UL 1838

STANDARD FOR SAFETY

Low Voltage Landscape Lighting Systems

UL Standard for Safety for Low Voltage Landscape Lighting Systems, UL 1838

Third Edition, Dated January 13, 2003

Summary of Topics

The revisions of ANSI/UL 1838 dated October 30, 2020 include the following changes in requirements:

- ***Terminology – live parts; 2.10, 2.22, 2A.1, 24.4.9***
- ***Power supply cords and attachment plugs; 24.3.1.2, 24.3.5***
- ***Overload, Burnout and Endurance Test Consolidation and Simplification; 29.4, 29.5, Figure 29.1, Section 30, and Section 31,***
- ***Polymeric enclosure conduit connection test; 40.1.1, Table 40.2***
- ***Fuse replacement markings; 50.8***
- ***Installation instructions; 51.1***
- ***Polymeric material requirements for class 2 devices; Table 52.1***
- ***Unit low voltage cable; 53.4.1***
- ***Tungsten-halogen lamp containment barriers; 59.3***
- ***Water barriers for pond/decorative fountain luminaires; 67.1.2***

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

The revised requirements are substantially in accordance with Proposal(s) on this subject dated June 12, 2020 and August 21, 2020.

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UL 1838

Standard for Low Voltage Landscape Lighting Systems

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Third Edition

January 13, 2003

This ANSI/UL Standard for Safety consists of the Third edition including revisions through October 30, 2020.

The most recent designation of ANSI/UL 1838 as an American National Standard (ANSI) occurred on October 9, 2020. 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 UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 The requirements in this standard apply to a low-voltage landscape lighting system and components that consist of an isolating type power unit, low voltage cable or flexible cord, and luminaires. The equipment is intended to be installed in accordance with the National Electrical Code, ANSI/NFPA 70, Article 411.

1.2 Landscape lighting power units covered by this standard have a maximum output circuit voltage as specified in Table 2A.1.

1.3 This standard covers power units where each output circuit is rated maximum 25 A and 300 VA.

1.4 This standard covers landscape lighting system luminaires and other system components that are intended for use on circuits rated maximum 25 A 300 VA, and the voltage specified in Table 2A.1.

1.5 The luminaires and low voltage system components covered by this standard are intended for garden, walkway, patio areas, or similar outdoor locations and for certain indoor locations such as atriums and shopping malls. The power units are to be installed indoors or outdoors in accordance with the marking on the product.

1.6 This standard covers luminaires and low voltage system components intended for use submersed in or floating on:

a) portable self-contained fountains; and

b) ponds and other natural and artificially made body of water within the scope of Article 682 “Natural and Artificially Made Bodies of Water” of the National Electrical Code, NFPA 70.

1.7 Throughout this standard, all requirements identified as applicable to luminaires and low voltage system components used submerged in or floating on ponds also apply to luminaires and low voltage system components intended for use in other bodies of water covered by Article 682 of the National Electrical Code, ANSI/NFPA 70. Further, markings, instructions, and other product specific information shall be permitted to refer to one or more bodies of water covered by Article 682 in addition to ponds or instead of ponds.

1.8 The luminaires and low voltage system components covered by this standard are not suitable for use in swimming pools, spas, other bodies of water intended to contain immersed persons, or permanent fountains covered by Part V of Article 680 of the National Electrical Code, ANSI/NFPA 70. Luminaires intended for use in these locations are covered by the Standard for Underwater Luminaires and Junction Boxes, UL 676. Fountains covered by Part V of Article 680 of the National Electrical Code, ANSI/NFPA 70 are permanent, not self-contained, not portable, or exceed 5 feet (1.5 m) in any dimension.

1.9 Fluorescent and high intensity discharge lighting systems will be investigated in accordance with the applicable requirements in this standard and with the applicable requirements in the Standard for Luminaires, UL 1598, as intended.

1.10 Light emitting diode (LED) components and subassemblies, such as drivers, control gear, and LED arrays, shall comply with the applicable requirements of the Standard for Lighting Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750.

2 Glossary

2.1 For the purpose of this standard, the following definitions apply.

2.2 ACCESSIBILITY BARRIER – A material provided to restrict access to:

a) Uninsulated current carrying parts; and

b) Current carrying parts insulated with materials not intended to be subject to user contact. All or part of the barrier is able to serve as an enclosure.

2.2.1 CLASS 1 WIRING METHODS– Wiring methods specified in Chapter 3 of the National Electrical Code, ANSI/NFPA 70.

2.2.2 CLASS 2 CIRCUIT – A circuit supplied by either (a) a transformer complying with the construction and performance requirements for Class 2 transformers in the Standard for Low Voltage Transformers – Part 1: General Requirements, UL 5085-1 and the Standard for Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers, UL 5085-3; or (b) a power unit complying with the construction and performance requirements in the Standard for Class 2 Power Units, UL 1310.

