



# UL 2108

## STANDARD FOR SAFETY

### Low Voltage Lighting Systems

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UL Standard for Safety for Low Voltage Lighting Systems, UL 2108

Second Edition, Dated December 7, 2015

### **Summary of Topics**

**These revisions to ANSI/UL 2108 dated April 18, 2023 include the following changes in requirements:**

- **Scope simplification; [1.1](#)**
- **Scope exclusions; [1.5](#)**
- **Definition Removals; [3.13](#), [3.14](#), [3.14.1](#), [3.21](#) and [3.23](#)**
- **Permitted openings in recessed housings; [11.9](#)**
- **Protective devices and the Maximum Output Test; [19.1](#) and [33.2.2](#)**
- **Power unit temperature test; [34.2.3](#), [48.2.8](#) and [48.2.8A](#)**
- **Overload Test; [36.2](#) and [Figure 36.1](#)**
- **Removal of surge protection devices for dielectric withstand test; [37.1](#) and [Appendix A](#)**
- **Reduced the marking minimum letter height; [48.1.3](#), [48.2.7](#), [48.4.3](#), [48.5.2](#), [67.1.3](#), [67.1.5](#), [67.1.6](#) and [83.1](#)**
- **Marking type options; [Table 48.1](#), [48.1.10](#) and [48.1.11](#)**
- **Class 2 luminaires with signal inputs; [51.1](#)**
- **Clarification of class 2 wet location compliance; [51.3](#) and [73.7](#)**
- **Class 2 device housings; [3.6A](#), [Section 53](#), [62.1](#), [62.4](#) and [66.1](#)**
- **Separable mounting means for class 2 luminaires; [54.1](#) and [68.5](#)**
- **Grounding permitted but not required for class 2 luminaires; [59.4](#)**
- **Editorial Corrections; [Section 6](#), [9.1](#), [45.4](#), [Table 51.1](#) and [B2.1.8](#)**

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated March 3, 2023.

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## **UL 2108**

### **Standard for Low Voltage Lighting Systems**

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**December 7, 2015**

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through April 18, 2023.

The most recent designation of ANSI/UL 2108 as an American National Standard (ANSI) occurred on April 18, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in ULSE's Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

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## INTRODUCTION

### 1 Scope

1.1 These requirements apply to low voltage lighting systems and components intended for installation in accordance with the National Electrical Code, NFPA 70, Article 411.

1.2 These requirements cover:

- a) Power units in which output is limited to 25 A and below the risk of electric shock voltage levels as defined in [3.19](#); and
- b) Class 2, exposed bare conductor, POE, and other low-voltage luminaires and lighting systems.

1.3 These requirements do not cover lighting equipment covered by other standards such as, but not limited to, the Standard for Portable Electric Luminaires, UL 153, the Standard for Track Lighting Systems, UL 1574, or the Standard for Luminaires, UL 1598:

- a) Luminaires provided with a cord and attachment plug intended for branch circuit connection. See the Standard for Portable Electric Luminaires, UL 153.
- b) Luminaires intended to be mounted to and relocatable along a track, including when the track is supplied at low voltage. See the Standard for Track Lighting Systems, UL 1574.
- c) Luminaires intended to be carried by hand or exclusively used not connected to a branch circuit. See the Standard for Flashlights and Lanterns, UL 1576.
- d) Luminaires integrated with a power unit in a singular product. See the Standard for Luminaires, UL 1598.

1.4 Light emitting diode (LED) components, controls, and subassemblies integral to a low voltage lighting system shall comply with the applicable requirements of the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750.

1.5 These requirements do not address certain specialized applications, including but not limited to hazardous/classified locations, emergency lighting, marine (ship-board) lighting, horticultural systems, germicidal luminaires, air-handling luminaires, or luminaires installed over cooking equipment. Low voltage lighting system equipment intended for such applications are to be investigated in accordance with standards written for the purpose.

### 2 Units of Measurement

2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

### 3 Glossary

3.1 For the purpose of this standard the following definitions apply.

3.2 ACCESSIBILITY BARRIER – A material provided to limit access to uninsulated current-carrying parts that involve a risk of shock and insulated current-carrying parts not intended to be subject to user contact.

