



UL 514D

STANDARD FOR SAFETY

Cover Plates for Flush-Mounted Wiring Devices

UL Standard for Safety for Cover Plates for Flush-Mounted Wiring Devices, UL 514D

Second Edition, Dated June 28, 2013

Summary of Topics

This revision of ANSI/UL 514D dated May 18, 2023 includes the following changes in requirements:

- Added New Annex [E](#) for Spring-Tensioned Contacts for Illuminated Cover Plates; [5.1](#), [10.1](#), [10.2](#), [B.3.5](#) and [B.3.6](#)***
- Cover Plate Material (Nonmetallic) over the Face of a Receptacle; [4.3](#), [4.6](#), [5.1.5](#) and [5.5.6](#)***
- Clarification that Hot Wire Ignition method or the Glow-Wire Resistance Test are acceptable and that conducting both is not required; [7.3.1](#) – [7.3.13](#), Annex [A](#)***
- Spray Direction When Performing the Resistance to Moisture Tests Specified in Clauses 8.1.9 and 8.1.10 for Outlet Box Hoods Used with Raceway Supported Enclosures; [8.1.7](#)***
- Exposed Surface Areas of Hoods Do Not Have to have Flats to be Eligible for Impact Tests; [8.9.1.1A](#)***
- Increase in products that this standard does not apply to; [1.5](#)***

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 October 7, 2022 and March 3, 2023.

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This UL Standard for Safety consists of the Second Edition including revisions through May 18, 2023. The most recent designation of ANSI/UL 514D as an American National Standard (ANSI) occurred on May 18, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), and Preface.

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Preface

This is the harmonized CSA Group and ULSE standard for Cover Plates for Flush-Mounted Wiring Devices. It is the Second edition of CSA C22.2 No. 42.1 and the Second edition of UL 514D. This edition of CSA-C22.2 No. 42.1 supersedes the previous edition(s) published in 2000. This edition of UL 514D supersedes the previous edition(s) published in 2000. This harmonized standard has been jointly revised on May 18, 2023. For this purpose, CSA Group and ULSE are issuing revision pages dated May 18, 2023.

This harmonized standard was prepared by CSA Group and ULSE. The efforts and support of the Technical Harmonization Subcommittee, 23BC, Wiring Devices of the Council on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This Standard was reviewed by the CSA Integrated Committee on Wiring Devices under the jurisdiction of the CSA Technical Committee on Wiring Products and the CSA Strategic Resource Group, and was approved by the CSA Technical Committee. This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of harmonization

This standard is published as an identical standard for CSA Group and ULSE.

An identical standard is a standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations. Presentation is word for word except for editorial changes.

Reasons for differences from IEC

This binational standard is not based on an IEC standard or IEC requirements. The Technical Harmonization Committee identified two main reasons the requirements in this standard were not harmonized with IEC requirements. First, for some products and assemblies covered by this standard, there are no corresponding IEC standards covering the specific products only. Instead, IEC requirements for these products are included under several separate IEC standards. The time required to research and identify specific requirements in each of the relevant IEC correlating standards would inhibit the completion of the harmonization project in a reasonable time period, and would negate the benefit of having harmonized North American requirements available presently.

The second reason for not harmonizing with IEC requirements is that the IEC standards specify different product and assembly configurations and installation requirements, that are not compatible with the North American product and assembly configurations and installation specifications.

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Cover Plates for Flush-Mounted Wiring Devices

1 Scope

1.1 This standard applies to metallic and nonmetallic cover plates and associated gaskets for flush-mounted wiring devices intended for installation in accordance with the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part I, CSA C22.1, General Requirements – Canadian Electrical Code, Part II, CSA C22.2 No. 0-10.

1.2 This standard also applies to outlet box hoods that are either integral or not integral with a cover plate for flush-mounted wiring devices.

1.3 This standard also applies to cover plates for flush-mounted wiring devices intended for use in marine applications in accordance with the applicable requirements of the United States Coast Guard and the Canadian Coast Guard; IEEE Recommended Practice for Electrical Installation on Shipboard, IEEE 45; the American Boat and Yacht Council; and the Standard for Pleasure and Commercial Motor Craft, NFPA 302.

