SLOVENSKI STANDARD
SIST EN 50107-3:2018

01-oktober-2018

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

Ta slovenski standard je istoveten z: **EN 50107-3:2018**

ICS:

29.140.30	Fluorescenčne sijalke. Sijalke	Fluorescent lamps. Discharge lamps

SIST EN 50107-3:2018 **en**

EUROPEAN STANDARD

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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

Norme de produit couvrant les enseignes lumineuses avec des lampes à décharge et/ou à LED (diodes électroluminescentes) et/ou les sources lumineuses électroluminescentes (EL) avec une tension nominale ne dépassant pas 1000 V, à l'exclusion de l'éclairage général ainsi que des enseignes relatives à la circulation routière et aux situations d'urgence

Produktnorm für Lichtwerbeanlagen mit Entladungslampen und/oder LED- (lichtemittierende Dioden) und/oder EL- (elektrolumineszierende) Lichtquellen mit einer Nennspannung bis einschließlich 1 000 V, ausgenommen Allgemeinbeleuchtung, Verkehrs- oder Notbeleuchtung

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European Committee for Electrotechnical Standardization
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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Contents

European foreword

This document (EN 50107-3:2018) has been prepared by CLC/BTTF 142-1 “Product requirements for signs, artwork and accent lighting using low voltage cold cathode and/or LED”.

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)	2019-02-03
—	latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2021-08-03

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1 Scope

This product standard contains electrical safety requirements for luminous signs, light-artwork or architectural accent lighting (finished functional sign, abbreviated: sign) using light sources with a nominal voltage not exceeding 1000 V with the exclusion of general lighting, traffic- or emergency related purposes.

The finished functional sign as a product fulfilling its intended purpose as luminous sign can be achieved by combining products with similar purpose through installation (according to HD 384 series/HD 60364) 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 60598-2-23, *Luminaires - Part 2-23: Particular requirements - Extra low-voltage lighting systems for filament lamps (IEC 60598-2-23)*

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 61347-2-2:2012, *Lamp controlgear - Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps (IEC 61347-2-2:2011)*

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)*

EN 61347-2-10:2001, *Lamp controlgear - Part 2-10: Particular requirements for electronic invertors and convertors for high-frequency operation of cold start tubular discharge lamps (neon tubes) (IEC 61347-2-10:2000)*

EN 61347-2-13:2006, *Lamp controlgear - Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules (IEC 61347-2-13:2006)*

EN 62031:2008, *LED modules for general lighting - Safety specifications (IEC 62031:2008)*

EN 62384, *DC or AC supplied electronic control gear for LED modules - Performance requirements (IEC 62384)*

EN 62532, *Fluorescent induction lamps - Safety specifications (IEC 62532)*

HD 384/60364 *(all parts), Electrical installations of buildings / Low-voltage electrical installations (IEC 60364, all parts)*

IEC 60050-826, *International Electrotechnical Vocabulary - Part 826: Electrical installations*

EN ISO 7010:2012, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010:2011)*

3 Terms and definitions

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

3.1 General

3.1.1
luminous sign
system with light sources which is intended as finished functional sign, light-artworks, and/or decorative lighting with the exclusion of general lighting, traffic- or emergency related purpose, for indoor and/or outdoor operation, consisting of a combination of some products with similar purpose (apparatus, devices and components), through manufacturing or installation in order to yield the luminous sign as new product by itself

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

3.1.2
architectural accent lighting
fixed or portable lighting unit or installation to enhance elements of the design or the structure of a immobile construction and not intended for general lighting, signalling or traffic/ emergency purpose

3.1.3
general lighting
substantially uniform lighting of an area without provision for special local requirements

[SOURCE: IEV 845-09-06]

3.1.4
no-load rated output voltage
maximum rated voltage between the output terminals(s) of the transformer, inverter, converter, ballast or power supplies connected to the rated supply voltage at rated frequency, with no load on the output circuit

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

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

[SOURCE: EN 50107-1:2002]

3.1.5
creepage distance
shortest distance along the surface of a solid installation material between two conductive parts

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

3.1.6
clearance
shortest distance in air between two conductive parts

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

3.1.7
insulating sleeve
insulation designed to be placed over the exposed output-voltage connections at tube electrodes or over cable-end insulators

3.1.8
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

3.1.9
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: IEV 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: IEV 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: IEV 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
converter
unit for electronic conversion of an s.c. supply at one frequency to an a.c. supply of another frequency

Note 1 to entry: The voltage may or may not be altered during the conversion.

[SOURCE: EN 61347-2-10:2001, 3.4]

3.3.5
inverter
electric energy transducer that converts direct current to alternating current

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

3.3.6
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 61347-2-2:2012]

3.3.7
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]

3.3.8
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.]

3.3.9
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.]

3.3.10
dimmer
device in the electric circuit for varying the luminous flux from light sources

[SOURCE: IEV 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 Residual Current Detector safety device (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.

NOTE 3: The sign manufacturer is advised to check the temperatures of the lamp(s) and other devices in operation (i.e. control gear, ballast, transformer etc.) that the ignition temperature of the construction materials in close proximity is not reached or exceeded.

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

NOTE 4: A fully enclosed sign letter or box sign is considered to be a suitable enclosure for this purpose.

4.1.1.2 Additional requirement - electrode connections of discharge tubes

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

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

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

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

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

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

4.1.2 Protection against indirect contact

4.1.2.1 Equi-potential bonding

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

4.1.2.2 Bonding by protective conductor

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

4.1.2.3 Protective conductors

The protective conductor shall be one of the following:

a) a separate cable having insulation coloured yellow/green and having the following cross-sectional area:

   i) in situations where it may suffer mechanical stress, 4 mm^2;

   ii) in other situations, 2,5 mm^2.

4.1.2.4 Joints

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

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