UL 50E

STANDARD FOR SAFETY

Enclosures for Electrical Equipment, Environmental Considerations

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UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E

Third Edition, Dated October 15, 2020

Summary of Topics

This revision of ANSI/UL 50E dated October 17, 2025 includes the following changes in requirements:

– Ancillary ratings for power wash; 5A.2.1

– Correct reference in Figure 6 Key, note 5

– Addition of definition and clarification on acceptable stainless steel; 5.9A and 7.2.1.1

– Clarification of uncoated ferrous enclosure testing; 7.2.3.1

– Factory-applied sealing compounds; 7.8.1 and 7.8.2

– Revised 8.3.4

– Added Ancillary Rating XH; Corrosion Resistant Hose Down; 9.3A and 9.3B.

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 November 8, 2024, April 4, 2025 and June 6, 2025.

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Enclosures for Electrical Equipment, Environmental Considerations

October 15, 2020

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This ANSI/UL Standard for Safety consists of the Third Edition including revisions through October 17, 2025.

The most recent designation of ANSI/UL 50E as an American National Standard (ANSI) occurred on October 17, 2025. 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 ULSE standard for Enclosures for Electrical Equipment, Environmental Considerations. It is the fourth edition of NMX-J-235/2-ANCE-2020, the third edition of CSA C22.2 No. 94.2-20, and the third edition of UL 50E. This edition of NMX-J-235/2-ANCE supersedes the previous edition published on October 16, 2015. This edition of CSA C22.2 No. 94.2 supersedes the previous edition published in 2015. This edition of UL 50E supersedes the previous edition published on October 16, 2015. This harmonized standard has been jointly revised on October 17, 2025. For this purpose, CSA Group and ULSE are issuing revision pages dated October 17, 2025, and ANCE is issuing a new edition dated October 17, 2025.

This harmonized standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and ULSE. The efforts and support of Technical Harmonization Committee 70/31 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 CDI Control y Distribución Industrial from the Comité de Normalización de la Asociación de Normalización y Certificación, A.C., CONANCE, with the collaboration of the enclosures manufacturers and users.

This standard was reviewed by the CSA Integrated Committee on Enclosures, under the jurisdiction of the CSA Technical Committee on Industrial 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 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 considered equivalent to, an IEC standard. This standard is published as an equivalent standard for ANCE, CSA Group, and ULSE.

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.

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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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Enclosures for Electrical Equipment, Environmental Considerations

1 Scope

1.1 This standard applies to enclosures for electrical equipment intended to be installed and used in non-hazardous locations in accordance with the Canadian Electrical Code, Part I, CSA C22.1, the provisions of the National Electrical Code, NFPA 70, and the provisions of Mexico's Electrical Installations, NOM-001-SEDE, as follows:

a) Enclosures for indoor locations, Types 1, 2, 5, 12, 12K, and 13; and

b) Enclosures for indoor or outdoor locations, Types 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 6, and 6P.

1.2 This standard covers additional environmental construction and performance requirements for enclosures. The general requirements for enclosures are contained in CSA C22.2 No. 94.1, UL 50, and NMX-J-235/1-ANCE (See Annex B, Ref. No. 10) or the end-use product standards that are to be used in conjunction with this standard.

1.3 This standard does not cover the requirements for protection of devices against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or that may enter via conduit or unsealed openings.

1.4 Where an individual product standard contains requirements that are at variance with those of this standard, the requirements of the individual product standard take precedence.

2 Units of Measurement

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

3 Components

3.1 Except as indicated in Clause 3.2, a component of a product covered by this standard shall comply with the requirements 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 Group, or UL standards as appropriate for the country where the product is to be used.

3.2 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.

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

3.4 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.

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4 Normative References

4.1 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. For dated references to standards, such reference shall be considered to refer to the dated edition and all revisions published up to the time the standard was approved.