1.4 This standard also applies to illuminating cover plates for flush-mounted wiring devices.

1.5 This standard does not apply to:

- a) telephone wall plates;
- b) cover plates and associated gaskets intended for use in hazardous (classified) locations as defined in the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part I, CSA C22.1;
- c) backplates, backplates intended to support live parts, or docking plates intended to support live parts;
- d) box partition; or
- e) cover plates or outlet box hoods intended to provide direct support of live parts, or parts that may become energized.

2 Normative References

2.1 For undated references to Standards, such reference shall be considered to refer to the latest edition and all revisions to that edition up to the time when this Standard was approved. Products covered by this standard shall comply with the referenced installation codes and standards noted in this clause.

In case where the editions listed below are amended, replaced by new editions, or superseded by another standard during the life of this referencing Standard, it is the responsibility of the users of this Standard to investigate the possibility of applying those amendments, new editions, or superseding standards.

CSA Group Standards

C22.1-12
Canadian Electrical Code, Part I

CSA C22.2 No. 0-10
Canadian Electrical Code, Part II

C22.2 No. 0.15-01 (R2012)
Adhesive Labels

CAN/CSA-C22.2 No. 0.17-00 (R2009)
Evaluation of Properties of Polymeric Materials

C22.2 No. 42-10
General Use Receptacles, Attachment Plugs, and Similar Wiring Devices

C22.2 No. 43-08
Lampholders

CAN/CSA-C22.2 No. 94.2-07 (R2012)
Enclosures for Electrical Equipment, Environmental Considerations

C22.2 No. 182.2-M1987 (R2009)
Industrial Locking Type, Special Use Attachment Plugs, Receptacles and Connectors

C22.2 No. 256-05 (R2010)
Direct Plug In Night Lights

UL Standards

UL 50E
Enclosures for Electrical Equipment, Environmental Considerations

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

UL 157
Gaskets and Seals

UL 496
Lampholders

UL 498
Attachment Plugs and Receptacles

UL 746A
Polymeric Materials – Short Term Property Evaluations

UL 746B
Polymeric Materials – Long Term Property Evaluations

UL 746C
Polymeric Materials – Use in Electrical Equipment Evaluations

UL 969
Marking and Labeling Systems

UL 1332
Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment

UL 1786

Direct Plug In Nightlights

UL 8750

Light Emitting Diode (LED) Equipment For Use In Lighting Products

ASME¹ Standard

B94.11

Twist Drills, Straight Shank and Taper Shank Combined Drills, and Countersinks

ASTM² Standards

B117

Standard Method of Salt-Spray (Fog) Testing

D573

Standard Test Method for Rubber Property – Durometer Hardness

D1654

Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

D2240

Standard Test Method for Rubber – Deterioration in an Air Oven

G151

Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G153

Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G155

Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

IEEE³ Standard

IEEE 45

Recommended Practice for Electric Installations on Shipboards

ISO⁴ Standards

ISO 4892-1

Plastics – Methods of Exposure to Laboratory Light Sources – Part 1: General Guidance

ISO 4892-2

Plastics – Methods of Exposure to Laboratory Light Sources – Part 2: Xenon-Arc Lamps

Note: ISO 4892-1 and ISO 4892-2 are considered equivalent to ASTM G151, G153 and G155.

ISO 9227

Corrosion Tests in Artificial Atmospheres – Salt Spray Tests

Note: The neutral salt spray (NSS) test in ISO 9227 is considered equivalent to ASTM B117.

NEMA⁵ Standard

WD6

Wiring Devices – Dimensional Requirements

NFPA⁶ Standard

NFPA 70

National Electrical Code

NFPA 302

Fire Protection Standard for Pleasure and Commercial Motor Craft

¹ American Society of Mechanical Engineers

² American Society for Testing and Materials

³ Institute of Electrical and Electronics Engineers

⁴ International Organization for Standardization

⁵ National Electrical Manufacturers Association

⁶ National Fire Protection Association

3 Terms and Definitions

3.1 Cover plate for flush-mounted wiring devices – a cover intended to close the flush-device box and cover the edges of the wall opening in which the box is located. The cover is either a blank plate or a plate intended to be fastened directly to a wiring device. See [Figure 1](#).

Note: In this standard, the term "cover plate" refers to "cover plate for flush-mounted wiring devices."

