



UL 773

STANDARD FOR SAFETY

Plug-In Locking Type Photocontrols for Use with Area Lighting

UL Standard for Safety for Plug-In Locking Type Photocontrols for Use with Area Lighting, UL 773

Fifth Edition, Dated March 18, 2016

Summary of Topics

This revision of UL 773 dated July 29, 2020 includes adding the reference of UL 60730-1 to cover electronic requirements and UL 746C to cover polymeric materials; [7.4](#), Section [7A](#), [10.1.1](#), [10.2](#), Section [18A](#), and [33.1.1](#).

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 new and revised requirements are substantially in accordance with Proposal(s) on this subject dated April 10, 2020.

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UL 773

Standard for Plug-In Locking Type Photocontrols for Use with Area Lighting

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This UL Standard for Safety consists of the Fifth Edition including revisions through July 29, 2020.

The Department of Defense (DoD) has adopted UL 773 on May 7, 1984. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 These requirements cover light-sensitive control units of the plug-in, locking type, rated 480 V ac or less, for controlling outdoor electric lighting fixtures used for area lighting.

1.2 These requirements also cover receptacle devices equipped electrically and mechanically to receive the light-sensitive control units described in [1.1](#).

1.3 Shorting and open-circuit devices, used as substitutes, where necessary, for the light-sensitive control units described in [1.1](#), are also covered by the requirements in this standard, where applicable.

1.4 These requirements do not cover photoelectric switches, intended for residential, industrial or commercial use, of the non-plug-in, nonlocking type.

2 Components

2.1 Except as indicated in [2.2](#), a component of a product covered by this standard shall comply with the requirements for that component.

2.2 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.

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

2.4 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.

3 Units of Measurement

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

4 Undated References

4.1 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 Glossary

5.1 ACCESSIBLE PART – A part so located that it can be contacted by a person, either directly or by means of a probe or tool.

5.2 CONTROL RECEPTACLE – An outlet device equipped electrically and mechanically to receive a control unit having a standard 3-blade plug configuration.

5.3 CONTROL UNIT – A plug-in, locking type, light-sensitive control device, with a standard 3-blade plug configuration, used with a mating control receptacle for the control of outdoor electric lighting fixtures for area lighting.

5.4 LIVE PARTS – Denotes metal or other conductive parts that have a potential difference with respect to ground or any other conductive part.

5.5 OPEN-CIRCUIT PLUG – A device similar in construction to a shorting plug, but intended to maintain a lighting fixture in the off mode of operation until removed.

5.6 SHORTING PLUG – A plug-in, locking type device, having the same standard 3-blade plug configuration as a control unit and which provides an electrical connection through the control receptacle of an outdoor electric lighting fixture, without performing a control function. A shorting plug is used as a substitute, where necessary, for a control unit and maintains a lighting fixture in the on mode of operation until removed.

CONSTRUCTION

ALL EQUIPMENT

6 General

6.1 The requirements detailed in Sections [7](#) – [10](#) are applicable to all equipment covered by this standard. Requirements applicable to specific equipment only are detailed separately.

7 Insulating Material

7.1 A base for mounting of uninsulated live parts shall be strong, not easily ignited, moisture-resistant and insulating. The base shall be so constructed that, considering the material used, it will withstand the most severe conditions likely to be encountered in service.

7.2 Insulating material, including barriers between parts of opposite polarity and material that may be subject to the influence of the arc formed by the opening of contacts, shall be acceptable for the particular application.

7.3 Vulcanized fiber may be used for insulating bushings, washers, separators, and barriers, but not as the sole support for uninsulated live parts.

7.4 Polymeric materials used to meet the requirements of [7.1](#) and [7.2](#) shall comply with the requirements of UL 746C, Standard for Polymeric Materials – Use in Electrical Equipment Evaluations. Polymeric materials that may be exposed to the outdoor elements and/or subjected to sunlight shall be evaluated or rated for resistance to water absorption and exposure to UV in accordance with the requirements of Section [22](#).

7A Polymeric Enclosures

7A.1 Polymeric material used in the construction of the enclosure shall comply with the requirements under path II (all other portable equipment) of Table 4.1 in UL 746C, Standard for Polymeric Materials – Use in Electrical Equipment Evaluations for the intended purpose and application.