4.2 In Canada, general requirements are as indicated in Annex B, Ref. No. 6.

5 Definitions

The following definitions are applicable in this standard:

5.1 BOX – That portion of an enclosure not including the cover or door.

5.2 BREAKOUT – A portion of a wall of a cast or molded enclosure so fashioned, usually by the use of one or more rings of reduced thickness of the wall material, that the material within the outer perimeter of the ring to be removed may be readily broken away at the time of installation in order to provide an opening similar to that provided by a knockout.

5.3 DEGREE OF PROTECTION – The extent of protection provided by an enclosure against access to parts which result in a risk of injury, ingress of foreign solid objects, and/or ingress of water as verified by standardized test methods.

5.4 DESIGN TESTS – Tests to demonstrate performance of a product designed to applicable standards; they are not intended to be production tests.

5.5 DOOR – A hinged portion of an enclosure that covers an opening.

5.6 ELASTOMER – Rubber or any polymer other than a thermoplastic elastomer that has properties similar to those of rubber.

5.7 ENCLOSURE – A surrounding case constructed to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection to the enclosed equipment against specified environmental conditions. The specific enclosure types, their applications, and the environmental conditions for which they are designed to protect against are as follows:

TYPE 1 – Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection against ingress of solid foreign objects (falling dirt).

TYPE 2 – Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).

TYPE 3 – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); and that will be undamaged by the external formation of ice on the enclosure.

TYPE 3R – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to

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harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); and that will be undamaged by the external formation of ice on the enclosure.

TYPE 3S – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); and for which the external mechanism(s) remain operable when ice laden.

TYPE 3X – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.

TYPE 3RX – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.

TYPE 3SX – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, and snow); that provides an increased level of protection against corrosion; and for which the external mechanism(s) remain operable when ice laden.

TYPE 4 – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts ; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose-directed water); and that will be undamaged by the external formation of ice on the enclosure.

TYPE 4X – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose-directed water); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.

TYPE 5 – Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and settling airborne dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).

TYPE 6 – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts ; to provide a degree of protection against ingress of solid foreign objects (falling dirt) to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, hose-directed water, and the entry of water during occasional temporary submersion at a limited depth); and that will be undamaged by the external formation of ice on the enclosure.

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TYPE 6P – Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts to provide a degree of protection against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, hose-directed water, and the entry of water during prolonged submersion at a limited depth); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.

TYPE 12 – Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing); and to provide a degree of protection against light splashing and consequent seepage of oil and non-corrosive coolants.

TYPE 12K – Enclosures constructed (with knockouts) for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing); and to provide a degree of protection against light splashing and consequent seepage of oil and non-corrosive coolants.

TYPE 13 – Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing); and to provide a degree of protection against spraying, splashing, and seepage of oil, and non-corrosive coolants.

5.8 INDOOR LOCATIONS – Areas that are protected from exposure to the weather.

5.9 KNOCKOUT – A portion of a wall of a sheet metal enclosure so fashioned that it may be removed readily by a hammer, screwdriver, and pliers at the time of installation in order to provide a hole for the attachment of an auxiliary device or raceway, cable, or fitting.

5.9A NONFERROUS MATERIAL – metals and alloys that do not contain iron as the principal component.

5.10 NONVENTILATED – Constructed so as to provide no intentional circulation of external air through the enclosure.

5.11 OIL RESISTANT GASKETS – Gaskets made of material that is resistant to oil and oil fumes.

5.12 OUTDOOR LOCATIONS – Areas that are exposed to the weather.

5.13 SCRIBING TOOL – A straight-shank tungsten carbide tip, lathe cutting tool, or carbide-tipped pencil type tool used to penetrate a protective coating on base metal.

5.14 THREADED CONDUIT ENTRY – A conduit entry that is threaded so as to secure a rigid conduit without the use of a bushing or locknut.

5.15 VENTILATED – Constructed so as to provide for the circulation of external air through the enclosure to remove excess heat, fumes, or vapors.