3.2 DEVICE: A unit of an electrical system that is intended to carry, not utilize, electrical energy.

3.3 DRIPPROOF: A designation of a marine-use product that is constructed or so protected that falling drops of liquid or solid particles striking the enclosure, from 0 – 15° downward from vertical, do not interfere with the intended operation of the equipment.

3.4 ELASTOMER: Rubber or any polymer that has properties similar to those of rubber (also referred to as solid elastomer in this standard).

3.5 FLUSH-DEVICE BOX: A box with provision for mounting one or more flush wiring devices.

3.6 OUTLET BOX HOOD: A product intended to fit over a cover plate for flush-mounted wiring devices, or an integral component of an outlet box or cover plate for flush-mounted wiring devices. The hood does not serve to complete the electrical enclosure; it reduces the risk of water coming in contact with electrical components housed within, such as attachment plugs, current taps, surge protective devices, direct plug-in transformer units, or wiring devices.

3.7 OUTLET BOX HOOD, REATTACHABLE: An outlet box hood that comes off without damage under a degree of force and can be reattached without the use of tools.

3.8 OUTLET BOX HOOD, RETRACTABLE: An outlet box hood that can be either in the extended position (when in use) or in the retracted position (when not in use).

3.9 RECEPTACLE: One or more female contact devices on the same yoke installed at an outlet for the connection of one or more attachment plugs.

3.10 RECEPTACLE, DUPLEX: Two female contact devices on the same yoke installed at an outlet for the connection of two attachment plugs.

3.11 RECEPTACLE, FLUSH: A receptacle provided with means for flush mounting on a standard flush-device box or cover plate.

3.12 RECEPTACLE, ISOLATED GROUND: A receptacle having the grounding terminal electrically isolated from the means to which it is mounted.

3.13 RECEPTACLE, SINGLE: One female contact device with no other contact device on the same yoke installed at an outlet for the connection of one attachment plug.

3.14 WATERTIGHT: A designation of a marine-use product that is constructed to prevent water from entering the enclosure under any condition other than submersion.

4 General Requirements

4.1 A component of a product covered by this standard shall comply with the requirements for that component.

4.2 The values given in SI (metric) units shall be normative. Any other values given shall be for information purposes only.

4.3 A cover plate or outlet box hood that is used with a receptacle shall not hinder the complete seating of an attachment plug of the type intended for use with the receptacle.

Exception: A kit or assemblies encompassing receptacles and nonmetallic faceplates that cover the receptacle face, where the plate cannot be installed on any other receptacle is permitted, provided all of the following conditions are met:

- a) The receptacle and cover shall be produced by the same manufacturer and evaluated as an assembly,
- b) The assembly shall be evaluated for compliance to requirements in this Standard, and also the Standard for Attachment Plugs and Receptacles, UL 498;
- c) The receptacle and cover shall be permanently attached or uniquely constructed by employing two keying methods to prevent securement of the non-metallic cover to any other receptacle; and
- d) The assembly shall be marked in accordance with [5.1.5](#), and provided with installation instructions in accordance with [5.5.6](#).

4.3A An outlet box hood that is intended for use with receptacles of 15 and 20 A in a wet location and marked according to either option in Clause [5.3.4](#), shall be of the extra-duty type and shall be marked in accordance with Clause [5.3.8](#).

4.4 A cover plate intended for use with a flush-mounted wiring device of the dimensions specified in ANSI/NEMA WD6 shall have cover plate dimensions that comply with ANSI/NEMA WD6 for features intended to accommodate the flush-mounted wiring device.

4.5 In applying the appropriate requirements in this standard, consideration shall be given to parts of assemblies as described in [Figure 1](#).

4.6 The cover plate may be constructed of one or more parts to complete the kit or assembly.

5 Marking and Instructions

5.1 General marking

Advisory Note: In Canada, there are two official languages, English and French. Annex D lists acceptable French translations of the markings specified in this standard. All markings required by this standard might have to be in other languages to conform with the language requirements where the product shall be used.

5.1.1 A cover plate or outlet box hood shall be plainly marked with the manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product is identified. The catalog number or an equivalent designation shall appear on the product, the smallest unit shipping carton, or other container in which the product is packaged.

5.1.2 In the case of a manufacturer that produces or assembles products at more than one factory, each finished product shall have a distinctive marking to identify it as a product of a particular factory.

