UL 6A

STANDARD FOR SAFETY

Electrical Rigid Metal Conduit – Aluminum, Red Brass, and Stainless Steel

UL Standard for Safety for Electrical Rigid Metal Conduit – Aluminum, Red Brass, and Stainless Steel, UL 6A

Second Edition, Dated October 31, 2008

Summary of Topics

This reaffirmation of ANSI/UL 6A dated November 20, 2024 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

As noted in the Commitment for Amendments statement located on the back side of the title page, ULSE, CSA, and ANCE are committed to updating this harmonized standard jointly. However, the revision pages dated November 20, 2024 will not be jointly issued by ULSE, CSA, and ANCE as these revision pages only address UL ANSI approval dates.

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 requirements are substantially in accordance with Proposal(s) on this subject dated September 27, 2024.

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NMX-J-576-ANCE-2019
Second Edition

CSA Group
CSA C22.2 No. 45.2-08
First Edition

ULSE Inc.
UL 6A
Second Edition

Electrical Rigid Metal Conduit – Aluminum, Red Brass, and Stainless Steel

October 31, 2008

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ANSI/UL 6A-2019 (R2024)

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), Canadian Standards Association (operating as "CSA Group"), and ULSE Inc. (ULSE). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or ULSE at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and ULSE. CSA Group and ULSE 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 ULSE 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 Second Edition including revisions through November 20, 2024. The most recent designation of ANSI/UL 6A as a Reaffirmed American National Standard (ANS) occurred on November 20, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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Preface

This is the harmonized ANCE, CSA Group, and ULSE standard for electrical rigid metal conduit – aluminum, red brass, and stainless steel. It is the second edition of NMX-J-576-ANCE, the first edition of CSA C22.2 No. 45.2, and the second edition of UL 6A. This harmonized standard has been jointly revised on March 5, 2021. For this purpose, CSA Group and UL are issuing revision pages dated March 5, 2021, and ANCE is issuing a new edition dated March 5, 2021.

This harmonized standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and ULSE. The efforts and support of the conduit manufacturing industry and the Technical Harmonization Subcommittee for Conduit and Tubing 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 CT Technical Committee 23 Electrical Accessories from the Comite de Normalizacion de la Asociacion de Normalizacion y Certificacion, A.C., CONANCE, with the collaboration of the metal conduit and tubing manufacturers and users.

This standard was reviewed by the CSA Subcommittee on Metal Conduit and Tubing, 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 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 Technical Harmonization Subcommittee identified several IEC standards that address electrical conduit and tubing included in the scope of this standard. The IEC standards for electrical conduit and tubing are recognized as being generally system-specific, containing the requirements for the relevant conduits and cables and associated fittings in several discrete IEC standards.

The THSC determined the safe use of electrical conduit and tubing is dependent on the design and performance of the conduit and tubing systems 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 conduit and tubing and associated fittings with those presently

addressed in the known IEC standards. The THSC agreed such future investigation might be facilitated by the completion of harmonization of the North American standards for electrical conduit and tubing and their fittings.

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.

Electrical Rigid Metal Conduit – Aluminum, Red Brass, and Stainless Steel

1 Scope

1.1 These requirements cover aluminum (ERMC-A) and stainless steel (ERMC-SS) electrical rigid metal conduit, nipples, elbows, and couplings in 12 – 155 (3/8 – 6) trade sizes for use as metal raceway for the installation of wires and cables in accordance with CSA C22.1, Canadian Electrical Code, Part 1, NOM-001-SEDE, Standard for Electrical Installations, and NFPA 70, National Electrical Code (see Reference Item No. 1, Annex A). It is the user's responsibility to determine the appropriate product for the application.

1.2 These requirements also cover red brass (ERMC-RB) electrical rigid metal conduit, nipples, elbows, and couplings in 16 (1/2) trade size for use as metal raceway for the installation of wires and cables in direct burial and swimming pool applications in accordance with the applicable national electrical installation codes.

1.3 Steel conduit is covered by the standards listed in Reference Item No. 2, Annex A.

2 Normative references

2.1 Products covered by this standard shall comply with the reference installation codes and standards 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. A "Reference Item No." is provided at the point of use for each reference in this standard. See Annex A for a list of reference publications and the correlating list of reference item numbers to applicable country publications.

2.2 Undated references to standards shall be considered to refer to the latest edition and all revisions to that edition up to the time when this standard was approved. Dated references to standards shall be considered to refer to the dated edition and all revisions published to that edition up to the time the standard was approved.

