



UL 2239

STANDARD FOR SAFETY

Hardware for the Support of Conduit, Tubing, and Cable

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UL Standard for Safety for Hardware for the Support of Conduit, Tubing, and Cable, UL 2239

Second Edition, Dated February 20, 2015

Summary of Topics

The new edition dated February 20, 2015 was issued to incorporate minor editorial changes, some clarifications, organizational changes, renumbering changes, and the following:

- ***Revisions to the Flammability Test, Clause 6.7.***
- ***Additional Requirements for Protector Bushings.***
- ***Additional Requirements for Protector Plates.***
- ***Clarification of the Term “Interior” in Clause 5.3.4.***
- ***Deletion of Insulated Standoff Requirements for Canada in Accordance with the CEC.***
- ***Modification of Annex A, Smoke and Heat Release Test, to Align with the New Edition of the Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, UL 2043.***

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated February 21, 2014, September 26, 2014, and October 3, 2014.

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CSA Group
CSA C22.2 No. 18.4-15
Second Edition



Underwriters Laboratories Inc.
UL 2239
Second Edition

Hardware for the Support of Conduit, Tubing, and Cable

February 20, 2015



ANSI/UL 2239-2015

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This ANSI/UL Standard for Safety consists of the Second Edition.

The most recent designation of ANSI/UL 2239 as an American National Standard (ANSI) occurred on February 20, 2015. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

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Preface

This is the harmonized CSA and UL standard for *Hardware for the Support of Conduit, Tubing, and Cable*. It is the second edition of CSA C22.2 No. 18.4 and the second edition of UL 2239. This edition of CSA C22.2 No. 18.4 supersedes the previous edition(s) published in 2004.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Subcommittee for Conduit and Cable Hardware, 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 Subcommittee on ICCM03-Fittings, Hardware and Positioning Devices under the jurisdiction of the CSA Technical Committee on Wiring Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

This standard has been approved by the American National Standards Institute (ANSI) as an American National 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 uses the IEC format but is not based on, nor is it to be considered equivalent to, an IEC standard. This standard is published as an equivalent standard for CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

Reasons for differences from IEC

The THSC investigated and found no existing IEC standards or work programs covering the scope of the products in this standard.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

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CSA Group Effective Date

The effective date for CSA Group will be announced through *CSA Informs* or a CSA Group certification notice.

UL Effective Date

As of February 20, 2015 all products Listed by UL must comply with the requirements in this standard.

A UL effective date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved standard.

Hardware for the Support of Conduit, Tubing, and Cable

1 Scope

1.1 These requirements cover hardware for the support of conduit, tubing, and cable, such as HANGERS, STAPLES, STRAPS, and similar devices for installation in accordance with the National Electrical Code, NFPA 70, and the Canadian Electrical Code (CEC), Part I.

1.2 These requirements also cover STANDOFFS for nonmetallic-sheathed cable, PROTECTOR PLATES, and PROTECTOR BUSHINGS.

1.3 These requirements do not cover hardware for use with surface raceway, wireway, or busway systems, sprinkler systems, and other piping systems used for fire protection service, hardware for use with lighting fixtures, or hardware for grounding and bonding applications.

1.4 These requirements do not cover:

- a) Hardware intended to support boxes (see UL 514A or CSA C22.2 No. 18.1),
- b) Conduit and cable fittings (see UL 514B or CSA C22.2 No. 18.3),
- c) Reducing washers (see UL 514B or CSA C22.2 No. 18.3),
- d) Pulling grips for cable or cord (see UL 514B or CSA C22.2 No. 18.3),
- e) Cable ties (see UL 1565 or CSA C22.2 No. 18.5), or
- f) POSITIONING DEVICES (see UL 1565 or CSA C22.2 No. 18.5).

2 Normative References

2.1 Products covered by this standard shall comply with the reference installation codes and standard as appropriate for the country where the product is to be used. When the product is intended for use in more than one country, the product shall comply with the installation codes and standards for all countries where it is intended to be used.

2.2 Where reference is made to any Standards, such reference shall be considered to refer to the latest editions and revisions thereto available at the time of printing, unless otherwise specified.

