

STANDARD INFORMATION

Standard: CSA E60598-1

Standard ID: Luminaires - Part 1: General Requirements and Tests [CSA E60598-1:2016 Ed.3]

Previous Standard ID: Luminaires - Part 1: General Requirements and Tests (R2012) [CSA E60598-1:2002 Ed.2]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **February 1, 2023**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard.

Overview of Changes:

- Fixing of thermal sensing controls
- Touch current, protective conductor current and electric burn
- Thermal test (abnormal condition) ignitors
- Marking of earths
- Retinal blue light hazard
- Insulation between circuits
- Over voltage protective devices
- Annex M: Access to basic insulation

Specific details of new/revise requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<p>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</p>
3	Info	MARKING
3.2	Info	Marking on luminaires
		<p>Except for type Z attachments, terminations shall be marked to <u>identify live, neutral and earth in case of connection of the luminaire to the supply mains to ensure safe and satisfactory operation.</u></p> <p><u>Symbols, when applied, indicating mains supply terminations shall be according to IEC 60417.</u></p> <p><u>The earthing termination shall be marked by the relevant symbol of IEC 60417 only.</u></p> <p><u>Where terminals are provided in a Class II luminaire for the continuity or termination of an earth conductor such terminals shall be marked with the letter E.</u></p>
3.2.12		<p><u>Leads (tails) used for the connection to extra low voltage d.c. supply, shall be colour coded red to indicate its intended connection to the positive termination, and shall be colour coded black to indicate its intended connection to the negative termination. Fixed terminations, when applied, shall be marked with the "+" sign to indicate the positive connection, and shall be marked with the "-" sign to indicate the negative connection.</u></p> <p><u>Luminaires with supply cords which are not fitted with a plug shall include with the manufacturer's instructions any information necessary to ensure safe connection, e.g. deviations from the national standardised colour coding of the cores where this does not create the possibility of an unsafe situation during installation, use or maintenance.</u></p>
		<p><i>New clause added;</i></p>
3.2.23		<p>Warning symbol "Do not stare at the operating light source" (see Figure 1) for portable and handheld luminaires that have been classified as having a threshold illuminance E_{thr} in accordance with IEC/TR 62778. This marking shall be visible as detailed by condition 'c' of Clause 3.2 and Table 3.1. In addition, the symbol should be positioned so that it can be read without looking into the operating light source. This requirement is applicable only when the E_{thr} is reached at a distance further than 200 mm from the luminaire.</p>



CLAUSE	VERDICT	COMMENT
		<p>For fixed luminaires that have been classified as having a threshold illuminance E_{thr} in accordance with IEC/TR 62778 the manufacturer's instructions provided with the luminaire shall give the following text, where x m is the distance at which the threshold illuminance E_{thr} condition occurs. This requirement is applicable only when the E_{thr} is reached at a distance further than 200 mm from the luminaire.</p> <p>"The luminaire should be positioned so that prolonged staring into the luminaire at a distance closer than x m is not expected".</p> <p>In addition luminaires incorporating light sources that have been classified as having a threshold illuminance E_{thr} condition in accordance with IEC/TR 62778 and which are directly visible during luminaire maintenance shall be marked with the warning symbol "Do not stare at the operating light source" (see Figure 1). This marking shall be visible as detailed by conditions 'a' and 'c' of Subclause 3.2 and Table 3.1.</p>
		<i>New clause added;</i>
3.3.22		For controllable luminaires the classification of insulation that has been maintained between LV supply and control conductors shall be provided. E.g. basic insulation, reinforced insulation.
4	Info	CONSTRUCTION
4.24	Info	Photobiological hazards
		<i>New clause added;</i>
		Retinal blue light hazard
		<p>Luminaires with light sources, where the safety standard does not exclude the lamp from retinal blue light hazard assessment, shall be assessed according to IEC/TR 62778.</p> <p>The use of light sources with a blue light risk group rating greater than RG2 is not expected. Additional more onerous requirements for the management of these types of light sources would need to be applied.</p>
4.24.2		<p>For luminaires using light sources having an RG0 unlimited or RG1 unlimited rating in accordance with IEC/TR 62778, or which have been assessed as RG0 unlimited or RG1 unlimited fully assembled for use, under the same conditions, no requirements for retinal blue light hazard apply.</p> <p>For luminaires having a threshold illuminance E_{thr} assessed in accordance with IEC/TR 62778 the following requirements apply.</p> <p>a) For fixed mounted luminaires, an additional assessment according to IEC/TR 62778 shall be made to find the distance x m between luminaire and the borderline</p>