3 Definitions

3.1 The following definitions apply in this standard.

3.2 Elbow – A manufactured curved section of conduit threaded on each end.

3.3 Electrical rigid metal conduit – aluminum (ERMC-A) – A threadable aluminum raceway of circular cross-section designed for the physical protection and routing of wire conductors and use as an equipment grounding conductor when installed utilizing appropriate fittings.

3.4 Electrical rigid metal conduit – red brass (ERMC-RB) – A threadable red brass raceway of circular cross-section designed for the physical protection and routing of wire conductors and use as an equipment grounding conductor when installed utilizing appropriate fittings.

3.5 Electrical rigid metal conduit – stainless steel (ERMC-SS) – A threadable stainless steel raceway of circular cross-section designed for the physical protection and routing of wire conductors and use as an equipment grounding conductor when installed utilizing appropriate fittings.

3.6 Finished conduit – A straight conduit with one coupling attached.

3.7 Nipple – A straight section of conduit generally not more than 610 mm (2 ft) long and threaded on each end.

3.8 Protective coating – A coating on the conduit for protection against severe corrosive conditions.

3.9 Straight conduit – A straight length of conduit without a coupling.

3.10 Threaded coupling – An internally threaded cylinder that connects two sections of conduit.

4 Units of measurement

4.1 In Canada and Mexico, the values given in SI (metric) units shall be normative. Any other values given shall be for information purposes only.

In the United States, the values stated in either SI units or inch-pound units shall be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems can result in nonconformance with the standard.

5 Construction

5.1 Tube

5.1.1 Each tube shall be of an aluminum alloy containing no more than 0.40 % copper, a red brass alloy C23000 as indicated in Reference Item No. 3, Annex A, or stainless steel. Each tube shall have a circular cross section, with dimensions as specified in Table 5.1, thereby facilitating the cutting of clean, true threads.

5.1.2 The interior or exterior surfaces of the tube shall not have metal trimmings, sharp edges, or sharp projections. For welded tubes, a slight bead on the interior wall at the weld line shall be allowed if the bead is not sharp and if the bead does not exceed 0.38 mm (0.015 in) in height for 12 – 53 (3/8 – 2) trade sizes or 0.51 mm (0.020 in) in height for 63 – 155 (2-1/2 – 6) trade sizes.

Table 5.1
Outside diameter of conduit

Metric designator	Outside diameter,[a] mm	Trade size	Outside diameter,[a] in
12[b]	17.15	3/8[b]	0.675
16	21.34	1/2	0.840
21	26.67	3/4	1.050
27	33.40	1	1.315
35	42.16	1-1/4	1.660
41	48.26	1-1/2	1.900
53	60.33	2	2.375
63	73.03	2-1/2	2.875
78	88.90	3	3.500
91	101.60	3-1/2	4.000

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Table 5.1 Continued

Metric designator	Outside diameter,[a] mm	Trade size	Outside diameter,[a] in
103	114.30	4	4.500
129	141.30	5	5.563
155	168.28	6	6.625

[a] Tolerances:

12 – 41 (3/8 – 1-1/2) trade sizes ± 0.38 mm (±0.015 in)

53 – 155 (2 – 6) trade sizes ± 1%

[b] In the United States and Mexico, 12 (3/8) trade size is permitted for special applications. In Canada, 12 (3/8) trade size is not permitted by the Canadian Electrical Code, Part I.

5.2 Finished conduit

5.2.1 The length of straight conduit and the weight of finished conduit shall be as indicated in Clause 5.2.2 and Table 5.2. Typical dimensions of conduit complying with the requirements of this standard are provided for information only in Annex B.

5.2.2 The production of lengths shorter or longer than the standard length specified in Table 5.2 shall be allowed, whether threaded or unthreaded and with or without couplings. Lengths other than standard lengths shall have a minimum acceptable weight proportional to the weights specified in Table 5.2. The length tolerances specified in Table 5.2 shall be applicable to standard and nonstandard lengths.

5.2.3 Standard lengths of finished conduit shall be provided with one threaded coupling attached.

5.2.4 The exterior and interior surfaces of the finished conduit shall be free from hard scale, burrs, fins, or other defects. See Annex C.