Exception: Polymeric materials used in the Fresnel lens of a control shall have a minimum flame rating of HB where the PWB serves as the barrier to the spread of fire.

8 Corrosion Protection

8.1 Iron and steel parts, except for thermal elements, magnet-pole faces, hardened and polished parts such as latching surfaces, and the like where such protection is impractical, shall be protected against corrosion by enameling, galvanizing, plating, or other equivalent means.

8.2 Phosphate treatment with an oil or wax coating is acceptable as corrosion protection for magnets and armatures; oil treatment is acceptable as corrosion protection for steel springs; and stainless steel is acceptable without additional protection, if properly polished or treated.

8.3 All surfaces of a metal enclosure, and all attached metal parts of an enclosure, shall be protected against corrosion by one of the coatings described in [8.4](#) – [8.6](#), unless the metal is inherently resistant to corrosion. Metals shall not be used in combinations as to cause galvanic action that will adversely affect any part of the device.

8.4 A sheet steel enclosure shall be protected against corrosion by one of the coatings as specified in (a) – (f).

a) Hot-dipped mill galvanized sheet steel conforming with the coating Designation G90 in Table I of ASTM Designation A653/A653M, with not less than 40 percent of the zinc on any side, based on the minimum single spot test requirement in this ASTM Designation. The weight of the zinc coating may be determined by an acceptable method; however, in case of question the weight of coating shall be established in accordance with the test method of ASTM Designation A90.

b) A zinc coating, other than that provided on hot-dipped mill galvanized sheet steel, uniformly applied to an average thickness of not less than 0.00061 inch (0.015 mm) on each surface with a minimum thickness of 0.00054 inch (0.014 mm). The thickness of the coating shall be established by the chromic acid dropping test as described in [8.5](#). An annealed coating shall comply with [8.6](#).

c) A zinc coating conforming with item 1 or 2 and with one coat of an organic finish of the epoxy or alkyd-resin type or other outdoor paint on both surfaces after forming. The acceptability of the paint may be determined by consideration of its composition or by corrosion tests if these are considered necessary.

1) Hot-dipped mill galvanized sheet steel conforming with the coating Designation G60 or A60 in Table I of ASTM Designation A653/A653M, with not less than 40 percent of the zinc on any side, based on the minimum single spot test requirement in this ASTM Designation. The weight of zinc coating may be determined by any acceptable method; however, in case of question the weight of coating shall be established in accordance with the test method of ASTM Designation A90. An A60 (alloyed) coating shall also comply with [8.6](#).

2) A zinc coating, other than that provided on hot-dipped mill galvanized sheet steel, uniformly applied to an average thickness of not less than 0.00041 inch (0.010 mm) on each surface with a minimum thickness of 0.00034 inch (0.009 mm). The thickness of the coating shall be established by the chromic acid dropping test as described in [8.5](#). An annealed coating shall also comply with [8.6](#).

d) A cadmium coating not less than 0.0010 inch (0.025 mm) thick on both surfaces. The thickness of coating shall be established by the chromic acid dropping test as described in [8.5](#).

e) A cadmium coating not less than 0.00075 inch (0.019 mm) thick on both surfaces with one coat of outdoor paint on both surfaces, or not less than 0.00051 inch (0.013 mm) thick on both surfaces with two coats of outdoor paint on both surfaces. The thickness of the cadmium coating shall be established by the chromic acid dropping test as described in [8.5](#) and the paint shall be as specified in (c).

f) Other finishes, including paints, special metal finishes, or combinations of the two may be accepted when comparative tests with galvanized sheet steel (without annealing, wiping or other surface treatment) as specified in (a), indicate they provide equivalent protection. Among the factors which are taken into consideration when evaluating the acceptability of such coating systems are exposure to salt spray, moist carbon dioxide-sulphur dioxide-air mixtures, moist hydrogen sulphide-air mixtures, ultraviolet light, and water.