CLAUSE	VERDICT	COMMENT
		<p>between RG2 and RG1. The luminaire shall be marked and have instructions according to 3.2.23 of this standard.</p> <p>b) Portable and handheld luminaires exceeding RG1 at 200 mm assessed according to IEC/TR 62778 are required to be marked according to 3.2.23 of this standard.</p> <p>Portable luminaires for children, covered by IEC 60598-2-10, and mains socket-outlet nightlights, covered by IEC 60598-2-12, shall not exceed RG1 at 200 mm according to IEC/TR 62778.</p>
		<p><i>New clause added;</i></p> <p>Fixing of thermal sensing controls</p> <p>Any temperature sensing control external to lamp control gear shall not be of the plug-in or an otherwise easily replaceable type. It shall be reliably kept in its specified position with regard to the control gear.</p> <p>Adhesive fixing of temperature sensing controls shall not be used where UV radiation emitted from a lamp could degrade the reliability of the fixing during the life of the luminaire. Temperature sensing controls shall not be mounted outside of the luminaire enclosure.</p> <p>Compliance is checked by inspection and, for temperature sensing controls with adhesive fixing, according to the following test.</p> <p>The temperature sensing control, together with the ballast/transformer to which it is fixed, is subjected to the temperature change test in accordance to IEC 60068-2-14, test Na, according to the following details.</p> <p>The specimen shall be subjected to 100 cycles between the minimum and the maximum values as given below.</p> <p>The maximum temperature is the temperature measured on the adhesive material when the ballast/transformer is loaded by a current equal to 0,95 times the value of the lowest current that causes the protective device to operate in steady state conditions;</p> <p>The minimum test temperature is 0°C.</p> <p>The duration of exposure of the two temperatures is 30 min each.</p> <p>As specified in IEC 60068-2-14, the standard transfer time is between 2 min and 3 min. A transfer time (t₂) of less than 30 s is allowed, if an automatic test system is used.</p>



CLAUSE	VERDICT	COMMENT
		<p>During the test the temperature sensing control shall not undergo any change in fixing impairing its further use, especially with respect to its operating temperature. After the test, the temperature sensing control shall not be detached/moved from its designed position.</p> <p>Transformers complying with IEC 61558 (series) are not subjected to this test.</p> <hr/> <p><i>New section added;</i></p> <p>Insulation between circuits</p>
4.31		<p>Luminaires incorporating transformers or controlgears providing insulation between circuits and luminaire using circuits insulated from a LV supply, shall provide suitable insulation between circuits and between these circuits and the external accessible conductive parts. See standard for details.</p> <hr/> <p><i>New clause added;</i></p> <p>Overvoltage protective devices</p>
4.32		<p>Overvoltage protective devices shall comply with IEC 61643-11. Over voltage protective devices which are external to controlgear and connected to earth, shall be used only in fixed luminaires and connected only to a protective earth</p> <hr/>
8	Info	PROTECTION AGAINST ELECTRIC SHOCK
8.2	Info	Protection against electric shock
		<p>Luminaires shall be so constructed that their live parts are not accessible when the luminaire has been installed and wired as in normal use, and when it is opened as necessary for replacing replaceable light sources or (replaceable) starters, even if the operation cannot be achieved by hand. <u>Basic insulated parts shall not be used on the outer surface of the luminaire without appropriate protection against accidental contact.</u></p> <p><u>Where a protective cover is used over a non-user replaceable light source in accordance with Clause 4.30, the cover shall be left in place during the tests and inspections detailed by this section.</u></p>
8.2.1		<p><u>No access to live parts with the standard test finger is permitted when the luminaire has been installed and/or assembled for normal use and, in addition, under the same conditions:</u></p> <p><u>– for portable, settable and adjustable luminaires, no access to basic insulated parts with the standard test finger is permitted, and</u></p> <p><u>– for other types of luminaires, there shall be no access to basic insulated parts from the outside of the luminaire by means of a Ø,50 mm probe according to Figure 1 in IEC 61032:1997.</u></p> <hr/>



CLAUSE	VERDICT	COMMENT
		<p><u>Lampholders and starterholders, if used in portable, settable and adjustable luminaires and if accessible as specified above, shall comply to the electrical strength test and creepage distance and clearance requirements for double or reinforced insulation.</u></p> <p><u>Basic insulation may be accessible when the luminaire is opened for lamp or starter replacement.</u></p> <p><u>If a component intended for building-in is used on the outside of a fully assembled luminaire which can be touched by the 50 mm sphere, it shall comply with the relevant requirements applied to an independent component (see 1.2.29).</u></p> <p><u>Other than where specifically required, lamps, lampholders and starterholders complying with their own standard are exempt from the requirements of this subclause.</u></p> <p>Protection against electric shock shall be maintained for all methods and positions of installation in normal use with regard to the limitations indicated in the manufacturer's installation instructions, and for all adjustments of settable and adjustable luminaires. Protection shall be maintained after removal of all parts which can be removed by hand, except lamps and the following parts of the lampholders:</p> <ul style="list-style-type: none">a) For bayonet lampholders:<ul style="list-style-type: none">1) domes (terminal covers);2) skirts.b) For Edison screw lampholders:<ul style="list-style-type: none">1) domes (terminal covers) for cord grip types only;2) outer shells. <p>Covers in fixed luminaires that cannot be removed by a single action with one hand are not removed. However, covers which have to be removed for changing lamps or starters are removed for this test.</p> <p>Supply conductors held by screwless terminals with push-button releasing devices shall not be removed for this test.</p> <p>The use of push-button type terminal blocks without the use of a cover is not precluded by this requirement. This is possible as some specific actions are required in order to release wiring from these blocks.</p> <p>Class I and class II luminaires intended for tubular tungsten filament lamps having a cap/base at each end shall incorporate a means of automatic double-pole disconnection operative when the lamp is being changed. This requirement does not apply if the relevant cap and holder combination(s) is (are) covered by</p>



