard is to be read in conjunction with IEC 60598-1.

The changes to the text introduced by this new edition introduce requirements for column-integrated luminaires.

The text introduced by interpretation sheets IS 01 and IS 02 is contained in subclause 3.6.5 Note 1 and subclause 3.12.1, second paragraph, respectively.

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

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LUMINAIRES –

Part 2-3: Particular requirements – Luminaires for road and street lighting

3.1 Scope

This part of IEC 60598 specifies requirements for

- luminaires for road, street lighting and other public outdoor lighting applications;
- tunnel lighting;
- column-integrated luminaires with a minimum total height above normal ground level of 2,5 m;

and for use with electrical lighting sources on supply voltages not exceeding 1 000 V.

NOTE Column integrated luminaires with a total height below 2,5 m are under consideration.

3.1.1 Normative references

The normative references listed in Section 0 of IEC 60598-1 apply to this part as well as the following reference:

IEC 60068-3-76:1997, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60364-7-714, 1996, *Electrical installations of buildings – Part 7: Requirements for special installations or locations – Section 714: External lighting installations*

IEC 62262: 2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

3.2 General test requirements

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

The tests described in each appropriate section of Part 1 shall be carried out in the order listed in this section of Part 2.

In order to facilitate testing, and due to the dimensions of the sample, it is allowed to make use of the appropriate parts of the luminaire only (this is mainly applicable to column-integrated luminaires).

3.3 Definitions

For the purposes of this section, the definitions of Section 1 of IEC 60598-1 apply together with the following definitions.

3.3.1

span wire

wire between main supports which carries the weight of the complete installation.

NOTE This may include several luminaires, supply cables and a stay wire.

3.3.2

suspension wire

wire attached to the span wire and carrying the weight of the luminaire

3.3.3

stay wire

tensioned wire between main supports to limit lateral and rotary movement of the suspended luminaires

3.3.4

column-integrated luminaires

lighting systems formed with a luminaire integrated in a lighting column fixed in the ground

3.3.5

reflective or decorative external part of a column-integrated luminaire

device reflecting the light in a fixed direction or with a decorative purpose, mounted outside the lamp compartment generally at the top of the column-integrated luminaire

NOTE Such devices are referred to in this standard as “external parts”.

3.3.6

lighting column

support intended to hold one or more luminaires, consisting of one or more parts: a post, possibly an extension piece, and if necessary a bracket. It does not include columns for catenary lighting

3.3.7

nominal height of a column-integrated luminaire

distance between the centre line of the point of entry of the external part and the intended ground level, for column-integrated luminaires planted in the ground, or the bottom of the flange plate, for column-integrated luminaires with a flange plate

3.3.8

door opening of a column-integrated luminaire

opening in the column of a column-integrated luminaire for access to electrical equipment

3.3.9

cable entry slot of a column integrated luminaire

opening in the part of a column-integrated luminaire below ground for the cable entry

3.3.10

connection box of a column integrated luminaire

box containing terminal blocks: protecting devices allowing the connection of a column-integrated luminaire to the mains and the looping of electricity supply cables

3.3.11

tunnel luminaires

luminaires for lighting tunnels which are mounted direct or on frames to the wall or ceiling of the tunnel

3.4 Classification of luminaires

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

NOTE Luminaires for road and street lighting are normally suitable for one or more of the following modes of installation:

- a) on a pipe (bracket) or the like;
- b) on a mast (column) arm;
- c) on a post top;

- d) on span or suspension wires;
- e) on a wall.

3.5 Marking

The provisions of Section 3 of IEC 60598-1 apply. In addition, the following information shall be provided in the instruction leaflet supplied with the luminaire:

- a) design attitude (normal operating position);
- b) weight including control gear if any;
- c) overall dimensions;
- d) if intended for mounting more than 8 m above ground level, the maximum projected area subjected to wind force (see 3.6.3.1);
- e) the range of cross-sectional areas of suspension wires suitable for the luminaire, if applicable;
- f) suitability for use indoors provided the 10 °C, allowed for the effects of natural air movement, has not been deducted from measured temperature (see 3.12.1);
- g) dimensions of the compartment in which the connection box is placed;
- h) the torque setting in newton metres to be applied to any bolts or screws which fix the luminaire to its support;
- i) maximum mounting height relevant to the selected method for protection against the falling of glass particles.

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3.6 Construction

The provisions of Section 4 of IEC 60598-1 apply together with the requirements of 3.6.1 to 3.6.5.