Table 5.2
Length and weight of finished conduit[a]

Metric designator	Length of finished conduit without a coupling attached, mm (±6 mm)	Minimum weight of ten lengths of finished conduit with one coupling attached to each length			Trade size	Length of finished conduit without a coupling attached, ft and in (±1/4 in)	Minimum weight of ten lengths of finished conduit with one coupling attached to each length		
		Stainless steel, kg[b]	Aluminum, kg[c]	Red brass, kg[d]			Stainless steel, lb[e]	Aluminum, lb[f]	Red brass, lb[g]
12	3035	23.46	8.08	h	3/8	9 11-1/2	51.6	17.8	h
16	3030	36.12	12.40	39.05	1/2	9 11-1/4	79.5	27.4	89.1
21	3030	47.98	16.48	h	3/4	9 11-1/4	105.6	36.4	h
27	3025	69.86	24.01	h	1	9 11	152.7	53.0	h
35	3025	91.75	31.54	h	1-1/4	9 11	201.8	69.6	h
41	3025	113.63	39.08	h	1-1/2	9 11	250.0	86.2	h
53	3025	151.59	52.10	h	2	9 11	333.5	115.0	h
63	3010	240.57	82.70	h	2-1/2	9 10-1/2	529.3	182.5	h
78	3010	311.62	107.12	h	3	9 10-1/2	685.6	236.4	h

Table 5.2 Continued on Next Page

Table 5.2 Continued

Metric designator	Length of finished conduit without a coupling attached, mm (±6 mm)	Minimum weight of ten lengths of finished conduit with one coupling attached to each length			Trade size	Length of finished conduit without a coupling attached, ft and in (±1/4 in)	Minimum weight of ten lengths of finished conduit with one coupling attached to each length		
		Stainless steel, kg[b]	Aluminum, kg[c]	Red brass, kg[d]			Stainless steel, lb[e]	Aluminum, lb[f]	Red brass, lb[g]
91	3005	379.37	130.41	h	3-1/2	9 10-1/4	834.6	287.8	h
103	3005	443.83	152.58	h	4	9 10-1/4	976.4	336.7	h
129	2995	599.64	206.14	h	5	9 10	1319.2	454.9	h
155	2995	796.71	273.89	h	6	9 10	1752.8	604.4	h

[a] The lengths indicated are designed to produce a 3.05 m (10 ft) length of conduit when a standard coupling is attached.

[b] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 7861 kg/m^3. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 7861.

[c] The weight shown is for an aluminum alloy with a density of 2710 kg/m^3. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 2710.

[d] The weight shown is for a red brass alloy with a density of 8747 kg/m^3. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 8747.

[e] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 0.284 pound mass per cubic inch. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.284.

[f] The weight shown is for an aluminum alloy with a density of 0.098 pound mass per cubic inch. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.098.

[g] The weight shown is for a red brass alloy with a density of 0.316 pound mass per cubic inch. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.316.

[h] To be developed.

5.3 Protective coatings

5.3.1 Electrical rigid metal conduit made of aluminum, red brass, or stainless steel does not require a protective coating. When intended for use in concrete, for direct burial, or for use in severely corrosive environments, aluminum conduit shall be provided with a protective coating.

5.3.2 It is not prohibited for one or more protective coatings to be employed. When such protective coatings have not been evaluated as supplying corrosion resistance for the tube, they shall be marked in accordance with Clause 7.8.

5.3.3 Nonmetallic coatings shall be evaluated with respect to flame propagation, the fit of couplings, and electrical continuity with couplings. See Reference Item No. 4, Annex A.

5.3.4 A protective coating shall comply with the requirements of Clause 6.2. When the conduit, elbows, and nipples are intended to be used with either set-screw or compression type couplings, they shall comply with the requirements of Clause 6.2 and be subjected to the assembly, bending, resistance, pull, and fault current tests, without removal of the protective coating, in accordance with the relevant standard for fittings for cable and conduit as indicated in Reference Item No. 4A, Annex A. Conduit, elbows, and nipples provided with a protective coating and marked in accordance with Clause 7.9 are not suitable for use with these couplings and therefore do not require evaluation.

5.4 Threading and chamfering

5.4.1 General

5.4.1.1 Each elbow, nipple, and straight length of conduit shall be threaded on both ends. Each end shall be chamfered on the interior surface to remove burrs and sharp edges formed by the cutting-off tool. The entire effective length of threads (see L_2 in Figure 1) shall be full and clean cut. See Reference Item No. 5, Annex A.

5.4.2 Pitch of threads

5.4.2.1 The pitch, number of threads per 25.4 mm (1 in), and length of the threaded portion at each end of an elbow, nipple, or straight length of conduit shall be as indicated in Figure 1 and Table 5.3.