5.1.3 A product that has been evaluated for environmental conditions shall be marked with the environmental type number or numbers, as specified in UL 50E and CAN/CSA C22.2 No. 94.2, indicating the external conditions for which it is rated.

5.1.4 All required markings shall be permanent and legible. The following types of markings or the equivalent are determined to be permanent:

- a) etched;
- b) molded;
- c) die-stamped;
- d) paint stenciled; or
- e) indelibly stamped on a pressure-sensitive label secured by adhesive and complying with UL 969 and CSA C22.2 No. 0.15 of a type appropriate for the application.

5.1.5 Assemblies encompassing receptacles and nonmetallic covers of the construction described in the Exception to [4.3](#), but which are not permanently attached receptacle/cover assemblies, shall be clearly and indelibly marked "CAUTION – Risk of Electric Shock or Fire Replace Receptacle only with Receptacle Model/Catalog Number _____", "Replace Receptacle only with Manufacturer's Specified Direct Replacement Receptacle (as Identified on Receptacle)" or the equivalent. The wording in parentheses is optional.

5.2 Marking for gaskets intended for use with cover plates in dry locations to reduce the flow of environmental air

5.2.1 A gasket that is not packaged with a cover plate shall be plainly marked with the manufacturer's name or identification.

5.2.2 The smallest unit shipping carton or other container in which a gasket is packed shall be marked as follows:

- a) For Use in Dry Locations Only;
- b) CAUTION;
- c) Risk of Fire; and
- d) Do Not Use With Dimmers.

5.3 Markings for cover plates and outlet-box hoods for use in wet and damp locations

5.3.1 The required markings in Clauses [5.3.2](#) to [5.3.6](#) shall be located where visible after installation. When a cover plate and an outlet box hood are shipped together, the markings required in Clauses [5.3.2](#) to [5.3.4](#) shall be placed on the cover plate, outlet box hood, or both.

5.3.2 A cover plate for use in wet locations shall be marked "Wet Locations." The cover plate may be additionally marked "Damp Locations."

5.3.3 A cover plate for use in wet locations only with the cover closed, shall be marked "Wet Location Only When Cover Closed" or the equivalent. The cover plate may be additionally marked "Damp Locations."

5.3.4 An outlet box hood for use in wet locations shall be marked (see Clause [8.1.2](#)) either:

- a) "Wet Locations" or the equivalent; or
- b) "Wet Locations Only When Hood Closed" or the equivalent.

An outlet box hood for use in wet locations may be additionally marked "Damp Locations."

5.3.5 An outlet box hood marked in accordance with Clause [5.3.4](#) (b), having a reattachable hood and tested according to Clauses [8.9.1.3](#) and [8.10.1.2](#), shall be additionally marked "Reattachable".

5.3.6 A cover plate or outlet box hood for use in damp locations only shall be marked "Damp Locations."

5.3.7 A cover plate or outlet box hood that complies with the performance requirements for the resistance to moisture test specified in Clause [8](#) due to its mounting orientation shall be marked with the proper mounting orientation. The marking is not required for products intended to be mounted with the hinge at the top.

5.3.8 An outlet box hood that is intended for use with receptacles of 15 and 20 A in a wet location shall be marked "Extra-Duty." Other outlet box hoods that comply with the applicable requirements in Clauses [8.9.1.4](#), [8.9.2](#), [8.9.3](#), [8.10.2](#), and [8.10.3](#) may be marked "Extra-Duty."

5.3.9 The smallest unit shipping carton for parts and installation materials for wet and damp location use that are shipped separately in bulk shall be marked "For Original Equipment Manufacturer Use Only," or the equivalent.

5.4 Markings for marine use

5.4.1 The cartons used to ship marine-use products, or the shipping labels, shall be marked "Rated For Marine Use," or the equivalent.

5.4.2 The product or the smallest unit shipping carton in which it is packed shall be marked with the terms "Watertight" or "Dripproof," as applicable.

5.5 General installation instructions

5.5.1 Cover plates for flush-mounted wiring devices and outlet box hoods shall be provided with legible instructions pertaining to proper assembly and installation.

5.5.2 All parts required for compliance with the applicable resistance to moisture requirements in Clause [8.1](#) shall be provided in a single unit carton with installation and assembly instructions, except as permitted in Clauses [5.5.3](#) and [5.5.4](#).