2.3 *Deleted*

2.4 CONNECTOR – A generic term used to refer to an electrical fitting that:

a) Connects the luminaire to the main low voltage cable (also called line-to-luminaire connector); or

b) Is used to extend main low voltage cable (also called line-to-line connector).

2.5 DECORATIVE PART – A part of a product that is present for ornamental purposes only. The product shall meet the requirements of this standard when the decorative part is provided, removed, damaged, or deteriorated to any extent.

2.6 ELECTRICAL FITTING – Any device that supports or encloses uninsulated current carrying parts.

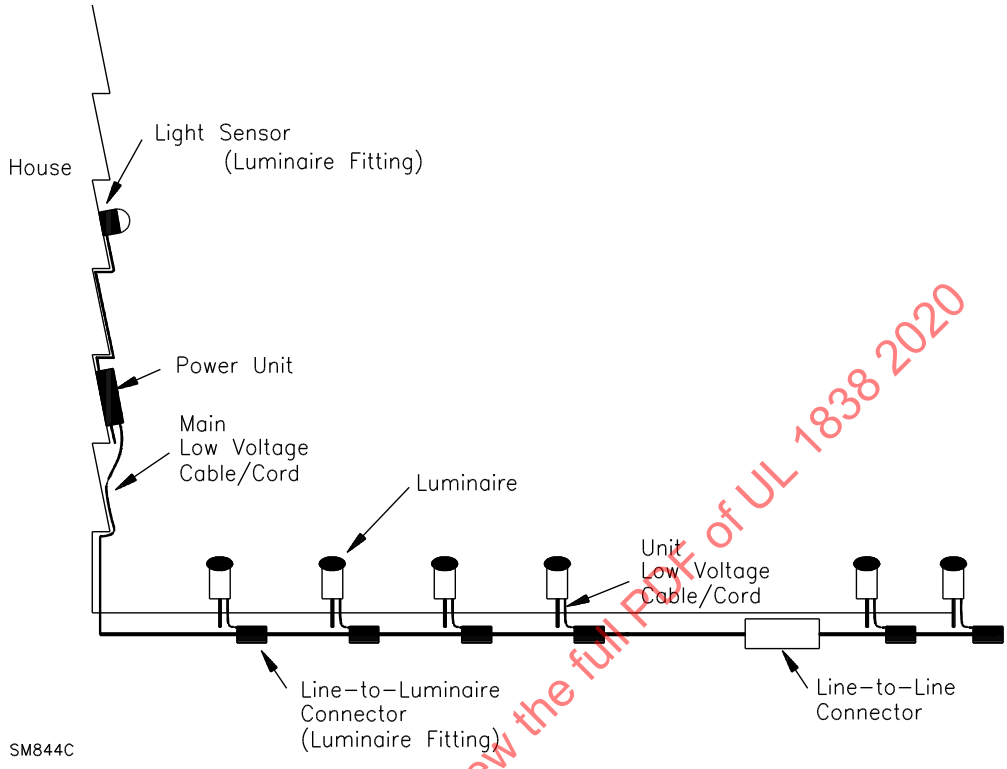
2.7 ELECTRONIC POWER UNIT – Equipment that powers and controls the lamps used for a landscape lighting system and consists of electronic circuits to isolate the secondary from the primary circuit and reduce voltage and limit available power.

2.8 ENCLOSURE – A material provided to enclose electrical parts and components that involves a risk of fire. All or part of the enclosure serves as an accessibility barrier.

2.9 LANDSCAPE LIGHTING SYSTEM – The system consisting of the power unit, luminaire, luminaire fittings, and wiring. See Figure 2.1 for a diagram of a typical landscape lighting system.

Figure 2.1

Typical landscape lighting system



2.10 *Deleted*

2.11 LUMINAIRE – An assembly that consists of the lamps, enclosures, mounting means, luminaire fittings, and the means of connection to unit low voltage cable or the main low voltage cable.

2.12 LUMINAIRE FITTING – An individual component or accessory that is provided with a luminaire or that is electrically or mechanically connected to the power unit.

2.13 OPEN HOLE – An aperture in an enclosure that is not covered or filled by another part. Typically, open holes relate to:

a) Ventilation;

b) Apertures provided for several different constructions that are left unused; and

c) An uncovered aperture provided for making supply connections.