CSA Group Standards

C22.1-15
Canadian Electrical Code, Part I

CAN/CSA-C22.2 No. 0-10
General Requirements – Canadian Electrical Code, Part II

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

CAN/CSA-C22.2 No. 0.17-00 (R2013)
Evaluation of Properties of Polymeric Materials

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C22.2 No. 18.1-13
Metallic Outlet Boxes

C22.2 No. 18.3-12
Conduit, Tubing, and Cable Fittings

C22.2 No. 18.5-13
Positioning Devices

UL Standards

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

UL 514A
Metallic Outlet Boxes

UL 514B
Conduit, Tubing, and Cable Fittings

UL 746A
Polymeric Materials – Short Term Property Evaluations

UL 969
Marking and Labeling Systems

UL 1565
Positioning Devices

ASTM¹ Standards

ASTM B117-11
Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM D1654-08
Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM F1137-11e1
Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners

IEC² Standards

IEC 60695-11-10 (2013-05-12)
Fire Hazard Testing - Part 11-10: Test Flames-50W Horizontal and Vertical Flame Test Methods

IEC 60695-11-5 (2004)
Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance

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ISO³ Standards

ISO 4892-1:1999

Plastics - Methods of exposure to laboratory light sources – Part 1: General guidance

ISO 4892-2:2013

Plastics - Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps

NFPA⁴ Standard

NFPA 70-2014

National Electrical Code

¹American Society for Testing and Materials

²International Electrotechnical Commission

³International Organization for Standardization

⁴National Fire Protection Association

3 Definitions

3.1 For the purpose of this standard, the following definitions apply. Terms used throughout this standard which have been defined in this Clause are in small roman capital type font.

3.2 **AIR-HANDLING SPACE:** A duct or plenum used for environmental air and other spaces used for environmental air, such as above hung ceilings or below raised floors. This does not include plenums used for the removal of dust, loose stock, or vapor, or for ventilation of commercial-type cooking equipment.

3.3 **BEAM CLAMP:** A **HARDWARE DEVICE** intended for use in conjunction with a beam.

Note: For the purpose of this standard, a flange, purlin, or other similar mounting surface is considered to be a beam.

3.4 **ELASTOMER:** Rubber or any polymer other than a thermoplastic **ELASTOMER** that has properties similar to those of rubber.

3.5 **HANGER:** A **HARDWARE DEVICE** intended to support conduit, cable, or tubing from a building structure or other structural support assemblies.

3.6 **HARDWARE DEVICE:** A means for supporting conduit, cable, or tubing from, or securing in place conduit, cable, or tubing to, a building structure or other structural support assemblies.

3.7 **LOAD RATING:** A maximum static load as identified by the manufacturer, in kg (lb), intended for a **HARDWARE DEVICE**.

3.8 **POSITIONING DEVICE:** For wire management and class of workmanship-related purposes, a device used for positioning or providing limited support for conduit or tubing in addition to required supports or where supports are not required.

Note: **POSITIONING DEVICES** are not within the scope of this standard.

3.9 **PROTECTOR BUSHING:** A means to provide protection from nails or screws for cables or tubing placed in bored holes of wood framing in concealed locations.

3.10 **PROTECTOR PLATE:** A means to provide protection for cables or tubing from nails or screws in concealed installations.

3.11 **STANDOFF :** In Canada, a nonmetallic means provided to prevent direct contact of nonmetallic-sheathed cable with metal studs when installed in parallel with the stud.

In the United States, **STANDOFFS** for nonmetallic-sheathed cable are not recognized.

3.12 **STAPLE:** A **HARDWARE DEVICE**, other than a **STRAP**, that is typically hammer- or tool-driven, intended to secure conduit, cable, or tubing to a building structure, such as to a wooden stud.

3.13 **STRAP:** A **HARDWARE DEVICE**, other than a **STAPLE**, that is intended to secure conduit, cable, or tubing to a building structure or other support assembly.

4 General Requirements

4.1 Except as indicated in Clause 4.2, a component of a product covered by this standard shall comply with the requirement for that component. A component shall comply with CSA Group or the Underwriters Laboratories Inc. standard as appropriate for the country where the product is to be used.

4.2 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.

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

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

4.5 In this standard, a requirement that applies only to one or more types of hardware is so identified by a specific reference in that requirement to the type or types of hardware involved. Absence of such reference indicates that the requirement applies to all types of hardware unless the context indicates otherwise.

4.6 For products intended for use in Canada, general requirements are given in CAN/CSA-C22.2 No. 0, General Requirements – Canadian Electrical Code, Part II.

5 Construction

5.1 General

5.1.1 A **HARDWARE DEVICE** intended for assembly to conduit, cable, or tubing shall be constructed so that the device complies with the assembly test in Clause 6.2.

5.1.2 A HARDWARE DEVICE for use with more than one type or size of product shall comply with the appropriate requirements for each type or size of product when installed as intended.

5.1.3 A HARDWARE DEVICE shall comply with the applicable requirements in Clauses 7 – 10 and shall be marked as applicable in accordance with Clause 11.

5.1.4 A HARDWARE DEVICE intended for a specific condition of installation or for use with a specific wiring system shall be provided with instructions in accordance with Clause 12.

