

UNDERWRITERS LABORATORIES INC. CERTIFICATION REQUIREMENT DECISION

This Certification Requirement Decision is prepared by UL LLC. It is normative for the applicable UL Product Certification Program(s); however, it is currently not part of the UL Standard(s) referenced below.

Product Category (CCN): OOLV

Standard Number: UL 1993

Standard Title: Standard for Self-Ballasted Lamps and Lamp Adapters

Edition Date: January 27, 2017

Edition Number: 5

Section / Paragraph Reference: Supplement SD (New)

Subject: Requirements for evaluating LED lamps as direct replacements for specific high intensity discharge (HID) lamps

This Certification Requirement Decision (CRD) supersedes prior CRDs issued February 9, 2017 and May 31, 2018

DECISION:

(Add to Clause 2.1, "Normative References" for ANSI)

ANSI IEEE C62.41, *IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits*

ANSI NEMA ANSLG C78.389, *High-Intensity Discharge Lamps – Methods of Measuring Characteristics*

ANSI NEMA ANSLG C78.40, *Specifications for Mercury Lamps*

ANSI NEMA ANSLG C78.42, *High Pressure Sodium Lamps*

ANSI NEMA ANSLG C78.43, *Single-Ended Metal-Halide Lamps*

ANSI NEMA C82.5, *Reference Ballasts – High-Intensity-Discharge and Low-Pressure Sodium Lamps*

SUPPLEMENT SD - ADDITIONAL REQUIREMENTS FOR LED LAMPS INTENDED AS DIRECT REPLACEMENTS FOR HIGH INTENSITY DISCHARGE (HID) LAMPS

SD1 Special Terminology

SD1.1 The following definitions apply:

SD1.2 DEVICE – A generic term for an LED lamp.

SD1.3 (LAMP) CURRENT LIMIT – The nominal operating current of the target lamp after seasoning, as published by ANSI. On ANSI lamp data sheets, this is usually found under "Operating requirements at 100 hours – Lamp current (A, rms)".

SD1.4 (LAMP) POWER LIMIT – The nominal operating power of the target lamp after seasoning, as published by ANSI. On ANSI lamp data sheets, this is usually found under "Operating requirements at 100 hours – Lamp wattage (W)".

SD1.5 TARGET LAMP(S) – The HID lamp(s) that the device is intended to replace.

SD2 General

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SD2.1 The construction, test and marking requirements in Supplement SD supplement the requirements in the main body of this Standard.

SD2.2 These requirements apply to devices intended as direct substitutes for one or more HID lamps, such as those defined in ANSI NEMA ANSLG C78.40, C78.42 and C78.43.

SD2.3 These requirements do not apply to devices that, in order to function as intended, require an installer to electrically alter an HID luminaire. Such alterations include removing the ballast or re-wiring the lampholders to bypass the ballast.

SD2.4 For the purposes of this Supplement, the following assumptions apply:

- a) The output of an HID ballast is considered both a risk of fire and risk of electric shock and not isolated from the mains;
- b) The device may be installed in open luminaires without additional enclosures or diffusers; and
- c) Double-ended devices will be powered from and supported by the luminaire's existing lampholders, exclusively.

SD3 Construction

SD3.1 The device shall comply with all electrical and mechanical construction requirements in UL 1993 applicable to LED lamps.

SD3.2 When evaluating electrical spacings between the device's base contacts, or between any base contact and exposed dead metal, clearance and creepage distances shall comply with UL 1993 but be no less than those specified by the applicable ANSI lamp base datasheet. These distances shall be at least 3mm (0.118") for E26 bases and at least 5mm (0.200") for E39 and EX39 bases.

SD3.3 With regard to the weight and moment requirements in Clauses 5.4 and SA5.4, the maximum moment is not defined for devices with fixed alignments intended for vertical use only and marked per Clause SD5.5.

SD4 Tests

SD4.1 General

SD4.1.1 Table SD4.1 tabulates the tests applicable to these devices. All paragraphs referenced below are from UL 1993. See also Clause SD4.2.

Table SD4.1
Test plan summary

Test description	Reference	Number and description of samples ^a
Input measurements ^b	8.2, SA8.2, SD4.2.2	1 sample of device.
Leakage-current ^{b,c}	8.4	1 sample of device; can be same as used for input measurements.
Temperature ^b	8.5, SA8.5	1 sample of device. If the device is normally potted, it is necessary to prepare a sample with thermocouples attached prior to potting. If acceptable to all parties concerned, the sample for test can be unpotted.
Dielectric voltage withstand	8.6, SA8.6, SD4.2.4	1 sample of the device – can be the same as used for input measurements, but not the sample for temperature test as the thermocouples can interfere with the test.
Drop impact	8.8, SA8.8	One sample of each enclosure type can be subjected to 3 drops, or if suitable to all concerned, three samples each of which can be subjected to one drop.
Mold-stress relief conditioning	8.9	1 sample of each enclosure type; may be same as used in drop test, if undamaged.
Deflection	8.10	1 sample of each enclosure type; may be same as used in drop test, if undamaged.
Humidity conditioning	8.13	For damp location rating, 1 sample; may be used in previous tests.
Water spray	8.14	For wet location rating and device is not potted, 1 sample of each enclosure type; can be the same as used in previous tests if intact and undamaged.
Cold impact	8.15	For wet location rating, three samples of each enclosure type.
LED lamp and driver abnormal conditions ^b	SA8.22, SD4.2.3	1 sample for each component fault, or less if it can be determined that previous faults did not damage the sample. Potted samples would need to have additional wires to attach to internal connections so that the short condition can easily be created. Devices that are normally potted can be tested without potting if agreeable to all parties concerned.
Voltage pulse withstand ^b	SD4.3	1 sample of device.
^a This table is a summary of test samples typically needed. Actual number of samples may vary where agreeable to all parties concerned.		
^b The sample shall be powered from a reference ballast, see Clauses SD4.1.2 and SD4.1.3.		
^c For this test, the reference ballast shall be electrically isolated from the branch circuit.		

SD4.1.2 When a test requires the device to be energized from its intended supply source, it shall be energized from a 60 Hz reference ballast. The reference ballast shall comply with all pertinent requirements of ANSI NEMA C82.5 and be used as the supply sources for the LED lamp tests in this supplement.

SD4.1.3 When used as a test power source, the reference ballast shall be initially adjusted for the voltage, current and power characteristics defined by the lamp standard of the target lamp (See SD2.2). Once the LED lamp is connected and energized from the reference ballast, the reference ballast resistance shall be adjusted so that the LED lamp is operating at the target lamp's rated current.

Note: The adjusted power sources are not considered reference ballasts for the purposes of ANSI NEMA C78.40, C78.42 or C78.43.

SD4.1.4 The electrical characteristics of the device shall be measured in accordance with ANSI NEMA ANSLG C78.389 with the following variations:

- a) Lamp seasoning and pre-burning is not required; and