Table 5.3
Dimensions of threads

Metric designator	Number of threads per 25.4 mm	L_4 Total length of threads,[a] mm	L_2 Effective length of threads, mm	E_0 Pitch diameter at end of conduit,[b] mm	Trade size	Number of threads per inch	L_4 Total length of threads,[a] in	L_2 Effective length of threads, in	E_0 Pitch Diameter at end of conduit,[b] in
12[c]	18	15.2	10.4	15.55	3/8[c]	18	0.60	0.41	0.612
16	14	19.8	13.5	19.26	1/2	14	0.78	0.53	0.758
21	14	20.1	14.0	24.58	3/4	14	0.79	0.55	0.968
27	11.5	24.9	17.3	30.83	1	11-1/2	0.98	0.68	1.214
35	11.5	25.7	18.0	39.55	1-1/4	11-1/2	1.01	0.71	1.557
41	11.5	26.2	18.3	45.62	1-1/2	11-1/2	1.03	0.72	1.796
53	11.5	26.9	19.3	57.63	2	11-1/2	1.06	0.76	2.269
63	8	39.9	29.0	69.08	2-1/2	8	1.57	1.14	2.720
78	8	41.4	30.5	84.85	3	8	1.63	1.20	3.341
91	8	42.7	31.8	97.47	3-1/2	8	1.68	1.25	3.838
103	8	43.9	33.0	110.09	4	8	1.73	1.30	4.334
129	8	46.7	35.8	136.93	5	8	1.84	1.41	5.391
155	8	49.5	38.4	163.73	6	8	1.95	1.51	6.446

[a] A minus tolerance of one thread applies to the total length of threads L_4.

[b] Plus and minus tolerances of one turn apply to the pitch diameter E_0.

[c] In the United States and Mexico, 12 (3/8) trade size is permitted for special applications. In Canada, 12 (3/8) trade size is not permitted by the Canadian Electrical Code, Part I.

5.4.3 Taper of threads

5.4.3.1 The taper of threads shall have a ratio of 1 to 16 (see Reference Item No. 6, Annex A). The perfect thread (see L_2 in Figure 1) shall be tapered for its entire length.

5.4.3.2 The angle between the sides of the thread shall be 60 degrees when measured in an axial plane. The line bisecting this angle shall be perpendicular to the axis.

5.5 Nipples

5.5.1 A nipple shall be made from straight tubing of the same grade as the conduit, shall be treated, coated, and threaded in accordance with the applicable requirements for conduit in this standard, and shall not exceed 610 mm (2 ft) in length.

5.5.2 The measured weight W_1 in kg (lb) mass of each lot of 100 finished nipples shall not be less than the weight W_2 in kg (lb) mass of 100 finished nipples calculated as:

$$W_2 = (W_3 \times L) - W_4$$

where

W_3 = the weight per 100 nipples from Table 5.4, kg (lb)

W_4 = the weight, from Table 5.5, of metal removed from 100 nipples during threading, kg (lb)

L = the length of one nipple, mm (in).

Example – The minimum weight of one hundred pieces of 1-1/2 (41) trade size nipples, 356 mm (14 in) in length, is:

$$(0.36 \times 356) - 4.99 = 123.17 kg$$

or

$$(20.2 \times 14) - 11 = 271.8 lb$$

Table 5.4
Weights of nipples (W_3)

Metric designator	Weight of W_3 per unit length of nipple			Trade size	Weight of W_3 per unit length of nipple		
	Stainless steel, (kg/100 mm)[a]	Aluminum, (kg/100 mm)[b]	Red brass, (kg/100 mm)[c]		Stainless steel, (lb/in)[d]	Aluminum, (lb/in)[e]	Red brass, (lb/in)[f]
16	0.1199	0.0401	0.1334	1/2	0.068	0.023	0.075
21	0.1396	0.0531	g	3/4	0.090	0.027	g
27	0.2237	0.0772	g	1	0.134	0.043	g
35	0.2952	0.1013	g	1-1/4	0.181	0.057	g
41	0.3632	0.1248	g	1-1/2	0.217	0.070	g
53	0.4831	0.1662	g	2	0.290	0.093	g
63	0.7730	0.2656	g	2-1/2	0.462	0.149	g
78	1.0074	0.3465	g	3	0.603	0.194	g
91	1.1935	0.4095	g	3-1/2	0.726	0.230	g
103	1.4118	0.4855	g	4	0.858	0.272	g
129	1.9039	0.6773	g	5	1.162	0.367	g
155	2.5319	0.8710	g	6	1.509	0.488	g

Table 5.4 Continued on Next Page

Table 5.4 Continued

Metric designator	Weight of W_3 per unit length of nipple			Trade size	Weight of W_3 per unit length of nipple		
	Stainless steel, (kg/100 mm)[a]	Aluminum, (kg/100 mm)[b]	Red brass, (kg/100 mm)[c]		Stainless steel, (lb/in)[d]	Aluminum, (lb/in)[e]	Red brass, (lb/in)[f]

[a] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 7861 kg/m^3. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 7861.

