

SLOVENSKI STANDARD
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Standard za proizvod, ki zajema svetlobne znake z razelektritvenimi sijalkami in/ali diodami LED (svetleče diode) in/ali EL (elektroluminescenčnimi) svetlobnimi viri z nazivno napetostjo, ki ne presega 1000 V, razen splošne, cestne ali zasilne razsvetljave

Product standard covering luminous signs with discharge lamps and/or LED (light emitting diodes) and/or EL (electroluminescent) lightsources with a nominal voltage not exceeding 1000 V, with the exclusion of general lighting, traffic- or emergency related purpose

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English Version

Product standard covering luminous signs with discharge lamps and/or LED (light emitting diodes) and/or EL (electroluminescent) lightsources with a nominal voltage not exceeding 1000 V, with the exclusion of general lighting, traffic- or emergency related purpose

To be completed

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2016-07-29.

It has been drawn up by CLC/BTTF 142-1.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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54 **European foreword**

55 This document (prEN 50107-3:2016) has been prepared by CLC/BTTF 142-1 "Product requirements for low
56 voltage cold cathode and LED installations".

57
58 This document is currently submitted to the Enquiry.

59
60 The following dates are proposed:

- 61
- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
 - latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
 - latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months
(to be confirmed or modified when voting)

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1 Scope

A luminous sign, light-artwork or architectural accent lighting (finished functional sign, abbreviated: sign) shall comply with this product standard.

The finished functional sign as a product fulfilling its intended purpose as luminous sign can be achieved by combining products with similar purpose through installatio (according to HD 384/HD 60364 series) in order to yield a new product by itself.

NOTE 1: The scope of this product standard is specified by the areas C, D and E in the figure of Annex A.

NOTE 2: Even if the physical execution of a particular luminous sign might qualify the luminous sign to meet the requirements of a luminaire according to EN 60598, the exclusion of general lighting, traffic and emergency related purpose is intended to avoid the requirements of EN 60598 which are impracticable and/or impossible to fulfill for most luminous signs. To cover the special safety problems related with luminous signs, the present product standard is intended.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50107-1:2002, *Signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV – Part 1: General requirements*

EN 50107-2, *Signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV – Part 2: Requirements for earth-leakage and open-circuit protective devices*

EN 60081, *Double-capped fluorescent lamps – Performance specifications* (IEC 60081)

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529:1989)

EN 60901, *Single-capped fluorescent lamps – Performance specifications* (IEC 60901)

EN 60921, *Ballasts for tubular fluorescent lamps – Performance requirements* (IEC 60921)

EN 60929, *AC-supplied electronic ballasts for tubular fluorescent lamps – Performance requirements* (IEC 60929)

EN 61050, *Transformers for tubular discharge lamps having a no-load output voltage exceeding 1 kV (generally called neon-transformers) – General and safety requirements* (IEC 61050)

EN 61195, *Double-capped fluorescent lamps – Safety specifications* (IEC 61195)

EN 61199, *Single-capped fluorescent lamps – Safety specifications* (IEC 61199)

EN 61347-1:2008, *Lamp controlgear – Part 1: General and safety requirements* (IEC 61347-1:2007)

EN 61347-2-2:2001 + corr. Jul. 2003 + A1:2006 + corr. Nov. 2006 + A2:2006, *Lamp controlgear – Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down converters for filament lamps* (IEC 61347-2-2:2000 + A1:2005 + A2:2006)

EN 61347-2-3, *Lamp controlgear – Part 2-3: Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps* (IEC 61347-2-3)

EN 61347-2-8, *Lamp controlgear – Part 2-8: Particular requirements for ballasts for fluorescent lamps* (IEC 61347-2-8)

- 118
 119 EN 61347-2-10:2001, *Lamp controlgear – Part 2-10: Particular requirements for electronic inverters and*
 120 *converters for high-frequency operation of cold start tubular discharge lamps (neon tubes)*
 121 (IEC 61347-2-10:2000)
 122
 123 EN 61347-2-13:2006, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied*
 124 *electronic controlgear for LED modules* (IEC 61347-2-13:2006)
 125
 126 EN 62031:2008, *LED modules for general lighting – Safety specifications* (IEC 62031:2008)
 127
 128 EN 62384, *DC or AC supplied electronic control gear for LED modules – Performance requirements*
 129 (IEC 62384)
 130
 131 EN 62532, *Fluorescent induction lamps – Safety specifications* (IEC 62532)
 132
 133 HD 384/60364 (all parts), *Electrical installations of buildings / Low-voltage electrical installations* (IEC 60364 ,
 134 all parts)

135 3 Terms and definitions

136 For the purposes of this document, the terms and definitions given in IEC 60050-826 (IEV) and the following
 137 apply.
 138

139 3.1 General

140 3.1.1

141 luminous sign

142 system with light sources which is intended as finished functional sign, light-artworks, and/or decorative
 143 lighting with the exclusion of general lighting, traffic- or emergency related purpose, for indoor and/or outdoor
 144 operation, consisting of a combination of some products with similar purpose (apparatus, devices and
 145 components), through manufacturing or installation in order to yield the luminous sign as new product by
 146 itself
 147