3.2.1 BATTERY – General term for (1) any single cell, or (2) a group of cells connected together either in a series and/or parallel configuration. May be ready for use or may be an installed component.

3.2.2 BATTERY CELL – The basic manufactured unit of a battery. Provides electrical energy by direct conversion of chemical energy and designed to be charged electrically. Consists of electrodes, separators, electrolyte, container and terminals.

3.2.3 BATTERY, SECONDARY – A battery intended to be charged and discharged multiple times under prescribed rates of charging and discharging in accordance with the battery manufacturer's recommendations.

3.3 CABINET MOUNTED UNIT – A luminaire or power unit intended for final installation into cabinets and similar location, such that all or part of the unit is located within the interior space of the cabinet.

3.4 CONDUCTORS, INSULATED – A conductor encased within material recognized as electrical insulation.

3.5 ENCLOSURE – A material provided to enclose electrical parts and components that involve a risk of fire, and to protect internal parts from the environment and from mechanical damage. All or part of the enclosure is not prohibited from also serving as an accessibility barrier or recessed housing.

3.6 EXPOSED CONDUCTORS – Low voltage supply conductors with no additional housing, which provide physical support and electrical supply connections for one or more luminaire assemblies, including assemblies capable of being repositioned along the length of the conductors. Does not include lighting track bus bars (see UL 1574 clause 3.4) which may be accessible within their housing.

3.6A HOUSING – A protective casing for a device that is not required to meet the construction or performance criteria of an enclosure.

3.7 LAMP CONTAINMENT BARRIER – Any part of the luminaire that surrounds the lamp to contain hot particles of the lamp in the event that it ruptures.

3.8 LOCATION, DAMP – An exterior or interior location that is normally or periodically subject to condensation of moisture in, on, or adjacent to electrical equipment, and includes partially protected locations.

3.9 LOCATION, DRY – A location not normally subject to dampness, but may include a location subject to temporary dampness, as in the case of a building under construction, provided ventilation is adequate to prevent an accumulation of moisture.

3.10 LOCATION, WET – A location in which water or other liquid may drip, splash, or flow on or against electrical equipment.

3.11 LOW VOLTAGE LUMINAIRE – A lighting unit intended for connection to a power source for which output voltage does not represent a risk of electric shock.

3.12 NOMINAL OUTPUT WATTAGE/LOAD – Specified by power unit or system manufacturer as total lamp wattage. Assumes that lamps are operating at rated lamp voltage.

3.13 Deleted

3.13.1 OPEN DEVICE – A component or subassembly with instructions that limit installation to within enclosures of metal or nonmetallic materials suitable for fire containment and that limits user access to parts representing a risk of electric shock.

3.14 Deleted

### 3.14.1 Deleted

3.15 POWER UNIT – The equipment that powers and controls the luminaires in a low voltage lighting system. A power unit has the following characteristics:

- a) An isolating type transformer or electronic power supply of output voltage not exceeding the risk of electric shock;
- b) Is intended for field installation; and
- c) Each secondary circuit is limited to 25 A.

3.16 POWER OVER ETHERNET (PoE) – A DC power system conforming to IEEE 802.3 that uses category 5 (CAT5) or similar cables and 8P8C (RJ45) modular connectors to concurrently carry power and data between the power source and powered device. The voltage and power of all PoE systems are within the class 2 limits of NFPA 70, and therefore are given comparable treatment within this standard.

3.17 RECESSED HOUSING – A part of a recessed luminaire or power unit that projects into the ceiling or wall cavity and serves to close off the opening from the room side, and does not necessarily enclose conductors or similar components.

3.18 RECESSED EQUIPMENT – Equipment intended to be installed through (penetrating) or located above the mounting surface, and identified as one of the following:

Inherently Protected - Suitable for installation where in direct contact with thermal insulation or combustible materials, without reliance on a thermal protector to limit operating temperatures.

Type IC, Thermally Protected – Suitable for installation where in direct contact with thermal insulation or combustible materials.

Type Non-IC, Thermally Protected – Suitable for installation with minimum dimensions and spacings to thermal insulation or combustible materials in accordance with the installation code.

