UL 514A

STANDARD FOR SAFETY

Metallic Outlet Boxes

UL Standard for Safety for Metallic Outlet Boxes, UL 514A

Eleventh Edition, Dated February 1, 2013

Summary of Topics

This revision of ANSI/UL 514A dated June 30, 2022 includes the following changes in requirements:

- ***Slots in adjustable metal outlet boxes for use only with bar hanger assemblies; 10.3.3***

- ***Clarification of the calculation method for open hole area in boxes with removable faces; 10.3.4***

- ***Update typo reference; 2.2, 12.6.2.3***

- ***Test of preinstalled bonding/grounding conductors; 8.1.8***

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 May 14, 2021 and November 19, 2021.

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Association of Standardization and Certification
NMX-J-023/1-ANCE
Third Edition

CSA Group
CSA C22.2 No. 18.1-13
Second Edition

Underwriters Laboratories Inc.
UL 514A
Eleventh Edition

Metallic Outlet Boxes

February 1, 2013

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Approved American National Standard

ANSI/UL 514A-2022

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (Operating as “CSA Group”), and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and UL pages.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the Eleventh Edition including revisions through June 30, 2022. The most recent designation of ANSI/UL 514A as an American National Standard (ANSI) occurred on June 30, 2022. 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 ANCE, CSA Group, and UL standard for Metallic Outlet Boxes. It is the third edition of NMX-J-023/1-ANCE, the second edition of CSA C22.2 No. 18.1, and the eleventh edition of UL 514A. This edition of CSA C22.2 No. 18.1 supersedes the previous edition(s) published in 2004. This harmonized standard has been jointly revised on June 30, 2022. For this purpose, ANCE, CSA Group, and UL are issuing revision pages dated June 30, 2022.

This harmonized standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Committee for Switch and Outlet Boxes, 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.

The present Mexican standard was developed by the CT 23, Electric Accessories from the Comité de Normalización de la Asociación de Normalización y Certificación, A.C., CONANCE, with the collaboration of the metallic outlet boxes and accessories manufacturers and users.

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 Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

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 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 ANCE, 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 Technical Harmonization Committee identified the following IEC standard within the scope of this standard: IEC 60670 (1989-11), *General requirements for enclosures for accessories for household and similar fixed electrical installations* and Amendment No. 1 (1994-01). It was further recognized that significant revision of this IEC standard is in process, with participation by the IEC National Committees in each of the three countries that are party to this standard.

The THC determined that the safe use of electrical boxes is critically dependent on the design and performance of the system with which they are intended to be installed. Significant investigation is

required to assess safety and system compatibility issues that may lead to harmonization of traditional North American electrical boxes with those presently addressed in the known IEC standards. The THC agreed such future investigation might be facilitated by completion of harmonization of the North American standards for electrical boxes.

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.

Metallic Outlet Boxes

1 Scope

1.1 This standard applies to metallic OUTLET BOXES, flush-DEVICE BOXES, FLOOR BOXES, CONCRETE BOXES, EXTENSION RINGS, covers, CONDUIT BODIES, BAR HANGERS, bar-hanger assemblies, and all accessories whose principal function is for support of boxes. The products covered by this standard are intended for installation in accordance with the National Electrical Code (NEC), NFPA 70, the Canadian Electrical Code (CEC), Part I, and the Standard for Electrical Installations, NOM-001-SEDE.

In Canada, CONDUIT BODIES are not evaluated as OUTLET BOXES; they are fittings. Requirements in this standard for CONDUIT BODIES intended for use as OUTLET BOXES do not apply in Canada.

1.2 This standard also applies to marine application metallic OUTLET BOXES, flush-DEVICE BOXES, special purpose boxes, EXTENSION RINGS, and covers.

1.3 This standard also applies to marine products intended for installation in accordance with the manufacturer's instructions and the applicable requirements of the United States Coast Guard (USCG), IEEE Recommended Practice for Electric Installation on Shipboard, IEEE Standard 45; the American Boat and Yacht Council (ABYC); the Standard for Pleasure and Commercial Motor Craft, NFPA 302; and the Canadian Electrical Code (CEC), Part I.

1.4 This standard does not apply to cabinets and cutout boxes, boxes, and covers intended for use with raceway systems for surface wiring other than rigid or flexible conduit or electrical metallic tubing. This standard does not apply to boxes having a volume of more than 1640 cm^3 (100 in^3), other than multiple-gang boxes, flush-DEVICE BOXES, and CONDUIT BODIES intended for the larger trade sizes of conduit.