148 Note 1 to entry: See Annex A as guide to applicability of product and/or installation standard.
 149

150 3.1.2

151 no-load rated output voltage

152 maximum rated voltage between the output terminals(s) of the transformer, inverter, converter, ballast or
 153 power supplies connected to the rated supply voltage at rated frequency, with no load on the output circuit
 154

155 [SOURCE: EN 50107-1:2002]

156
 157 Note 1 to entry: For output circuits supplied by transformers, it is the peak value divided by the square root of 2 (see
 158 EN 61050).
 159

160 Note 2 to entry: For inverters or converters with sinusoidal waveform, it is the maximum rated voltage between the
 161 output terminals (see EN 61347-2-10). For other waveforms it is the r.m.s. value or the equivalent value deduced from
 162 the peak value, obtained by mathematical calculation.
 163

164 3.1.3

165 creepage distance

166 shortest distance along the surface of a solid installation material between two conductive parts
 167

168 [SOURCE: EN 60664-1:2007, 3.3]
 169

170 3.1.4

171 clearance

172 shortest distance in air between two conductive parts
 173

174 [SOURCE: EN 60664-1:2007, 3.2]

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3.1.5

insulating sleeve

insulation designed to be placed over the exposed output-voltage connections at tube electrodes or over cable-end insulators

3.1.6

electrical skilled person for luminous signs

person qualified in sign practice who has knowledge and experience in the production, installation, testing, maintenance of the technologies in use, in the installation of luminous signs and who takes responsibility for the product and its testing in accordance with the standards

3.1.7

output circuit

part of the device or installation between the output terminals of controlgear including the light sources and cables

[SOURCE: EN 50107-1:2002, 3.14, mod.]

3.2 Light sources

3.2.1

discharge lamp

device with purpose of generating visible or invisible light by means of recombination/relaxation of excited or ionized gas atoms as primary process

Note 1 to entry: The process can be a multi-step process involving fluorescence of solid-state materials or gases as secondary process.

3.2.2

electroluminescent light source

device with purpose of generating visible or invisible light by means of recombination/relaxation of excited atoms within a solid-state body, wherein the excitation is caused by an electric field

Note 1 to entry: An LED is a special form of electroluminescent light source employing two different semiconductors forming a P-N-junction.

3.2.3

hot-cathode-fluorescent lamp

low-pressure discharge lamp with or without mercury, utilising electrodes operating by thermo-ionic emission of electrons, and in which most of the light is emitted by one or several layers of phosphors excited by the ultra-violet radiation from the discharge

[SOURCE: IEC 845-07-26, mod.] (from EN 60081)

3.2.4

luminous-discharge tube

(common: Neon tube, Cold Cathode tube)

tube, or other vessel or device, which is constructed of translucent material, hermetically sealed, and designed for the emission of light arising from the passage of an electric current through a gas or vapour contained within it

Note 1 to entry: The tube may be with or without an internal fluorescent coating.

[SOURCE: EN 50107-1:2002, 3.1, mod.]

3.2.5

Light-Emitting Diode (LED)

solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current

[SOURCE: IEC 845-04-40 and EN 62031:2008, 3.1]

3.2.6**LED module**

unit supplied as a light source. In addition to one or more LED it may contain further components, e.g. optical, mechanical, electrical and electronic, but excluding the controlgear

[SOURCE: EN 62031:2008, 3.2]

3.2.7**induction lamp**

assembly of a low pressure discharge vessel and an inductive power coupler

[SOURCE: EN 62532:2011, 1.3.1 mod.]

3.3 Controlgear**3.3.1****controlgear**

one or more components between the supply and one or more lamps which may serve to transform the supply voltage, limit the current of the lamp(s) to the required value, provide starting voltage and preheating current, prevent cold starting, correct power factor or reduce radio interference

Note 1 to entry: This is the most comprehensive description of a device for operating lamps. It can be either electronic (ECG) or electro-magnetic (copper-iron type).

[SOURCE: EN 61347-1:2008]

3.3.2**transformer**

static piece of apparatus with two or more windings which, by electromagnetic induction, transforms a system of alternating voltage and current into another system of voltage and current usually of different values and at the same frequency for the purpose of transmitting electrical power.

Note 1 to entry: The high output impedance of most transformers designed for luminous discharge tubes allows the characteristics of transformer and current-limiting components to be combined in one unit.

[SOURCE: IEC 421-01-01]

3.3.3**ballast**

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

Note 1 to entry: It may also include means for transforming the supply voltage and arrangements which help provide starting voltage and pre-heating current (from EN 61347-1:2008). This definition concerns electro-magnetic (copper-iron) types. The expression, however, is often used colloquially for any type).