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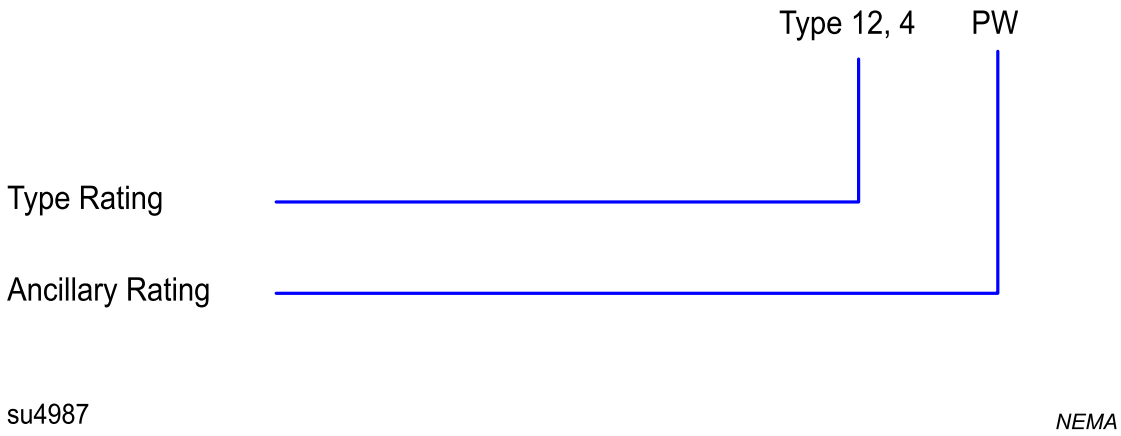
5A Explanation of The Enclosure Type Nomenclature



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5A.1 Ancillary ratings

5A.1.1 In addition to Type designations, the following ancillary conditions can be evaluated and marked. The ancillary ratings are optional add-ons to the basic Type ratings.

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5A.2 Pressure wash

5A.2.1 PW Enclosures constructed for exterior cleaning with high-pressure power washers and tested in accordance with Clause 8.18. The PW ancillary rating may be appended only to the following ratings: 3, 3X, 3S, 3SX, 4, 4X, 6, 6P, 12, 12K, 13.

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6 Enclosure Types and Applications

6.1 Protection against specific environmental conditions as defined for each environmental type (see Clause 5.7) is applicable only when the enclosure is completely and properly installed.

6.2 All mechanical and electrical parts mounted on or through an enclosure shall pass the applicable tests for the enclosure type unless otherwise specified in the standard.

6.3 Table 1 indicates the environmental conditions that each enclosure type is tested for and aids in comparing applications for enclosure types.

7 Construction

7.1 Polymeric materials

7.1.1 Polymeric materials exposed to direct sunlight used for Types 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 6, and 6P enclosures or polymeric materials used for fastenings and/or hinges for these enclosure types shall comply with the Ultraviolet light exposure test (Weatherometer test) specified in Annex B, Ref. No. 1.

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7.1.2 Polymeric materials used for Types 6 and 6P enclosures or polymeric materials used for fastenings and/or hinges for these enclosure types shall comply with the Water exposure and immersion tests specified in Clause 8.16.

7.1.3 A polymeric observation window necessary to maintain Enclosure Types 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 6, and 6P ratings and secured by an adhesive exposed to direct sunlight shall be conditioned in accordance with the Ultraviolet light exposure test (Weatherometer test) specified in Annex B, Ref. No. 1 prior to investigation of critical property values in accordance with Annex B, Ref. No. 1, or Annex E.

Note: This does not apply to adhesives internal to the enclosure where direct sunlight is shielded.

7.1.4 In Canada, a material used for an observation window shall be mechanically secured or shall be secured using an adhesive complying with Annex E.

7.2 Corrosion protection

7.2.1 General

7.2.1.1 Enclosures made of the following materials shall be considered to comply with the indoor and outdoor corrosion requirements:

a) Copper, aluminum, or stainless steel;

b) Bronze or brass, either of which containing at least 80 percent copper; and

c) Nonferrous material.

Note: The materials in (a), (b) and (c) above are not considered to comply with additional corrosion protection of Clause 7.2.4 without being investigated.

