CSA Group

C22.2 No. 40-M1989

(reaffirmed 2014)

Cutout, Junction, and Pull Boxes

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CSA Group

General Instruction No. 2
C22.2 No. 40-M1989
March 1992

CSA Standard C22.2 No. 40-M1989, *Cutout, Junction, and Pull Boxes,* was published in April 1989; it consisted of **37 pages,** each dated **April 1989.**

Errata to Clause 4.8.1 and Table 2 are incorporated (and identified by a vertical line in the margin) in the attached replacement pages.

CSA Standard C22.2 No. 40-M1989 now consists of the following pages:

3–18, 21–28, and **31–37** dated **April 1989;** and

19, 20, 29, and **30** dated **March 1992.**

These replacement pages are to be inserted into your copy of the Standard; the pages replaced should be kept for reference.

the edge of the metal and only slightly longer than the width of the strip. The acceptability of formed hinges made of materials other than steel shall be determined by special investigation.

4.6.1.8
Hinges of the ear-type shall not be used where the spacing between them would be more than 650 mm, regardless of the thickness of the metal used.
Note: *This type of hinge consists of projections at the ends of opposite side or end walls and corresponding projections in flanges on the cover. Rivets or bolts serve as hinge pins to connect adjacent projections on wall and cover respectively.*

4.6.1.9
Hinge pins without heads shall be upset or secured in place in an equivalent way.

4.6.2 Nonmetallic Enclosures
Hinges shall be constructed to permit the opening and closing of the door (refer to Clause 4.5.2).
Note: *It is intended that the reliability of membrane-type hinges will be determined by this requirement. Hinges may form either an integral part or be considered an add-on.*

4.7 Latches and Handles

4.7.1 Metal Enclosures

4.7.1.1
Doors shall be provided with at least one latch which shall have adequate strength and a positive action that prevents the doors from jarring open due to any vibration that they are likely to be subjected to during normal use.

4.7.1.2
Latches shall be securely fastened in place by not fewer than two screws, rivets, spot welds, or some acceptable equivalent.

4.7.1.3
Single doors more than 1220 mm in length shall be provided with a minimum of two latches that secure the doors at points nearest the ends. Double-doors that overlap shall be secured by a minimum of two latches, one located at each end. Latches are only required on the door that closes last. Double-doors that do not overlap shall have two latches per door, one located at each end of each door.

4.7.1.4
Where a door has all its edges flanged and does not exceed 457 mm in width or length, a latch may consist of:
(a) a button stamped in the side wall of the box that engages an indentation or close-fitting hole in the cover flange; or
(b) a button stamped on the cover flange that engages an indentation or close-fitting hole in the side wall of the box.

4.7.1.5
Except where latches of the pin-tumbler or self-locking types are used, knobs, door handles, or an approved equivalent shall be

provided for the opening of doors.

4.7.2 Nonmetallic Enclosures
Latches shall provide a positive fastening action.
Note: *Latches may form either an integral part or be considered an add-on.*

4.8 Covers

4.8.1* Metal Enclosures
Covers, unless hinged directly to the side wall of the box, shall be secured by no less than four fastenings, except that two screws, one at the centre of each short side, may be used to fasten a cover no larger than 32 900 mm^2, provided that no dimension of the cover is greater than 216 mm.
***Effective Date**--*March 31, 1992*

4.8.2 Nonmetallic Enclosures

4.8.2.1
Covers for junction or pull boxes shall be of the blank-type only.

4.8.2.2
Covers shall be a minimum of 4.37 and an average of 4.76 mm thick.

4.8.2.3
Mating surfaces of a cover and box shall provide a close fit. A gasket, if required to provide a close fit, shall be provided with the cover but need not be cemented or otherwise secured in place on the cover.

4.8.2.4
Screws provided to attach covers shall be made of brass, bronze, or steel. If made of steel, they shall be protected against corrosion. Screws shall be not smaller than No. 6, have no more than 32 threads per 25.4 mm, and shall engage at least 2 full threads in the cover.

4.9 Knockouts and Twistouts

4.9.1 Metal Boxes

4.9.1.1
Where knockouts are punched from the material of the box proper, they shall be clean-cut and, after being planished, shall not protrude more than (approximately) 50% of the thickness of the metal at any point on their circumference.

4.9.1.2
Where multiple arrangements consisting of a single knockout combined with twistouts are used, each shall be held by ties at least 3.17 mm wide, and the ties shall be arranged to make it unlikely that any other than the desired opening will be made. This will ordinarily require one or more extra ties for the twistouts, and staggering of the ties. See Clause 6.4 of CSA Standard C22.2 No. 0 for the test requirements for a single knockout surrounded by multiple twistouts.

shown in Figure 2, with the dimensions shown in Table 10.

Before the gauge is used, the knockout shall be removed and, when necessary, the remaining tab shall be filed or ground flush with the surface of the box, inside and outside the box, as well as at the edge surrounding the opening. An appropriate trade size gauge shall be used, offset from the centre of the knockout in a direction opposite to the area to be tested.

When testing knockouts located adjacent to a box radius, a steel feeler gauge, 0.13 mm thick and 2.5 mm wide, shall be used to check the space between inner box surface and the flat surface of the gauge, as shown in Figure 3.

The test gauge shall not be canted or tilted to make the necessary contact with the surface of the box.

The ability to insert the steel feeler between the box surface and the gauge surface confirms that the box's corner radius encroaches on the required flat surface and that the box has failed the test. When testing knockouts or portions of knockouts located away from any radius between two adjacent walls, the steel feeler gauge shall not be used.