3.3.4**inverter**

electric energy transducer that converts direct current to alternating current

[SOURCE: EN 61347-2-10:2001, 3.3]

3.3.5**electronic step down converter**

unit inserted between the supply and one or more incandescent lamps, which serves to supply the lamp(s) with its (their) rated voltage, generally at high frequency. The unit may consist of one or more separate components and may include means for dimming, correcting the power factor and suppressing radio interference

[SOURCE: EN 61347-2-2:2001]

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3.3.6

electronic controlgear for LED modules

unit inserted between the supply and one or more LED modules which serves to supply the LED module(s) with their rated voltage or rated current. The unit may consist of one or more separate components and may include means for dimming, correcting the power factor and suppressing radio interference

[SOURCE: EN 61347-2-13:2006, 3.1]

3.3.7

earth-leakage protective device

device which will remove the output power from one or more transformer(s), inverter(s) or converter(s) in the event of a leakage current or a short circuit between any relevant part of the output circuit and earth

[SOURCE: EN 50107-1:2002, 3.10, mod.]

3.3.8

flasher

device for automatically switching one or more output circuits on and off continuously

Note 1 to entry: The sequence of switching of the various output circuits may be suitably arranged to provide the impression of movement and other animated effects.

[SOURCE: EN 50107-1:2002, 3.20, mod.]

3.3.9

dimmer

device in the electric circuit for varying the luminous flux from light sources

[SOURCE: IEC 845-08-37, mod. "light-sources" instead of "lamps"]

4 Protection for safety

4.1 Protection against electric shock

4.1.1 Provisions for basic protection (protection against direct contact)

4.1.1.1 Barriers or enclosures

Protection is required and shall consist of an enclosure or other means of protection conforming to the following:

- a) It shall provide a degree of protection corresponding to at least IP2X for signs to be used in dry rooms; otherwise at least IP22, as specified in EN 60529:1991, Table I.

NOTE 1: The requirements for protection against ingress of solid objects, specified in EN 60529:1991, Table II, do not apply.

- b) If it is constructed from metal parts, these shall not be used as conductor and shall be earthed.

NOTE 2: National regulations might require installation of an RCD in the mains supply.

- c) If it is constructed from other materials, these shall be materials that have been certified by the supplier as suitable for use in the environment existing close to the lamp in use. The sign manufacturer shall obtain from the supplier a guarantee for the materials covering the expected lifetime of the product.

- d) Access to the interior of an enclosure shall be by means of a tool, e.g. a screwdriver.

NOTE 3: A fully enclosed sign letter or box sign is considered to be a suitable enclosure for this purpose.

352 353 **4.1.1.2 Additional requirement - electrode connections of discharge tubes**

354 In the case of an illuminated sign with discharge tubes, the connections of the electrodes shall be covered
355 with insulating sleeves, or heat shrinkable tubes or a combination of these.

356
357 Insulating sleeves or shrinkable tubes shall be made of a suitable insulating material having a breakdown
358 voltage certified by the supplier as not less than twice the no-load output voltage to earth of the transformer,
359 inverter or converter supplying the circuit. The insulating material shall have a wall thickness corresponding to
360 the required disruptive discharge strength and be resistant to an operating temperature of at least 180 °C
361 and suitable for the environmental conditions prevailing at the installation site, e.g. resistant to UV radiation
362 and ozone.

363
364 NOTE 1: This requirement is intended to prevent a person from touching a live electrode with a test probe, should the
365 discharge tube be broken.

366
367 NOTE 2: Figures 1 and 2 show the cross-sections of different letter and sign boxes.

368
369 NOTE 3: Other means of additional protection may be permanent, e.g. it may have to be cut away.

370
371 NOTE 4: See Figures 1 to 3, 9 and 10.

372 373 **4.1.2 Protection against indirect contact**

374 **4.1.2.1 Equi-potential bonding**

375 The protection against indirect contact shall be provided by equi-potential bonding, applied between all metal
376 parts and then connected to earth.

377 378 **4.1.2.2 Bonding by protective conductor**

379
380 All exposed metalwork, with the exception of clips and clamps for fixing cables and tubes, shall be bonded
381 together by means of a protective conductor and, unless this metalwork is connected to earth by other
382 means, shall be provided with an earthing terminal.

383 384 **4.1.2.3 Protective conductors**

385 The protective conductor shall be one of the following:

- 386
387 a) a separate cable having insulation coloured yellow/green and having the following cross-sectional
388 area:
- 389 i) in situations where it may suffer mechanical stress, 4 mm²;
 - 390 ii) in other situations, 2,5 mm².
- 391
392
393

394 **4.1.2.4 Joints**

395 Where metal parts are joined together, means shall be employed to ensure that earth continuity is
396 maintained across the joint.

397 NOTE: This is particularly important where the metal parts are painted or where they are joined together by adhesive.
398 The paint or adhesive can electrically insulate the parts and it is important that this insulation is by-passed.

399 **4.1.2.5 Connection to Neutral**

400 Equipotential bonding conductors shall be not connected to the neutral terminal of the mains supply to the
401 luminous sign, except as specified in HD 384 for protective multiple earthing arrangements in TN-C systems.