7.2.1.2 Enclosures shall not be constructed of metals in any combination such as to cause galvanic action that will adversely affect any part of the equipment exposed to moisture.

7.2.1.3 Fasteners and hinges used on an enclosure shall be resistant to corrosion and shall comply with the same requirements as the enclosure. Brass inserts containing at least 60 percent copper shall be considered to comply with the indoor and outdoor corrosion requirements.

7.2.1.4 Other than as permitted by Clause 7.2.1.5, both the inside and outside surfaces of an enclosure made of ferrous material, along with any external ferrous parts attached to these enclosures, shall be protected against corrosion in accordance with Clause 7.2.2, 7.2.3, or 7.2.4.

7.2.1.5 The corrosion protection requirement does not apply to:

a) Bearings, sliding surfaces of a hinge or shaft, and the like, located on the exterior of these enclosures;

b) Sheared or cut edges and punched holes of galvanized sheet steel;

c) Parts such as a decorative grill, and the like, that are not required to form part of these enclosures.

7.2.2 Indoor corrosion

7.2.2.1 Type 1, 2, 5, 12, 12K, and 13 ferrous enclosures and external ferrous parts attached to these enclosures either:

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a) Shall be protected against corrosion by enameling, painting, galvanizing, or other equivalent means; or

b) Shall be tested in accordance with Clause 8.7.

7.2.3 Outdoor corrosion protection

7.2.3.1 Type 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 6, and 6P ferrous enclosures, and external ferrous parts attached to these enclosures shall be protected against corrosion by one of the coatings in Clause 7.2.3.1 (a) – (d) or methods providing corrosion protection other than listed shall comply with Clause 8.8.

a) Hot-dipped mill-galvanized sheet steel conforming to the coating Designation G90 in Annex B, Ref. No. 2;

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 0.015 mm (0.00061 inch) on each surface with a minimum thickness of 0.014 mm (0.00054 inch); the thickness of coating shall be established by the metallic-coating-thickness test described in Annex B, Ref. No. 3 or No. 13; an annealed coating shall comply with Clauses 7.2.3.3 and 7.2.3.4;

c) A zinc coating conforming to Clause 7.2.3.1(c)(1) or 7.2.3.1(c)(2) and having at least one coat of an organic finish of the epoxy or alkyd-resin type or other outdoor paint applied after forming on each surface.

1) Hot-dipped mill-galvanized sheet steel conforming to the coating Designation G60 or A60 in Annex B, Ref. No. 2; or

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 0.010 mm (0.00041 inch) on each surface with a minimum thickness of 0.009 mm (0.00034 inch); the thickness of the coating shall be established by the metallic-coating-thickness test described in Annex B, Ref. No. 3 or No. 13.

The acceptability of the paint may be determined by consideration of its composition or by corrosion tests if these are considered necessary; or,

d) Paint shall comply with the requirements in Clause 8.8 or Annex B, Ref. No. 7.

7.2.3.2 Type 3X, 3RX, 3SX, 4X, and 6P ferrous enclosures, and external ferrous parts attached to these enclosures, conforming to 7.2.4.1(a) shall be considered to have met the requirements.

7.2.3.3 An annealed coating on sheet steel that is bent or similarly formed or extruded or rolled at edges of holes after annealing shall be additionally painted in the affected area if the process damages the zinc coating. See Clause 7.2.3.1(b).

7.2.3.4 If flaking or cracking of the zinc coating at the outside radius of the bent or 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. See Clauses 7.2.3.1(b) and 7.2.3.8.

7.2.3.5 A hot-dipped mill-galvanized G90 coating shall not be damaged during handling or fabrication to the extent that the base metal is exposed, other than as allowed by Clauses 7.2.3.6 and 7.2.3.7. See Clause 7.2.3.1(a).

7.2.3.6 In accordance with Clause 7.2.3.5, uncoated cross-sectional surfaces at cut edges and drilled openings are acceptable.