1.5 This standard does not apply to cover plates for flush-mounted wiring devices.

1.6 This standard does not apply to OUTLET BOXES or OUTLET BOX COVERS for use in hazardous (classified) locations as defined in the National Electrical Code (NEC), NFPA 70, the rules of the Canadian Electrical Code (CEC), Part I, and the Standard for Electrical Installations, NOM-001-SEDE.

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 Standard, such reference shall be considered to refer to the latest edition and revisions thereto available at the time of printing, unless otherwise specified.

ANCE Standards

NMX-W-047-SCFI
Aluminum and its Alloys – Mechanical Properties – Determination of Tensile Strength

NMX-H-146-SCFI
Unified Screw Threads – Specifications

NMX-J-017-ANCE
Fittings for Outlet Boxes and Conduit

NMX-J-235-ANCE
Enclosures for Electrical Equipment, Part 1 and Part 2

NMX-J-235/2-ANCE-2007
Enclosures for Electrical Equipment, Environmental Considerations

NMX-J-508-ANCE
Wiring Devices – Safety Requirements – Specifications and Test Methods

NMX-J-543-ANCE
Wire Connectors

CSA Group Standards

C22.1-12
Canadian Electrical Code, Part I

C22.2 No. 0.5-1982 (R2008)
Threaded Conduit Entries

C22.2 No. 0.15-01 (R2006)
Adhesive Labels

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

C22.2 No. 18.3-04 (R2009)
Conduit, Tubing, and Cable Fittings

CSA C22.2 No. 45.1-07
Electrical Rigid Metal Conduit – Steel

C22.2 No. 65-03 (R2008)
Wire Connectors

CAN/CSA-C22.2 No. 94-M91 (R2001)
Special Purpose Enclosures

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

UL Standards

UL 6
Electrical Rigid Metal Conduit – Steel

UL 50
Enclosures for Electrical Equipment

UL 50E
Enclosures for Electrical Equipment, Environmental Considerations

UL 486A-486B
Wire Connectors

UL 514B
Conduit, Tubing, and Cable Fittings

UL 746A
Polymeric Materials – Short Term Property Evaluations

UL 746B
Polymeric Materials – Long Term Property Evaluations

UL 969
Marking and Labeling Systems

ASME[1] Standards

ANSI/ASME B1.1-1989 (R2001)
Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B1.20.1-1983 (R2001)
Pipe Threads, General Purpose (INCH)

ASTM[2] Standards

B 117-97
Standard Practice for Operating Salt Spray (Fog) Apparatus

D 1654-92(2000)
Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

F 1137-00
Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners

G 151-00
Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G 153-00ae1
Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

IEC[3] Standards

IEC 60417-1
Graphical symbols for use on equipment – Part 1: Overview and application

IEC 60695-11-10
Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods

IEEE[4] Standards

IEEE 45-1998
IEEE Recommended Practice for Electric Installations on Shipboard

ISO[5] Standards

ISO 4892-2:1994
Plastics – Methods of exposure to laboratory light source – Part 2: Xenon-arc sources

Mexican Official Standards

NOM-001-SEDE
Standard for Electrical Installations

NFPA[6] Standards

NFPA 70-2011
National Electrical Code

NFPA 302-1998
Fire Protection Standard for Pleasure and Commercial Motor Craft

[1] American Society of Mechanical Engineers
[2] American Society for Testing and Materials
[3] International Electrotechnical Commission
[4] Institute of Electrical and Electronics Engineers
[5] International Organization for Standardization
[6] National 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 ADJUSTABLE MUD RING: A mud ring with an adjustable sleeve intended for use with a flush-mounted device. It positions a wiring device flush with the finished wall surface.

3.3 ADJUSTABLE SLEEVE EXTENDER: A sleeve intended to be mechanically secured to an adjustable sleeve. It extends the adjustable sleeve to position a flush mounted wiring device flush with the finished wall surface.

3.4 BAR HANGER: A means to support an OUTLET BOX, CONDUIT BOX, or DEVICE BOX between two structural members.

3.5 CLAMP: A means intended to secure raceway, tubing, conduit, or cable to the box.

3.6 CONCRETE BOX: A box intended for use in poured concrete.

3.7 CONCRETE RING: A ring, which is not necessarily round, intended for use in poured concrete, that accommodates end-to-end extension and the application of covers on top and bottom.

3.8 CONDUIT BODY: A means for providing access to the interior of a conduit or tubing system through one or more removable covers at a junction of two or more conduit or tubing sections or at the terminal point of a conduit or tubing. In Mexico and the United States, a CONDUIT BODY is investigated as an OUTLET BOX. In Canada, a CONDUIT BODY is not investigated as an OUTLET BOX; it is a fitting. Requirements in this standard for CONDUIT BODIES intended for use as OUTLET BOXES do not apply in Canada.