5.5.3 Parts that function to exclude water and installation material shipped separately from other parts of the assembly shall comply with Clause [5.5.2](#) when:

- a) the parts and installation material are specified in the installation instructions;
- b) the part is not a gasket that functions to exclude water; and
- c) the sealing compound is clearly and specifically identified in the installation instructions.

5.5.4 Parts and installation materials may be shipped separately in bulk when the smallest unit shipping carton is marked in accordance with Clause [5.3.9](#). At least one set of installation and assembly instructions shall be provided with the smallest unit shipping carton.

5.5.5 With reference to Clause [5.5.1](#), the installation instructions shall specify the appropriate mounting surface or surfaces and sealing method and indicate whether or not the outlet box hood or cover plate is intended for use with a box that is raceway supported.

5.5.6 Assemblies encompassing receptacles and nonmetallic receptacle covers that employ a construction as described in the Exception to 4.3 shall be provided with installation instructions for replacing the receptacles that include specific replacement receptacle specifications. The instructions shall also contain the following: "CAUTION – Risk of Electric Shock or Fire – Replace Receptacle only with Receptacle Model/Catalog Number _____", "Replace Receptacle only with Manufacturer's Specified Direct Replacement Receptacle (as Identified on Receptacle)" or the equivalent. The wording in parentheses is optional.

6 Metallic Cover Plates and Outlet Box Hoods

6.1 General

6.1.1 An opening for a receptacle shall be such that the face of the receptacle projects a minimum of 0.38 mm (0.015 inches) outside the outer plane of the opening. The receptacle used to determine compliance with this requirement shall comply with the receptacle dimension requirements in NEMA WD6 and in CSA C22.2 No. 42, CSA C22.2 No. 182.2, or UL 498.

6.1.2 The material thickness of a cover plate shall not be less than 0.76 mm (0.030 inches) for ferrous metal (including stainless steel) or 1.0 mm (0.040 inches) for nonferrous metal.

6.2 Corrosion protection

6.2.1 General

6.2.1.1 All ferrous metal surfaces shall have corrosion protection. The thickness of the coating on screws and on interior surfaces not accessible to a 19.1 mm (0.75 inches) diameter ball is not specified. The presence of a coating shall be determined by visual inspection.

6.2.1.2 With reference to Clause [6.2.1.1](#), stainless steel having a chromium content of not less than 16 percent is not required to be so protected.

6.2.1.3 With reference to Clause [6.2.1.1](#), cut edges and punched holes in a surface formed from galvanized stock are not required to be so protected.

6.2.1.4 With reference to Clause [6.2.1.1](#), spot or projection welds are not required to be protected, other than by a protective coating, as determined by visual inspection.

6.2.2 Zinc coatings

6.2.2.1 A zinc coating on an interior surface shall have an average thickness not less than 0.0038 mm (0.00015 inches) and a minimum thickness not less than 0.003 mm (0.0001 inches). A zinc coating on an exterior surface shall have an average thickness not less than 0.013 mm (0.0005 inches) and a minimum thickness not less than 0.0102 mm (0.0004 inches).

6.2.2.2 The thickness of a zinc coating on three samples of cover plate or outlet box hood shall be determined by the metallic coating thickness test specified in Clauses [6.2.2.3](#) to [6.2.2.11](#) or by an equivalent nondestructive test method. When a test method other than the test in Clauses [6.2.2.3](#) to [6.2.2.11](#) is used, the test in Clauses [6.2.2.3](#) to [6.2.2.11](#) shall be used whenever referee measurements are required.

6.2.2.3 The solution used for the test shall be made from distilled water and shall contain 200 g/L of American Chemical Society (ACS) reagent grade chromic acid (CrO_3) and 50 g/L of ACS reagent grade concentrated sulfuric acid (H_2SO_4). The latter is equivalent to 27 mL/L of reagent grade concentrated sulfuric acid, specific gravity 1.84, containing 96 percent of H_2SO_4 .

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

6.2.2.5 The samples and the test solution shall be kept in the test room long enough to acquire the temperature of the room, which shall be noted and recorded. The test shall be conducted at an ambient temperature of $21.0 - 32.0^\circ\text{C}$ ($70.0 - 90.0^\circ\text{F}$).