Note: *The purpose of this test is to ensure that a locknut will be seated flush with the surface of the box.*

6.3.2 Strength of Knockouts

A knockout shall remain in place when subjected to a force of 44 N applied at right angles by means of a mandrel with a 6.4 mm diameter flat end. The mandrel shall be applied at the point most likely to cause movement of the knockout.

6.3.3 Knockouts (Pryouts, Including Breakouts) in Boxes of Nonmetallic Material

6.3.3.1

A knockout shall be removed easily by means of a screwdriver used as a chisel, without any sharp edges being left or any damage being caused to the box. The side edge of a screwdriver may be run once along the edge of the knockout opening to remove any fragile tabs remaining along the edge.

6.3.3.2

Boxes that are constructed of a material that is known to be affected by low temperatures shall be conditioned for 5 h at a temperature of -20 ± 2°C in circulating air. Immediately after this conditioning, the test described in Clause 6.3.3.1 shall be repeated on a knockout.

6.4 Security of Doors

Doors shall be opened and closed 25 times without evidence of cracking or other indications of material breakdown.

Table 1
Minimum Thickness for Cast Metal Enclosures
(See Clause 4.1.2.1.)

Method of fabrication	Minimum thickness of plain walls, mm	
	Area up to 15 480 mm^2 Length up to 152 mm	Area over 15 480 mm^2 Length over 152 mm
Die-cast	1.58*	2.38
Other	3.17	3.17

**Area and length limitations may be complied with by subdividing larger areas by means of suitable reinforcing ribs.*

Table 2†
Minimum Thickness of Sheet Metal
(See Clause 4.1.2.2.)

Maximum size of largest surface		Minimum thickness, mm		
Length or width, mm	Area, m^2	Steel	Stainless steel*	Aluminum
610	0.232	1.34	1.06	1.84
1016	0.645	1.69	1.34	2.33
2286	1.626	2.35	1.69	3.03
Over 2286	Over 1.626	3.11	2.35	3.81

**Stainless sheet-steel shall comply with ASTM Standard A167.*
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General Instruction No. 1

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Cutout, Junction, and Pull Boxes

Wiring Products

Forming Part of Canadian Electrical Code, Part II Safety Standards for Electrical Equipment

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Contents

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Preface

This is the fourth edition of CSA Standard C22.2 No. 40, one of a series of Standards issued by the Canadian Standards Association under *Part II* of the *Canadian Electrical Code*. It is written in SI (metric) units and replaces the previous editions published in 1973, 1957, and 1936.

This edition covers the following changes to the previous edition:

(a) the incorporation of published amendments Nos. 1 to 10;
(b) the incorporation of the requirements of the following Electrical Bulletin:

Bulletin No.	Publication date	Subject
896	September 18, 1972	Cutout, Junction and Pull Boxes Made of Nonmetallic Material

(c) amendments to the definitions for "cutout box" and "junction or pull box".

For general information on the Standards of the Canadian Electrical Code, Part II, see the Preface of CSA Standard C22.2 No. 0, *General Requirements--Canadian Electrical Code, Part II*.

This Standard was prepared by a Subcommittee of the Technical Committee on Wiring Products under the jurisdiction of the Standards Steering Committee on the *Canadian Electrical Code, Part II*, and was formally approved by these Committees.

April 1989

Notes:

(1) *Use of the masculine gender in this Standard is not meant to exclude the feminine gender when applied to persons. Similarly, use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *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 user of the Standard to judge its suitability for his particular purpose.*

(3) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.*

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Requests for interpretation should

(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
(b) provide an explanation of circumstances surrounding the actual field condition; and
(c) be phrased where possible to permit a specific "yes" or "no" answer.

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Canadian Standards Association, 178 Rexdale Boulevard, Rexdale (Toronto), Ontario M9W 1R3.

Publication Date--*April 30, 1989*
(ie, the date on or after which this Standard may, at the discretion of the applicant, be used for certification).

Effective Date--*April 30, 1990*
(ie, the date on which this Standard shall be applicable to equipment being submitted for certification and to equipment already certified and manufactured on or after that date).
**Unless otherwise noted in the text or General Instruction.*

1. Scope

1.1
This Standard applies to the following products intended for use in accordance with the *Rules of the Canadian Electrical Code, Part I*:
(a) metal and nonmetallic cutout boxes;
(b) metal and nonmetallic junction boxes (of other than the swimming pool type), and pull boxes where the length does not exceed three times the width and the volume exceeds 1640 mL.

1.2
This Standard does not apply to
(a) junction and pull boxes that are made in accordance with CSA Standard C22.2 No. 18;
(b) enclosures for use in hazardous locations;
(c) enclosures that are made in accordance with CSA Standard C22.2 No. 26;
(d) junction boxes that are made in accordance with CSA Standard C22.2 No. 89; and
(e) weather-proof, water-proof, water-tight, and dust-tight enclosures.

2. Definitions

2.1
The following definitions apply in this Standard:

Bonding kit--a means for bonding a terminal that is intended to be field or factory installed, consisting of connectors and hardware such as bolts, studs, or screws, suitable for connecting a bonding conductor No. 14 AWG or larger to equipment required to be connected to ground. It is in addition to the means for securing conduit or cable armour.
Note: *It is not intended that the bonding kit consist merely of screws for direct attachment of bonding conductors.*

Cutout box--an enclosure of adequate mechanical strength, composed entirely of noncombustible and absorption-resistant material, designed for surface mounting, and having swinging doors or covers secured directly to and telescoping with the walls of the box proper.
Note: *This includes a transformer or meter box provided with a plate secured on the inside back wall for the mounting of an instrument transformer or meter.*

Door--an unflanged piece of metal that is hinged and closes an opening (refer to Figure 1.2 for a typical example).

Hinged cover--a flanged piece of metal that closes an opening