CLAUSE	VERDICT	COMMENT
		<p>standards which incorporate special requirements with regard to accessibility of live parts which may cause an electric shock.</p> <p>The insulating properties of lacquer, enamel, paper and similar materials shall not be relied upon to give the required protection against electric shock and protection against short-circuit.</p> <p>Luminaires with ignitors intended for use with double ended high pressure discharge lamps shall be tested according to Figure 26.</p> <p>If the voltage measured according to Figure 26 exceeds 34 V (peak), the ignitor shall only be active if the lamp is fully inserted, or a warning according to 3.2.18 a) or b) respectively shall be fitted to the luminaire.</p> <p><u>Luminaires for double-capped Fa8 tubular lamps shall comply with the marking requirement of 3.2.18.</u></p>
10	Info	<p>INSULATION RESISTANCE AND ELECTRIC STRENGTH, TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</p> <p>Insulation resistance and electric strength</p> <p>The insulation resistance and the electric strength of luminaires shall be adequate.</p> <p>Compliance is checked by the tests of 10.2.1 and 10.2.2 in the humidity cabinet or the room in which the sample was brought to the prescribed temperature, after reassembly of those parts which may have been removed.</p> <p>The switch, if any, shall be placed in the ON position for all tests, except for tests between live parts which are separated by the action of a switch.</p>
10.2		<p>During these tests, the following components shall be disconnected, so that the test voltages are applied to the insulation of the components, but not to the capacitive or inductive functional elements of these components, as appropriate:</p> <p><u>c) protective impedance device;</u></p> <p><u>When carrying out the electric strength test on luminaires containing electronic control gear, rated lamp circuit voltages greater than the luminaire supply voltage rating may be present. This is indicated by the rating U_{out} marked on the lamp control gear. In these instances, the test voltage applied to parts of the lamp circuit shall be calculated from the U_{out} rating marked on the lamp control gear instead of U, where U is the working voltage.</u></p>



CLAUSE	VERDICT	COMMENT
		<p>Test – Electric strength</p> <p>A voltage of substantially sine-wave form, with a frequency of 50 Hz or 60 Hz and the value specified in Table 10.2, shall be applied for 1 min across the insulation shown in that table.</p>
10.2.2		<p><u>When carrying out the electric strength test on luminaires containing electronic control gear, rated lamp circuit voltages greater than the luminaire supply voltage rating may be present. This is indicated by the rating U_{out} marked on the lamp control gear. In these instances, the test voltage applied to parts of the lamp circuit shall be calculated from the U_{out} rating marked on the lamp control gear instead of U where U is the working voltage.</u></p>
		<p><i>New clause added;</i></p>
		<p>Touch current, protective conductor current and electric burn</p>
10.3		<p>The touch current or protective conductor current that may occur during normal operation of the luminaire shall not exceed the values given in Table 10.3 when measured in accordance with Annex G:</p> <p>Compliance is checked in accordance with Annex G.</p>
		<p><i>New table added;</i></p>
Table 10.3		<p>Limits of touch current or protective conductor current and electric burn</p> <p>See standard for details.</p>
12	Info	ENDURANCE TEST AND THERMAL TEST
12.5	Info	Thermal test (abnormal operation)
		<p>In the test of 12.5.1, none of the temperatures shall exceed the appropriate value given in Tables 12.3, 12.4 and 12.5 by more than 5 °C when the luminaire is operated at its rated ambient temperature t_a. In cases where the temperature of the test enclosure differs from t_a, the difference shall be taken into account when applying the limits given in the table.</p>
12.5.1		<p><u>For lamp control gear subjected to an endurance test duration other than 30 days or 60 days, Equation (2) as specified in Clause 13 of IEC 61347-1 should be used to calculate the maximum temperature which should correspond to the number of days equal to two-thirds of the theoretical endurance test.</u></p> <p><u>(An explanation of the constant S and its use is given in the relevant IEC auxiliary standard.)</u></p>



CLAUSE	VERDICT	COMMENT
		<i>New table added;</i>
Table 12.3		Maximum temperatures under the test conditions of 12.5.1 See standard for details.
		<i>New table added;</i>
Table 12.4		Maximum temperature of windings under abnormal operating conditions and at 110 % of rated voltage for lamp control gear See standard for details.
		<i>New table added;</i>
Table 12.5		Maximum temperature of windings under abnormal operating conditions and at 110 % of rated voltage for lamp control gear marked “D6” See standard for details.
		<i>New annex added;</i>
		Determination of creepage distances and clearances
Annex M		This annex and Table M.1 are to be used in conjunction with the creepage and clearance requirement of Section 11. Note: Annex M was in the previous version of the standard, as an informative annex. In this new edition Annex M is now a normative annex. Review of Annex M is required to determine compliance. See standard for details.