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3.6.1 All luminaires shall have protection against ingress of moisture of at least IPX3, except for tunnel-lighting luminaires and glazing of column-integrated luminaires with an open-sided external part, for which IPX5 is required.

For column-integrated luminaires, door opening included, the IP classification shall be as follows:

- 1) parts below 2,5 m: IP3X (see IEC 60364-7-714)
- 2) parts above 2,5 m: IP2X (when the external part is open-sided, the IP classification of the glazing shall be 5X)

3.6.2 Luminaires for suspension on span wires shall be fitted with clamping devices for this purpose and the range of span-wire sizes for which the clamping devices are suitable shall be stated in the instruction leaflet supplied with the luminaire. The device shall clamp the span wire to prevent movement of the luminaire with respect to the span wire.

The suspension devices shall not damage the span wire during installation and during normal use of the luminaire.

Compliance is checked by inspection after fitting the luminaire to the smallest and largest span wires in the range stated by the luminaire manufacturer.

NOTE Care should be taken to avoid electrolytic corrosion between the clamping device and the span wire.

3.6.3 The means for attaching the luminaire or external part to its support shall be appropriate to the weight of the luminaire or external part. The connection shall be designed to withstand wind speeds of 150 km/h on the projected surface of the assembly without undue deflection.

Fixings which carry the weight of the luminaire or external part and internal accessories shall be provided with means to prevent the dislodgement of any part of the luminaire or external part by vibration, either in service or during maintenance.

Parts of luminaires or external parts which are fixed other than with at least two devices, for example, screws or equivalent means of sufficient strength, shall have such extra protection as to prevent those parts falling and endangering persons, animals and surroundings, should a fixing device fail under normal conditions.

Compliance is checked by inspection and, for mast-arm or post-top mounted luminaires or external parts, by the test of 3.6.3.1.

The wind-force test is not required to be performed on tunnel luminaires.

NOTE In considering the possible effects of vibration, the luminaire should be studied in conjunction with the lamp and the column with which it may be used.

3.6.3.1 Static load test for mast-arm or post-top mounted luminaires or external parts

The luminaire or external part is mounted in such a way that the most critical surface is loaded.

The most critical surface is determined by calculating the highest value of $Cd \times S$

where

Cd is the drag coefficient;

S is the area of the surface to be loaded (m^2).

The drag coefficient depends on the shape of the surface. For luminaires or external parts for which the Cd is not measured, the value of 1,2 shall be taken.

NOTE 1 See Annex A for measurement of Cd .

The means of attachment shall be secured in accordance with the manufacturer's instructions.

A constant evenly distributed load is applied for 10 min on the most critical surface.

NOTE 2 See Figure 1 for methods of equal distribution of the load. In cases where bags are used, these can be filled with sand, lead shot or small balls.

The load shall be equal to

$$F = 1/2 Rh \times S \times Cd \times V^2 \text{ (N)}$$

where

Rh is equal to 1,225 kg/m^3 (air volumic mass);

V is the wind speed (m/s).

The wind speeds relevant to the mounting heights of luminaires or external parts shall be

$V = 45$ m/s (163 km/h) for heights up to 8 m;

$V = 52$ m/s (188 km/h) for heights between 8 m and 15 m;

$V = 57$ m/s (205 km/h) for heights of more than 15 m.

NOTE 3 In some countries, the wind speed is determined by national rules (for example, Japan).

The drag coefficient is 1,2 (or the exact value measured in Annex A).

After the test, there shall be no visible failure impairing the safety, no permanent deformation from the attachment which exceeds a slope of more than 2 cm/m, and no rotation around the point of attachment.

3.6.4 If the use of a single lampholder does not ensure the correct position of the lamp, an adequate supporting device shall be provided.

For adjustable lampholders or optical parts, suitable reference marks shall be provided.

Compliance is checked by inspection.