6.2.2.6 Each sample shall be cleaned before testing. All grease, lacquer, paint, and other nonmetallic coatings shall be removed completely by means of solvents. Samples shall then be thoroughly rinsed in water and dried with a clean cloth. Care shall be exercised to avoid contact of the cleaned surface with the hands or any foreign matter.

6.2.2.7 The sample to be tested shall be supported 17.8 mm – 25.4 mm (0.7 inches – 1.0 inches) below the orifice, so that the drops of solution strike the point to be tested and run off quickly. The surface to be tested shall be inclined 45° from the horizontal.

6.2.2.8 After cleaning, the sample to be tested shall be put in place under the orifice. The stopcock shall be opened and the time in seconds shall be measured until the dropping solution dissolves the protective metallic coating, exposing the base metal. The end point shall be the first appearance of the base metal, recognizable by the change in color.

6.2.2.9 Each sample shall 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 metallic coating is expected to be the thinnest.

6.2.2.10 To calculate the thickness of the coating being tested, use [Table 1](#) to specify the thickness factor appropriate for the temperature at which the test was conducted, multiply by 0.0003 mm (0.00001 inches), and then multiply by the time in seconds required to expose the base metal as measured in [Clause 6.2.2.8](#).

6.2.2.11 The average zinc coating thickness shall be determined by averaging all readings on the three tested surfaces.

6.2.3 Coatings other than zinc

6.2.3.1 A cover plate or outlet box hood intended for use in wet locations shall comply with [Clauses 6.2.3.4 to 6.2.3.15](#). A cover plate or outlet box hood not intended for use in wet locations shall comply with [Clauses 6.2.3.7 to 6.2.3.15](#).

6.2.3.2 Fifty specimens of 102 mm x 305 mm (4 in x 12 inches) steel panels shall be prepared with the corrosion protection system. The thickness of the specimens is not specified. In the event steel panels are not available, the specimens shall be constructed of the finished product. Thirty specimens shall be tested. The additional specimens shall be used in case of damage to the original specimens during preparation or handling.

6.2.3.3 The edges or bare surfaces of all panels or finished products shall be covered with moisture-resistant tape or compound. Half of the specimens to be exposed shall be scribed in accordance with ASTM D1654. The specimens shall be free of grease or dirt. The coating thickness of each specimen shall be measured prior to exposing them to the test environments.

6.2.3.4 When subjected to the resistance to ultraviolet light and water test requirements in accordance with [Clause 6.2.3.5 to 6.2.3.6](#):

a) the average creeping distance of corrosion products from the scribe of a scribed specimen shall not be greater than Rating No. 6 [1.6 mm – 3.2 mm (1/16 inches – 1/8 inches)] as designated in Procedure A, Method 2 of ASTM D1654 with maximum isolated spot not exceeding 9.5 mm (3/8 inches). There shall not be visual evidence of pitting of the substrate and only the beginning of a buildup of corrosion products beneath the coating uplifted from the scribe of a scribed specimen; and

b) an unscribed specimen shall not show base metal corrosion or any blisters.

6.2.3.5 Three scribed and three unscribed specimens shall be exposed to ultraviolet light and water according to ISO 4892-2.

Note 1: General guidance is provided in ISO 4892-1.

The samples shall be exposed for 500 hours to xenon-arc, method A. There shall be continuous exposure to light and intermittent exposure to water spray. The cycle shall consist of 102 minutes without water spray and 18 minutes with water spray. The apparatus shall operate with an air or water-cooled xenon-arc lamp, borosilicate glass inner and outer optical filters, a spectral irradiance of 0.35 W/(m²·nm) at 340 nm and a black-panel temperature of (65 ±3)°C.

Note 2: Consideration should be given to prior evaluations using twin enclosed carbon-arc, Type DH, in accordance with ASTM G151 and ASTM G153, Method 1, specimens tested for exposure for a total of 360 hours as being equivalent to this test.

Note 3: Consideration should be given to prior evaluations using xenon arc in accordance with ASTM G151 and ASTM G155 as being equivalent to this test.