Type Non-IC, Concrete Only – Suitable for installation only in poured concrete.

3.19 RISK OF ELECTRIC SHOCK – A risk of shock exists between any two uninsulated conductive parts or between an uninsulated conductive part and earth ground, if the continuous current flow through a 1500  $\Omega$  resistor in parallel with a 0.015  $\mu\text{F}$  capacitor connected between the two points exceeds a 5 mA and if the open circuit voltage exceeds the following limits in [Table 3.1](#).

**Table 3.1**  
**Risk of electric shock voltage limits**

Waveform type <sup>a</sup>	Maximum Voltage	
	Dry and damp locations	Wet locations
Sinusoidal ac	30 V rms	15 V rms
Non-sinusoidal ac	42.4 V peak	21.2 V peak
Continuous dc <sup>b</sup>	60 V	30 V
10 – 200 Hz interrupted dc <sup>c</sup>	24.8 V	12.4 V

<sup>a</sup> For a combined ac + dc waveform, the dry and damp location voltage limit shall be the non-sinusoidal ac limit where the dc voltage is no more than 20.9 V, and shall be  $(33 + 0.45V_{dc})$  where the dc voltage is greater than 20.9 V. The wet location voltage limit shall be half this amount.

**Table 3.1 Continued on Next Page**

Table 3.1 Continued

Waveform type <sup>a</sup>	Maximum Voltage	
	Dry and damp locations	Wet locations
<sup>b</sup> If the peak-to-peak ripple voltage on a dc waveform exceeds 10% of the dc voltage, the waveform shall be considered a combined waveform per footnote a above. <sup>c</sup> Contact with interrupted dc at a lower or higher frequency shall be permitted only after a special investigation based on the specific waveform parameters.		

3.19.1 RISK OF FIRE – a risk of fire exists in an electrical circuit or device if the maximum voltage (V), current (I), or power (V x I) exceeds the applicable class 2 limit defined in Table 11(A) (for AC circuits) or 11(B) (for DC circuits) of NFPA 70.

3.20 SURFACE MOUNT UNIT – A luminaire or power unit that is designed to be mounted on the room side of a wall, ceiling, or other surface.

3.21 Deleted

3.22 UNDER-CABINET OR SHELF-MOUNTED UNIT – A luminaire and/or power unit intended for surface or blind hole mounting under a cabinet or shelf, where the unit does not extend through the mounting surface or into the cabinet interior.

3.23 Deleted

## 4 Components

4.1 Except as indicated in 4.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

4.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard; or
- b) Is superseded by a requirement in this standard.

4.3 A component shall be used in accordance with its rating established for the intended conditions of use.

4.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

## 5 Undated References

5.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5.2 The following publications are referenced in this Standard:

ASTM E230/E230M, Standard Specification and Temperature-Electromotive Force Tables for Standardized Thermocouples

IEEE 802.3, Standard for Ethernet

NFPA 70, National Electrical Code

NFPA 90A, Installation of Air-Conditioning and Ventilating Systems

UL 13, Power-Limited Circuit Cables

UL 62, Flexible Cords and Cables

UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

UL 153, Portable Electric Luminaires

UL 444, Communications Cables

UL 746C, Polymeric Materials – Use in Electrical Equipment Evaluations

UL 758, Appliance Wiring Material

UL 796, Printed-Wiring Boards

UL 873, Temperature-Indicating and -Regulating Equipment

UL 879, Electric Sign Components

UL 924, Emergency Lighting Equipment

UL 969, Marking and Labeling Systems

UL 1012, Power Units Other Than Class 2

UL 1097, Double Insulation Systems for Use in Electrical Equipment

UL 1310, Class 2 Power Units

UL 1411, Transformer and Motor Transformers for Use in Audio-, Radio- and Television-Type Appliances

UL 1574, Track Lighting Systems

UL 1577, Optical Isolators

UL 1598, Luminaires

UL 1642, Lithium Batteries

UL 1838, Low Voltage Landscape Lighting Systems

UL 2043, Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces

UL 2054, Household and Commercial Batteries