3.9 CONDUIT BOX: A box having threaded openings or knockouts for conduit, electrical metallic tubing, or fittings.

3.10 DEVICE BOX: A box with provisions for mounting a wiring device directly to the box.

3.11 DRIPPROOF: Designation for a type of marine product that is constructed or protected so that falling drops of liquid or solid particles striking the enclosure do not interfere with the intended operation of the equipment.

3.12 EXTENSION RING: A ring, which is not necessarily round, intended to extend the sides of an OUTLET BOX or flush-DEVICE BOX to increase the box depth, volume, or both.

3.13 FLOOR BOX: A box mounted in the floor intended for use with a FLOOR BOX COVER or other components to complete the enclosure.

3.14 FLOOR BOX COVER: A component of a FLOOR-MOUNTED ENCLOSURE assembly intended to complete the enclosure.

3.15 FLOOR-MOUNTED ENCLOSURE: A box and cover assembly provided with a means for mounting in a floor.

3.16 FLUSH FLOOR BOX COVER: A FLOOR BOX COVER that, when installed as intended, is essentially flush with the floor's finished surface.

Note: A FLUSH FLOOR BOX COVER may have openings for access to flush-mounted receptacle outlets or openings or knockouts for attachment of conduits or fittings. Openings may be provided for access to data and communications outlets.

3.17 NON-DETACHABLE HUB: An integral, non-detachable protuberance from a box intended for the attachment of a raceway essentially independent of the box. Conduit body hubs are not included.

3.18 OUTLET BOX: A box that provides access to a wiring system having pryout openings, knockouts, threaded entries, or hubs in either of the sides or the back, or both, for the entrance of conduit, conduit or cable fittings, or cables. The box has provisions for the mounting of an OUTLET BOX COVER; however, it does not have provisions for mounting a wiring device directly to the box.

3.19 OUTLET BOX COVER: A means intended to close or cover an OUTLET BOX when the cover has been mounted directly to an OUTLET BOX or to an OUTLET BOX EXTENSION RING.

3.20 PARTITION: A barrier used to separate sections of a box.

3.21 PEDESTAL FLOOR BOX COVER: A FLOOR BOX COVER that, when installed as intended, provides a means for typically vertical or near-vertical mounting of receptacle outlets above the floor's finished surface.

Note: The PEDESTAL FLOOR BOX COVER may provide a means for attachment of conduits or fittings above the floor's finished surface. Openings may be provided in the cover for access to data and communications outlets.

3.22 PLASTER RING COVER: A means intended for mounting directly onto a box to provide for the attachment of wiring devices or fixtures/luminaires. The center portion is raised to accommodate a specific wall or ceiling thickness and is intended for the mounting of the wiring devices or fixtures/luminaires flush with the surface.

3.23 POKE-THROUGH FLOOR FITTING: An assembly intended to provide passage of wiring from one building story to another through a penetration drilled through a concrete floor. It is used in conjunction with FLUSH, PEDESTAL, or RECESSED ACCESS FLOOR BOX COVERS.

3.24 RAISED COVER: A cover intended for mounting directly onto a box to provide for the attachment of accessories and to increase the internal volume of the enclosure.

3.25 RAISED-FLOOR BOX: A FLOOR BOX intended for use in a raised floor, such as in an electronic computer/data processing equipment room.

3.26 RECESSED ACCESS FLOOR BOX: A FLOOR BOX with provisions for mounting wiring devices below the floor surface.

3.27 RECESSED ACCESS FLOOR BOX COVER: A FLOOR BOX COVER that, when installed as intended, is essentially flush with the floor's finished surface and provides access to and passage of cords to recessed wiring devices mounted within a recessed floor box.

3.28 STRUCTURE, UNFINISHED (NEW WORK): Construction where structural framing members are accessible for direct mounting and support of boxes.

3.29 STRUCTURE, FINISHED (OLD WORK): Construction where structural framing members are not accessible for mounting and supporting boxes.

3.30 SUPPORTING-NAIL HOLE: A hole provided in a box for the purpose of mounting the box to a structure using nails or screws. The following are not considered nail holes:

a) A hole that is 3 mm (0.120 in) or smaller in diameter, and

b) A hole that is located so as to prevent insertion of a 3-mm (0.120-in) diameter drill rod through both walls.

3.31 WATERTIGHT: Designation for a type of marine product that is constructed so that moisture does not enter the enclosure.

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. See Annex A for a list of standards covering components generally used in the products covered by this standard. A component shall comply with the ANCE, CSA, or UL standards 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.