6.2.3.6 When subjected to the neutral salt spray (fog) test requirements in accordance with Clauses [6.2.3.7](#) to [6.2.3.9](#):

a) the average creeping distance of corrosion products from the scribe of a scribed specimen shall not be greater than Rating No. 5 [3.2 mm – 4.8 mm (1/8 in – 3/16 inches)] as designated in Procedure A, Method 2, of ASTM D1654 with maximum isolated spot not exceeding 9.5 mm (3/8 inches); and

b) an unscribed specimen shall not show more than a light corrosion beneath the coating system, with no visual pitting of the substrate and only the beginning of a buildup or weeping of corrosion products.

6.2.3.7 Six scribed and six unscribed specimens of each coating system shall be conditioned for 240 hours at a temperature of $87 \pm 2^{\circ}\text{C}$ ($189 \pm 4^{\circ}\text{F}$) in an air-circulating oven.

6.2.3.8 Six as-received and six air-oven conditioned specimens shall be exposed to the neutral salt spray (fog). Three of the as-received and three of the air-oven conditioned specimens shall be scribed as described in Clause [6.2.3.3](#).

6.2.3.9 The specimens shall be exposed to neutral salt spray (NSS) for 600 h in accordance with ISO 9227.

Note: Consideration should be given to prior evaluations using salt spray according to ASTM B117 as being equivalent to this test.

6.2.3.10 When subjected to the resistance to the moist carbon dioxide-sulfur dioxide-air test requirements in accordance with Clauses [6.2.3.11](#) to [6.2.3.14](#):

a) the average creeping distance of corrosion products from the scribe of a scribed specimen shall not be greater than Rating No. 6 [1.6 mm – 3.2 mm (1/16 in – 1/8 inches)] as designated in Procedure A, Method 2, of ASTM D1654 with maximum isolated spot not exceeding 9.5 mm (3/8 inches); and

b) an unscribed specimen shall not show more than a light corrosion beneath the coating system, with no visual pitting of the substrate and only the beginning of a buildup or weeping of corrosion products.

6.2.3.11 Six scribed and six unscribed specimens of each coating system shall be conditioned for 240 hours at a temperature of $87 \pm 2^{\circ}\text{C}$ ($189 \pm 4^{\circ}\text{F}$) in an air-circulating oven.

6.2.3.12 Six as-received and six air-oven conditioned specimens shall be exposed to the moist carbon dioxide-sulfur dioxide-air. Three of the as-received and three of the air-oven conditioned specimens shall be scribed as described in Clause [6.2.3.3](#).

6.2.3.13 The specimens shall be exposed to a mixture consisting of moist carbon dioxide-sulfur dioxide-air for 1200 hour. The apparatus used for this exposure shall consist of a chamber having a volume of at least 0.085 m^3 (3 feet³) with a water jacket and thermostatically controlled heater to maintain a temperature of $35 \pm 2^{\circ}\text{C}$ ($95 \pm 4^{\circ}\text{F}$).

6.2.3.14 The carbon dioxide and sulfur dioxide shall be supplied to the test chamber from commercial cylinders containing the gases under pressure. An amount of carbon dioxide equivalent to 1 percent of the volume of the test chamber and an equal volume of sulfur dioxide shall be introduced into the chamber each working day. Prior to introducing the new charge of gas each day, the remaining gas-air mixture from

the previous day shall be purged from the chamber. A small amount of water shall be maintained at the bottom of the chamber for humidity. This water shall not be changed during the exposure. The specimens shall be supported in plastic racks at an angle of 15° from the vertical.

6.2.3.15 A polymeric material used as a coating other than zinc coating shall be subjected to identification of the compound using infrared spectroscopy (IR), thermogravimetric analysis (TGA), and differential scanning calorimetry (DSC) in accordance with UL 746A or CSA C22.2 No. 0.17. A compound that has been subjected to a separate identification investigation need not be re-identified.

An organic material used as a coating other than zinc coating shall be subjected to identification of the compound using infrared spectroscopy (IR) in accordance with UL 1332. A compound that has been subjected to a separate identification investigation need not be re-identified.

6.3 Bonding

6.3.1 A cover plate or outlet box hood shall have provision for bonding to ground. Using the cover plate mounting means to accomplish this bonding shall comply with the requirement.

7 Nonmetallic cover plates and outlet box hoods

7.1 General

7.1.1 An opening for a receptacle shall be such that the face of a receptacle is flush with or projects from the outer plane of the opening in the cover plate. The receptacle used to determine compliance with this requirement shall comply with the receptacle dimension requirements in NEMA WD6 and in CSA C22.2 No. 42, CSA C22.2 No. 182.2, or UL 498.