~~3.6.5 Glass covers shall either consist of a glass that fractures into small pieces or shall be provided with a guard of sufficiently small mesh or a film-coated glass that retains glass fragments.~~

~~For flat glass covers compliance is checked by inspection and, if the glass is not provided with a guard, by the following test.~~

~~The glass component is supported over the whole area to ensure that particles will not be scattered upon fragmentation and that movement of the particles is prevented. Shatter the glass with a centre punch at a point 30 mm from the mid-point of one of the longer edges of glass towards the centre. Within 5 min of fracture, count the particles in a 50 mm square, located approximately at the centre of the area of coarsest fracture but always within the confines of the glass.~~

~~NOTE Where possible, the area of measurement should not be within 30 mm of any edge, hole or machining of the glass.~~

~~A glass is deemed to have passed the test if the number of particles in the 50 mm square is more than 60; glass splinters and pieces less than the full thickness of the glass being excluded from the count. For glass of smaller size where a 50 mm × 50 mm area is not possible, the number of pieces necessary in the count is proportionately reduced.~~

~~In the count of the total number of particles in the 50 mm square, the particles in the centre of the square plus those at the edge shall be taken into account. In order to count particles at the edge of the square, it is recommended that all pieces intersected by two adjacent sides be included and all particles intersected by the two other sides be ignored (see Figure 2).~~

~~A suitable method of counting the particles is to place a square of 50 mm side, of transparent material over the glass and mark a spot of ink as each particle within the square is counted.~~

~~NOTE 1 When the test sample remains as one sheet, the fragmentation lines would normally be used to indicate fractures and the size and number of particles would thus be evaluated, unless reinforcing or a film were employed.~~

~~NOTE 2 For glass covers formed from a flat plate, a test is under consideration.~~

3.6.5 In order to reduce the risk of injury caused by breaking glass, the following requirements, in relation to the intended mounting height of the luminaire, are applicable.

When luminaires are installed below 5 m, no additional requirements are requested on glass covers.

For tunnel luminaires, the requirements of 3.6.5.1 apply without exception.

When luminaires are installed above 5 m, glass covers shall be:

- a) constituted with a glass that fractures into small pieces, or
- b) constituted with a glass having a high impact shock resistance, or

- c) protected by any means to retain glass fragments in case of breakage (e.g. guard, film coating).

Compliance is checked:

- for a) by test and inspection according to 3.6.5.1;
- for b) by test and inspection according to 3.6.5.2;
- for c) by inspection.

The luminaire manufacturer shall declare to the testing laboratory the method of protection used.

3.6.5.1 Protection by the use of glass that fractures into small pieces

Preconditioning of the luminaire and glass cover before testing is not required.

For flat glass, the glass component is supported over the whole area to ensure that particles will not be scattered upon fragmentation and that movement of the particles is prevented. Shatter the glass with a centre punch at a point 30 mm from the mid-point of one of the longer edges of glass towards the centre.

NOTE 1 A centre punch is a tool made of steel with a sharp point.

For formed glass, the glass component part shall be supported on all the surfaces (example of testing method could be the use of material like sand or a mould). The thickness of the material used as a support surface shall be more than 30 mm. The face of the glass shall be completely covered with an adhesive film in order to avoid any move of the broken particles. Shatter the glass (from the inside or the outside) with a centre punch in the middle of the glass cover.

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Within 5 min of fracture, count the particles in a 50 mm square, located approximately at the centre of the area of the coarsest fracture but always within the confines of the glass.

Compliance: A glass is deemed to have passed the test if the number of particles in the 50 mm square is more than 40; glass splinters and pieces less than the full thickness of the glass being excluded from the count. For glass of smaller size where a 50 mm × 50 mm area is not possible, the number of pieces necessary in the count is proportionately reduced. The size of the particles shall be less than 50 mm for all the dimensions.

In the count of the total number of particles in the 50 mm square, the particles in the centre of the square plus those at the edge shall be taken into account. In order to count particles at the edge of the square, it is recommended that all pieces intersected by two adjacent sides be included and all particles intersected by the two other sides be ignored (see Figure 2).

NOTE 2 A suitable method of counting the particles is to place a square of 50 mm side, of transparent material over the glass and mark a spot of ink as each particle within the square counted.

NOTE 3 When the test sample remains as one sheet, the fragmentation lines would normally be used to indicate fractures and the size and number of particles would thus be evaluated, unless reinforcing or a film were employed.

NOTE 4 Where possible, the area of measurement should not be within 30 mm of any edge, hole or machining of the glass or in a circle of 50 mm around the impact.

3.6.5.2 Protection by the use of high impact resistant glass

3.6.5.2.1 Glass covers shall have high mechanical strength.

The luminaire and glass cover shall be preconditioned by the thermal endurance test of 12.3 of IEC 60598-1.

The test is performed on one sample and on the external face (opposite side of the lamp) of the glass mounted on the luminaire.