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7.2.3.7 In accordance with Clause 7.2.3.5, the base metal may be exposed if:

a) The maximum width and length of the exposed metal does not exceed the thickness and length of any cut edge on the sheet; or

b) The surface has one coat of an organic finish of the epoxy or alkyd-resin type, or other outdoor paint applied after fabrication.

7.2.3.8 Sheet steel that employs a hot-dipped mill-galvanized G90 coating that is drawn, formed, extruded, or rolled shall be additionally painted with one coat of an organic finish of the epoxy or alkyd-resin type or other outdoor paint in the areas that are affected by a process that damages the coating as determined by the requirement in Clause 7.2.3.4. See Clause 7.2.3.1(b).

7.2.3.9 An enclosure of cast iron or malleable iron at least 3.2 mm (1/8 inch) thick shall be protected against corrosion by:

a) A 0.0038 mm (0.00015 inch) thick coating of zinc, cadmium, or the equivalent, on the outside surface and a visible coating of such metal on the inside surface; or

b) One coat of an organic finish of the epoxy or alkyd-resin type or other outdoor paint on each surface. The acceptability of the paint may be determined by consideration of its composition or, if necessary, by Corrosion tests as specified in Clause 8.8.

7.2.4 Additional corrosion protection

7.2.4.1 Type 3X, 3RX, 3SX, 4X, and 6P enclosures, and external parts attached to these enclosures, shall be manufactured of:

a) Austenitic stainless steel designated as American Iron and Steel Institute (AISI) Type 302, 303, 304, 305, 309, or 316;

b) Polymerics; or

c) Other materials that have been determined to comply with Clauses 7.2.3 and 8.9.

7.3 Openings

7.3.1 General

7.3.1.1 Other than as permitted by Clause 7.3.1.2, openings provided in an enclosure shall comply with the tests in Table 2 or Table 6 with these openings unfilled.

7.3.1.2 Openings in accordance with Clause 7.3.2, if provided in the test enclosure, shall be filled as intended to maintain the environmental integrity of the enclosure.

7.3.1.3 Joints for all devices closing openings into the equipment cavity of a Type 12 or 12K enclosure, as well as any door or cover for a Type 12 or 12K enclosure, shall include a gasket in the full length of the joint. The gasket shall comply with the requirements of Clause 8.13.

7.3.2 Equipment openings

7.3.2.1 Enclosures may be provided with openings that are intended to be closed by field-installed equipment (such as pushbutton switches, door latches, etc.) if these enclosures are marked in accordance with Clause 9.6.

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7.3.3 Drainage openings

7.3.3.1 Type 2, 3R, and 3RX enclosures shall have provisions for drainage. Drainage openings shall not be less than 3.2 mm in diameter (1/8 inch in diameter) or more than 6.4 mm in diameter (1/4 inch in diameter), unless baffled or provided with a drainage fitting.

7.3.3.2 For Type 2, 3R, and 3RX enclosures that also meet the requirements of other enclosure types, the drainage openings shall be closed by a removable plug, and instructions shall be provided in accordance with Clause 9.7.1.

7.3.3.3 Type 2, 3R, and 3RX enclosures that also meet the requirements of other enclosure types need not have drainage holes if the enclosure is provided with instructions in accordance with Clause 9.7.2.

7.3.4 Mounting openings

7.3.4.1 For Type 3, 3X, 3S, 3SX, 4, 4X, 6, 6P, 12, 12K, and 13 enclosures, the mounting means shall be external to the equipment cavity or shall comply with Clause 7.3.4.2. For Type 1, 2, 3R, 3RX, and 5 enclosures, the mounting means shall comply with 6.3.4 of Annex B, Ref. No. 10.

7.3.4.2 In accordance with Clause 7.3.4.1, the mounting means may pass through the enclosure wall into the equipment cavity if it attaches to an intermediate bracket or foot and is tested in accordance with Clause 8.1. The bracket or foot shall then rely on separate mounting hardware to attach it to the building wall. The mounting means shall not have the same mounting hardware both pass through the equipment cavity and attach directly to the building wall.

