**Proposal Number: 2018-OA-007**

**Rule 2-022(3) and Appendix B Note**
**Description of Change: Amend requirements for lighting equipment approval**
**Proposed by: Electrical Safety Authority**

**Background:**
CSA standard, C22.2 No. 250.13 Light emitting diode (LED) equipment for lighting specifies that risk of electric shock exists if the open circuit voltage in lighting equipment exceeds the voltages specified in the table below:

| | Maximum voltage | |
|---|---|---|
| **Waveform type*** | **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 |
| dc †‡ | 60 V | 30 V |

This standard requires a unit suitable for wet locations that excides the maximum voltage specified in the table above to meet the environmental tests, be provided with a suitable enclosure and be marked as such.

Requirements specified in CSA standard, C22.2 No. 250.13 are intended to supplement those in other end- product standards (such are standards for luminaire, signs, portable luminaires, swimming pool luminaires, nightlights, landscape lighting systems).

**1.3.1**
LED equipment is utilized in lighting products that comply with the end-product standards listed in this Clause. The requirements specified in this Standard are intended to supplement those in other end-product standards.

**1.3.2**
LED luminaires comply with the following end-product standards:
a) CSA C22.2 No. 207;
b) CSA C22.2 No. 12;
c) CSA C22.2 No. 89;
d) CSA C22.2 No. 141;
e) CSA C22.2 No. 166;
f) CSA C22.2 No. 9;
g) CSA C22.2 No. 250.0;
h) CSA C22.2 No. 256;
i) CSA C22.2 No. 250.7;
j) CSA C22.2 No. 1993;
k) CSA TIL B-31B; and
l) CSA TIL B-39.

Also, CSA standard C22.2 No. 223 Power supplies with extra-low-voltage Class 2 outputs has been updated in 2015 to increase the dc voltage of Class 2 power supply from 42.4 Vdc to 60 Vdc.

**4.14 Maximum output voltage**

**4.14.1**

Between any two output terminations, the maximum voltages under any load condition including no load shall not be more than:

a) peak 42.4 V or 33 + 0.45 x the dc component voltage, up to maximum of 60 V; and
   Note: *This corresponds to a limit of 30 V rms for sinusoidal ac wave form, 42.4 V peak for other wave forms and 60 V continuous dc.*
b) 24.8 V peak for square wave dc interrupted at a rate of 10 to 200 Hz.

**Rationale:**

Based on the requirements in CSA standard, C22.2 No. 250.13 and additional testing required for LED equipment suitable for wet location, even with voltages below the limits of Class 2 power supply, it is important to require that equipment to be certified. The existing Item (b) of Subrule (3) is amended to require decorative light strings, signs, or displays utilizing light-emitting diodes (LEDs) as the light source that are connected to Class 2 power supplies or a limited power supply (LPS) whose voltage and power output does not exceed Class 2 limits, to be approved.

New Item (f) is added to include additional LED lighting equipment (such as swimming pool luminaires, nightlights, landscape lighting systems) based on requirements in CSA standard, C22.2 No. 250.13 that supplement those in other end-product standards. The revised Item (b) and new item (f) are harmonized with CE Code.

The Appendix B note is changed to recognize increased dc voltage limits, 60 Vdc, in the standard for Class 2 power supply. Reference to CSA standard, C22.2 No. 250.13 is provided to support the changes in Subrule (3).

**Proposed Change:**

***Amend Rule 2-022 and Appendix B Note***

**2-022 Sale or use of electrical equipment (see Appendix B)**

(1) No person shall use, advertise, display, sell, offer for sale or for other disposal any electrical equipment unless it has been approved in accordance with Rule 2-024, except as specified in Subrule (2).

(2) Electrical equipment does not require approval

(a) if permission is granted by the inspection department to be displayed or activated for demonstration at a trade show;

(b) except as specified in Subrule (3), where the equipment is connected to the output of

(i) a Class 2 power supply; or

(ii) a limited power supply (LPS) whose power output does not exceed Item (i);

(c) except as specified in Subrule (4), if the equipment is battery operated and portable; or

(d) if the equipment, by design, is intended to be used solely outside of Ontario.

(3) The following equipment is required to be approved when connected to the output of Class 2 or LPS power supply:

(a) luminaires;

(b) decorative lighting strings, signs, or displays ~~utilizing incandescent or halogen lamps~~;

(c) electrical medical equipment;

(d) equipment for hazardous locations as defined under Sections 18 and 20 of this Code; or

(e) equipment that incorporates heating elements.

(f) lighting devices that incorporates light-emitting diodes (LEDs)

(...)

***Amend Appendix B Note to Rule 2-022***

**Rule 2-022**

Class 2 power supplies certified to CAN/CSA-C22.2 No. 223, or both CSA C22.2 No. 66.1 and CSA C22.2 No. 66.3, shall not exceed 100 V•A with the operating voltage not more than 30 V rms, 42.4 V peak, or 60 V dc. ~~or dc (30 V rms)~~. Limited power supply (LPS) is required to be certified to CAN/CSA-C22.2 No. 60950-1.

It is permitted by Subrule (2) that approval is not required for electrical equipment connected to a Class 2 power supply or LPS, if the power supply is not an integral part of the equipment. If the Class 2 power supply or LPS is within a product enclosure, or part of a product, the product is required to be approved in accordance with applicable Canadian Standards as per Subrule (1).

The light source for the luminaire referenced by Subrule (3)(a) and (b) may be an incandescent, halogen, light-emitting diode (LED) lamp or module, or as specified in CSA C22.2 No. 250.0. ~~It is intended by Subrule (3)(b) that decorative light strings, signs, or displays utilizing light-emitting diodes (LEDs) as the light source that are connected to Class 2 power supplies or a limited power supply (LPS) whose voltage and power output does not exceed Class 2 limits are not required to be approved.~~ Based on CSA standard, C22.2 No. 250.13 "Light emitting diode (LED) equipment", there is a risk of electric shock with LED equipment used in wet location even with the output voltages below Class 2 power supply limits. Therefore, it is important for this equipment to be approved to the appropriate standards.

It is intended by Subrule (2)(d) that electrical equipment intended to be used solely outside of Ontario, such as travel adapter plugs for using electrical equipment overseas, does not require approval because there is no applicable standard for Canadian certification.

It is intended by Subrule (4)(a) that battery-operated portable products could become an ignition source in hazardous (classified) locations as explained by Appendix B Note to Rules 18-050 and 18-064.

It is not intended by Subrule (4)(a) to require approval of equipment powered by a maximum of two button cell batteries, such as electronic wristwatches, hearing aids, or calculators, as they are deemed incapable of causing an ignition under normal conditions as per ANSI/ISA-12.12.03.

For battery operated medical devices as defined by the Food and Drugs Act, refer to all approval requirements of Health Canada.