2.14 OPENING – An aperture in an enclosure that is covered or filled by a plug or knockout and that has the potential of becoming an open hole. Typically, openings relate to supply connections and accessibility for inspection of splices.

2.14.1 POND AND SMALL DECORATIVE FOUNTAIN LUMINAIRES AND FITTINGS – Luminaires and fittings intended for underwater or floating use in ponds or small decorative fountains as specified in 1.6 – 1.8.

2.15 POWER UNIT – The equipment that powers and controls the lamps used for the landscape lighting system. A power unit consists of one or more of the following:

a) Transformer or solid-state circuitry to isolate the output circuit from the primary input circuit, reduce voltage and limit available power;

b) Timers, switches, sensors, or similar devices to control the lighting; and

c) Integral overcurrent protection.

2.16 RISK OF ELECTRIC SHOCK – See Section 2A.

2.17 SCREW, SHEET-METAL – A screw with threads having a pitch such that thinner sheet metal is able to be secured by physical fit between successive threads. Self-tapping screws are also known as sheet-metal screws.

2.18 SCREW, THREAD-FORMING – A screw with a tapered end that is criss-cross stamped as shown in Figure 2.2. When screwed into an open hole, the screw forces the sheet-metal around the open hole to expand and form threads. A thread-forming screw will not necessarily follow the same threads if reinserted into the same opening.

Figure 2.2

Thread-forming screw

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2.19 SECONDARY WIRING – Wiring connecting the output of the power unit to the luminaire, including the main low voltage cable and the unit low voltage cable.

2.19.1 SMALL DECORATIVE FOUNTAIN – A decorative, portable, self-contained fountain.

2.20 SPLICE – Any point where one wire is connected to another wire. A wire terminating at a pressure wiring terminal or wire binding screw is not determined to be a splice.

2.21 TERMINAL, INSULATION PIERCING – A terminal having a contact pin that punctures the conductor insulation and is inserted into strands of the conductor. Also an insulation displacement terminal where the insulation is cut and the conductor is positioned between the pins of the terminal.

2.22 WATER BARRIER – All parts such as a lens, luminaire body, gasket, or sealant/adhesive material that are in contact with water under normal use conditions and that, if compromised, would allow water to reach uninsulated parts that pose a risk of electric shock (see Section 2A). A water barrier includes a part not directly isolating water from a dry location but that is relied upon for water barrier integrity, such as a bezel or face/trim ring that bears against a lens that, in turn, bears against/compresses a gasket.

2A Electric Shock

2A.1 An uninsulated conductive part is considered to pose a risk of electric shock when the voltage potential between the part and earth ground or any other accessible part exceeds the values specified in Table 2A.1.

Table 2A.1
Maximum voltage considered not a risk of electric shock, and the maximum permitted output circuit voltage for landscape lighting systems

	Voltage type	Maximum Voltage
1.	Sinusoidal, ac	15 V, rms
2.	Nonsinusoidal, ac	21.2 V, peak
3.	Pure dc [a, b]	30 V
4.	Combinations of dc and sinusoidal ac at frequencies not greater than 100 Hertz	c

[a] If the peak-to-peak ripple voltage generated by an electronic power unit is more than 10 percent of the dc voltage, see footnote c.

[b] DC waveforms interrupted at frequencies between 10 – 200 Hz shall be limited to 12.4 V.

[c] The voltage limit shall be the non-sinusoidal ac limit where the dc voltage is no more than 10.4 V, and shall be (16.5 + 0.45 Vdc) where the dc voltage is between 10.4 and 30 V.

Figure 2A.1

Maximum voltage for combinations of dc and sinusoidal ac voltage at frequencies not greater than 100 hertz

Figure deleted

Table 2A.2
Maximum current considered not a risk of electric shock

Table deleted

Figure 2A.2

Maximum current for combinations of dc and sinusoidal ac current at frequencies not greater than 100 hertz

Figure deleted

3 Components

3.1 Except as indicated in 3.2, 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 used in the products covered by this standard.

3.2 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.

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

3.4 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.

4 Units of Measurement

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

4.2 Unless indicated otherwise all voltage and current values mentioned in this standard are root mean square (rms).

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.

6 Organization and Application

6.1 The standard is organized as follows:

Introduction – This covers general statements and requirements necessary to apply the requirements in the standard.

Part 1 – This part covers the construction, performance, and marking requirements for all power units.

Part 2 – This part covers equipment, including luminaires, low voltage cables, and other system components connected to the output circuit of a power unit.

Part 3 – This part covers luminaires that use tungsten halogen lamps.

Part 4 – This part covers luminaires for ponds and small decorative fountains.

6.2 *Deleted*

6.3 *Deleted*