5.1.5 A HARDWARE DEVICE having any nonmetallic component, and intended for use in AIR-HANDLING SPACES, shall comply with Clause 6.9.

5.1.6 A HARDWARE DEVICE for use in wet locations, having any polymeric component, shall comply with the applicable requirements in Clauses 7 and 8 in both the as-received condition and after exposure to ultraviolet-light and water conditioning described in Clause 6.8.

Note: Products for use in wet locations are tested and considered suitable for outdoor use.

5.1.7 A PROTECTOR BUSHING shall have smooth, rounded entries.

5.2 Materials

5.2.1 A HARDWARE DEVICE using an ELASTOMER other than a thermoplastic ELASTOMER shall comply with Clause 6.5.

5.2.2 A HARDWARE DEVICE using a thermoplastic ELASTOMER shall comply with Clause 6.6.

5.2.3 A polymeric HARDWARE DEVICE shall comply with Clause 6.7.

A HARDWARE DEVICE is not required to be tested if it is of a material classed HB, V-0, V-1, V-2, 5VA, or 5VB, in accordance with IEC 60695-11-10, UL 94 or CAN/CSA-C22.2 No. 0.17. Flammability classifications shall be for the minimum thickness used.

A HARDWARE DEVICE is not required to comply with Clause 6.7 when the following conditions are met:

- a) It does not occupy a volume greater than 2 cm³ (0.12 in³), and
- b) It does not have any dimension greater than 30 mm (1.2 in).

5.2.4 A PROTECTOR PLATE OR PROTECTOR BUSHING shall provide sufficient resistance to penetration to create ready awareness of the presence of concealed wires and cables through a framing member beneath, and a degree of protection from driven screws and nails.

5.2.5 In the United States, a PROTECTOR PLATE shall be made of steel a minimum of 1.6 mm (1/16 in) thick, and shall be provided with corrosion protection in accordance with 5.3.1.

In Canada, a PROTECTOR PLATE shall be made of steel a minimum of 1.3 mm (0.05 in) thick, or other materials of equivalent resistance to nail penetration. A PROTECTOR PLATE of ferrous metal shall be provided with protection against corrosion in accordance with 5.3.1.

5.2.6 A PROTECTOR BUSHING shall comply with the requirements in Clause 10.

5.2.7 A nonmetallic STANDOFF for use with nonmetallic-sheathed cable shall comply with Clause 9.

5.2.8 In Canada, a STRAP provided with a hole or holes for mounting, and intended for use with rigid metal conduit or electrical metallic tubing, shall have a minimum mounting hole diameter as specified in Table 1.

In the United States, this requirement does not apply.

5.2.9 In Canada, a STAPLE intended to secure nonmetallic-sheathed cable shall have smooth edges and a maximum radius of 11 mm (0.4 in) on the surface facing the cable. A STAPLE intended to hold armored cable, flexible metal conduit, or nonmetallic-sheathed cable shall be provided with stops to indicate the depth to which the STAPLE is to be driven. The total surface area of the stop indicator shall have a minimum bearing surface of 16 mm² (8 mm² per side) [0.02 in² (0.01 in² per side)]. The minimum STAPLE dimensions shall be as specified in Figure 1.

In the United States, this requirement does not apply.

5.3 Protection against corrosion

5.3.1 A ferrous metal HARDWARE DEVICE shall be protected against corrosion by a coating of zinc. A zinc coating shall have a thickness in accordance with Table 2 as determined in accordance with Clause 6.3.

5.3.2 A HARDWARE DEVICE of stainless steel having a minimum of 16 percent chromium content is not required to have an additional protective coating.

5.3.3 A cut edge, a punched hole, and the threaded surface of a tapped hole of a part formed from galvanized stock is not required to be protected by a zinc coating.

5.3.4 The thickness of a zinc coating specified in Table 2 does not apply to the coating on a screw or formed surfaces not accessible by a 19.1 mm (3/4 in) diameter ball. The presence of a coating shall be determined by visual inspection.

5.3.5 The surfaces of a cast-iron or a malleable iron HARDWARE DEVICE shall be protected against corrosion by zinc or an organic coating. The thickness of a zinc coating is not required to be a specified thickness and its presence shall be determined by visual inspection. An organic coating shall be evaluated in accordance with Clause 6.4.

5.3.6 A surface that has a corrosion protection system in accordance with Clause 6.4 does not require zinc coating protection.

6 Product Testing for all HARDWARE DEVICES

6.1 General

6.1.1 A HARDWARE DEVICE that is provided with specific instructions shall be assembled and installed in accordance with the method specified by the manufacturer. In the absence of instructions, applicable tests shall be conducted in the most severe foreseeable manner.