7.1.2 Tests conducted on a blank cover plate shall represent a line of cover-plate configurations of the same or greater dimensions. When a blank cover plate is not available in a line of cover plates, tests conducted on a device plate having the least device opening area of the available configurations shall comply with the requirement. When testing a device plate to the requirements of [Clauses 7.5 and 7.6](#), the device opening shall be filled in with a material having a resistance to heat or flaming equal to or greater than that of the plate material – for example, sodium silicate. For the mechanical strength test specified in [Clause 7.8](#) and the deformation resistance test specified in [Clause 7.10](#), a single gang cover plate intended for mounting to standard duplex receptacles shall represent a line of cover plates.

7.1.3 For the mold stress relief test specified in [Clause 7.9](#), a blank cover plate shall represent a line of cover plates of the same outside dimensions. A cover plate of phenolic or urea composition with a minimum thickness of 2.54 mm (0.1 inches) is not required to be tested.

7.2 Relative thermal index

7.2.1 A polymeric material that is used for a cover plate or outlet box hood shall have a relative thermal index electrical of 80°C, mechanical impact of 60°C, and mechanical strength (without impact) of 80°C minimum. The relative thermal index shall be determined in accordance with the method for relative thermal index, based upon long-term thermal-aging programs, described in UL 746B and CSA-C22.2 No. 0.17.

7.3 Resistance to ignition tests for cover plates

7.3.1 *Deleted*

7.3.2 *Deleted*

7.3.3 Deleted

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7.3.8 The resistance to ignition tests for cover plates shall be conducted using finished cover plates or samples of material representative of finished cover plates. Testing both the finished cover plates and cover plate material samples is not required. Therefore when required, only one of the resistance to ignition tests, either the glow-wire resistance to ignition test or the hot-wire resistance to ignition, is to be conducted.

7.3.9 A finished cover plate shall not ignite in less than 30 seconds when tested for glow-wire resistance to ignition as described in [7.3.10](#).

7.3.10 To test a sample of the material of the cover plate, two 12.7 mm x 127 mm (0.50 x 5.0 inches) specimens of the material in sheet form, having a thickness not more than the minimum thickness used for the cover plate, shall be tested in accordance with the requirements for glow-wire resistance to ignition described in UL 746A or CSA-C22.2 No. 0.17. To test a finished sample of the cover plate, the cover plate shall be tested in accordance with the glow-wire end-product test in UL 746A or CSA-C22.2 No. 0.17.

7.3.11 A finished cover plate of phenolic or urea composition with a minimum thickness of 2.54 mm (0.1 inches) is not required to be tested.

7.3.12 A polymeric material sample, representing a cover plate, shall not ignite in less than 15 seconds when tested for hot-wire resistance to ignition as described in [7.3.13](#).

7.3.13 Three 12.7 mm x 127 mm (0.50 x 5.0 inches) samples of the polymeric cover plate material in sheet form having a thickness of not more than the minimum thickness used for the cover plate shall be tested in accordance with the requirements for hot-wire ignition described in UL 746A and CSA-C22.2 No. 0.17.

7.4 Dielectric voltage-withstand test for cover plates

7.4.1 When subjected to the dielectric voltage-withstand test requirements in accordance with Clause [7.4.2](#), a molded material used for a cover plate shall withstand for 1 minute without breakdown the application of a 60 Hz, sinusoidal potential of 2500 V ac. A cover plate molded of a material that has been found to withstand a 60 Hz, sinusoidal potential of at least 2500 V ac, or a cover plate of phenolic or urea composition with a minimum thickness of 2.54 mm (0.1 inches), is not required to be tested.

7.4.2 Six cover plates shall be subjected to the application of a 60 Hz, sinusoidal potential of 2500 volts ac across the thinnest section of the cover plate. Each sample shall then be conditioned for 24 hour in moist air having a relative humidity of 85 ±5 percent at a temperature of 32 ±2°C (90 ±4°F). Following this conditioning, each sample shall again be subjected to the specified test potential.

7.5 Flame penetration for cover plates

7.5.1 When subjected to the flame penetration test requirements in accordance with Clause [7.5.3](#):