7.3.4.3 The mounting means noted in Clause 7.3.4.1 may be provided as a kit if the kit and the marking or instructions are included with the enclosure referencing this kit. The kit may be supplied separately only if the hardware required to maintain the environmental rating of the enclosure is provided.

7.3.5 Ventilation

7.3.5.1 An enclosure may be ventilated if the enclosure is tested in accordance with Clause 8.1 and the applicable design tests for the environmental rating(s) of the enclosure in accordance with Table 6.

7.4 Conduit connection

7.4.1 General

7.4.1.1 Enclosures shall be designed for use with appropriate conductor entry provisions to maintain the specified environmental capability in accordance with Clause8.1.1 after proper installation.

7.4.2 Hubs and fittings

7.4.2.1 An enclosure provided without conduit hubs shall be marked in accordance with Clause 9.6.

7.4.2.2 A conduit hub or fitting may be shipped separately if the necessary hardware, gaskets, and instructions are provided with either the enclosure or the fitting.

7.4.2.3 For non-metallic enclosures, other than Type 1, designed for or equipped with detachable threaded conduit hubs that are held in a circular opening, such as a single breakout or knockout, pre-punched openings, or user-punched (as specified in the manufacturer's instructions) openings, by means of a locknut or equivalent, shall withstand a Misalignment test in accordance with the requirements of 8.15 applied to any detachable hub installed in the enclosure.

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7.4.2.4 In Canada, the requirements of Clause 7.4.2.3 shall also apply to metallic enclosures, other than Type 1, with wall thickness less than 1.35 mm (0.05 in).

7.4.3 Knockouts and breakouts

7.4.3.1 All enclosure types may have knockouts and breakouts, except Type 12 enclosures.

7.4.3.2 Knockouts and breakouts shall meet the appropriate design tests in Table 2 or Table 6 for the enclosure type in which they are provided.

7.5 External operating mechanisms

7.5.1 External operating mechanisms, when mounted on or through the enclosure, shall comply with the applicable design tests in Table 2 or Table 6 for the enclosure type unless otherwise specified.

7.5.2 External operating mechanisms on a Type 3S and 3SX enclosure shall support the additional weight of ice and withstand the removal of ice by a hand tool. See Clause 8.5.

7.6 Access to interior

7.6.1 Types 3, 3X, 3R, 3RX, 3S, 3SX, 5, 12, and 12K enclosures shall require the use of a tool to gain access to the equipment cavity or shall have provisions for locking. When the provision for locking is provided as an accessory:

a) The accessory shall be shipped with the enclosure of which it is intended to be installed; and

b) Both the accessory and the enclosure shall comply with Clause 9.

7.6.2 All closing hardware for Type 5, 12, and 12K enclosures shall be captive.

7.7 Gaskets

7.7.1 A gasket of elastomeric or thermoplastic material or a composition gasket utilizing an elastomeric material that is provided on a Type 2, 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, or 13 enclosure to meet the environmental construction and performance requirements of this standard shall comply with the Gasket test of Clause 8.13.2 or 8.13.5.

7.7.2 A gasket provided on a Type 12, 12K, or 13 enclosure shall be oil resistant and shall additionally comply with the Oil immersion test in Clause 8.13.4.

7.7.3 A gasket shall be secured with adhesive or by mechanical means. The gasket and its securing means shall not be damaged when the joint is opened.

7.7.4 A cellular (open cell and closed cell) gasket of elastomeric or thermoplastic material or a composition gasket utilizing an elastomeric material which is under periodic compression and that is provided on a Type 2, 3, 3X, 3R, 3RX, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, or 13 enclosure to meet the environmental construction and performance requirements of this standard shall comply with the Gasket test of Clause 8.13.3. Gaskets under periodic compression are those which are subject to prolonged periods of compression followed by occasional, short periods of relaxation where the seal provided by the gasket may be broken during the life of the application and, after each such occurrence, the gasket is expected to provide the same seal when recompressed. Gaskets that are between parts of the enclosure not intended to be removed under regular use or maintenance are considered to not be under periodic compression.

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