8.5 The method of determining the thickness of coating by the chromic acid dropping test as specified in (a) – (h).

a) The solution to be used for the chromic acid dropping test is to be made from distilled water and is to contain 200 g/L of chemically pure chromic acid (CrO_3) and 50 g/L of chemically pure concentrated sulphuric acid (H_2SO_4). (The latter is equivalent to 27 mm/L of chemically pure concentrated sulphuric acid, specific gravity 1.84, containing 96 percent of H_2SO_4 .)

b) The test solution is to be contained in a glass vessel, such as a separatory funnel, with the outlet equipped with a stopcock and a capillary tube of approximately 0.025 inch (0.64 mm) inside bore and 5.5 inches (140 mm) long. The lower end of the capillary tube shall be tapered to form a tip, the drops from which are to be about 0.05 mm each. To preserve an effectively constant level, a small glass tube is to be inserted in the top of the funnel through a rubber stopper and its position adjusted so that, when the stopcock is open, the rate of dropping is 100 ± 5 drops per minute. If desired, an additional stopcock may be used in place of the glass tube to control the rate of dropping.

c) The sample and the test solution should be kept in the test room long enough to acquire the temperature of the room, which should be noted and recorded. The test is to be conducted at a room temperature of $70.0 - 90.0^\circ\text{F}$ ($21.1 - 32.0^\circ\text{C}$).

d) Each sample is to be thoroughly cleaned before testing. All grease, lacquer, paint, and other nonmetallic coatings are to be removed completely using an appropriate solvent. Samples are then to be thoroughly rinsed in water and dried with clean cheesecloth. Care should be exercised to avoid contact of the cleaned surface with the hands or any foreign material.

e) The sample to be tested is to be supported from 0.7 to 1 inch (18 to 25 mm) below the orifice, so that the drops of solution strike the point to be tested and run off quickly. The surface to be tested should be inclined about 45 degrees from horizontal.

f) After cleaning, the sample to be tested is to be put in place under the orifice. The stopcock is to be opened and the time in seconds is to be measured with a stop watch until the dropping solution dissolves off the protective metal coating, exposing the base metal. The end point is the first appearance of the base metal recognizable by the change in color at that point.

g) Each sample of a test lot is to be subjected to the test at three or more points, excluding cut, stenciled, and threaded surfaces, on the inside surface and at an equal number of points on the outside surface, at places where the metal coating may be expected to be the thinnest. On enclosures made from precoated sheets, the external corners that are subjected to the greatest deformation may have thin coatings.

h) To calculate the thickness of the coating being tested, select from [Table 8.1](#) the thickness factor appropriate for the temperature at which the test was conducted and multiply by the time in seconds required to expose base metal as specified in (f).

Table 8.1
Coating-thickness factors

Temperature, degrees F (C)	Thickness factors, 0.00001 inch (0.00025 mm) per second	
	Cadmium platings	Zinc platings
70 (21.1)	1.331	0.980
71 (21.7)	1.340	0.990
72 (22.2)	1.352	1.000
73 (22.8)	1.362	1.010
74 (23.3)	1.372	1.015
75 (23.9)	1.383	1.025
76 (24.4)	1.395	1.033
77 (25.0)	1.405	1.042
78 (25.6)	1.416	1.050
79 (26.1)	1.427	1.060
80 (26.7)	1.438	0.070
81 (27.2)	1.450	1.080
82 (27.8)	1.460	1.085
83 (28.3)	1.470	1.095
84 (28.9)	1.480	1.100
85 (29.4)	1.490	1.110
86 (30.0)	1.501	1.120
87 (30.6)	1.513	1.130
88 (31.1)	1.524	1.141
89 (31.7)	1.534	1.150
90 (32.2)	1.546	1.160

8.6 A hot-dipped mill galvanized A60 (alloyed) coating or an annealed coating on sheet steel which is bent or similarly formed or extruded or rolled at edge of holes after annealing shall be additionally painted in the effected area if the process damages the zinc coating. If flaking or cracking of the zinc coating at the outside radius of the bend for formed section is visible at 25 power magnification, the zinc coating is considered to be damaged. Simple sheared or cut edges and punched holes are not required to be additionally protected.

9 Current-Carrying Parts

9.1 Current-carrying parts shall have the mechanical strength and ampacity (current-carrying capacity) needed for the service and shall be of metal that is acceptable for the particular application.

9.2 Except as noted in [9.3](#), uninsulated live parts shall be prevented from turning or shifting in position by methods other than friction between surfaces if such motion may result in reduction of spacings to less than as indicated in [Table 10.1](#).

9.3 A lock washer, properly applied, is generally considered acceptable with respect to the requirement of [9.2](#).

9.4 The security of contact assemblies shall be such as to provide for the continued alignment of contacts.