[b] The weight shown is for an aluminum alloy with a density of 2710 kg/m^3. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 2710.

[c] The weight shown is for a red brass alloy with a density of 8747 kg/m^3. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 8747.

[d] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 0.284 pound mass per cubic inch. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.284.

[e] The weight shown is for an aluminum alloy with a density of 0.098 pound mass per cubic inch. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.098.

[f] The weight shown is for a red brass alloy with a density of 0.316 pound mass per cubic inch. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.316.

[g] To be developed.

Table 5.5
Weights of nipples (W_4)

Metric designator	Weight W_4 of metal removed from 100 nipples during threading			Trade size	Weight W_4 of metal removed from 100 nipples during threading		
	Stainless steel, (kg)[a]	Aluminum, (kg)[b]	Red brass, (kg)[c]		Stainless steel, (lb)[d]	Aluminum, (lb)[e]	Red brass, (lb)[f]
16	1.36	0.47	1.54	1/2	3.02	1.04	3.4
21	1.83	0.63	g	3/4	4.03	1.39	g
27	4.09	1.41	g	1	9.05	3.12	g
35	4.55	1.57	g	1-1/4	10.03	3.46	g
41	5.02	1.73	g	1-1/2	11.05	3.81	g
53	6.38	2.20	g	2	14.07	4.85	g
63	27.32	9.42	g	2-1/2	60.26	20.78	g
78	31.84	10.98	g	3	70.30	24.24	g
91	40.95	14.12	g	3-1/2	90.39	31.17	g
103	52.35	18.05	g	4	115.48	39.82	g
129	77.37	26.68	g	5	170.72	58.87	g
155	91.03	31.39	g	6	200.85	69.26	g

[a] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 7861 kg/m^3. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 7861.

[b] The weight shown is for an aluminum alloy with a density of 2710 kg/m^3. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 2710.

Table 5.5 Continued on Next Page

Table 5.5 Continued

Metric designator	Weight W_4 of metal removed from 100 nipples during threading			Trade size	Weight W_4 of metal removed from 100 nipples during threading		
	Stainless steel, (kg)[a]	Aluminum, (kg)[b]	Red brass, (kg)[c]		Stainless steel, (lb)[d]	Aluminum, (lb)[e]	Red brass, (lb)[f]

[c] The weight shown is for a red brass alloy with a density of 8747 kg/m^3. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in kg/m^3 to 8747.

[d] The weight shown is for a stainless steel alloy (Type 304 or 316) with a density of 0.284 pound mass per cubic inch. For a stainless steel alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.284.

[e] The weight shown is for an aluminum alloy with a density of 0.098 pound mass per cubic inch. For an aluminum alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.098.

[f] The weight shown is for a red brass alloy with a density of 0.316 pound mass per cubic inch. For a red brass alloy of a different density, the minimum weight shall be determined by multiplying the weight shown by the ratio of the density of the alloy used in pound mass per cubic inch to 0.316.

[g] To be developed.

5.6 Elbows

5.6.1 Elbows shall be made from the same grade of tube as that used for straight lengths of conduit and shall be coated and threaded in accordance with the requirements for conduit in this standard. Field-produced bends are not included in this standard. See Annex C.

5.6.2 The weight of an elbow, based upon the straight length from which it is formed, shall comply with the requirements for nipples specified in Clause 5.5.2 and Table 5.4 and Table 5.5.

5.6.3 The curve of an elbow shall be formed using any suitable bending equipment capable of producing elbows with a radius of the curve to the centerline not less than that indicated in CSA C22.1, NOM-001-SEDE, and NFPA 70. The curved portion of an elbow shall be smooth and continuous throughout the bend without creases when examined visually under an artificial light source using normal or corrected-to-normal vision. Elbows sharper than 90 degrees are not included in this standard. The length L_s of the straight portions at the ends of an elbow shall not be less than the values indicated in Table 5.6. See Figure 2.

Table 5.6
Minimum acceptable straight length L_s at each end of elbows

Metric designator	Straight length L_s at each end, mm	Trade size	Straight length L_s at each end, in
16	38	1/2	1-1/2
21	38	3/4	1-1/2
27	48	1	1-7/8
35	51	1-1/4	2
41	51	1-1/2	2
53	51	2	2
63	76	2-1/2	3
78	79	3	3-1/8

Table 5.6 Continued on Next Page

Table 5.6 Continued

Metric designator	Straight length L_s at each end, mm	Trade size	Straight length L_s at each end, in
91	83	3-1/2	3-1/4
103	86	4	3-3/8
129	92	5	3-5/8
155	95	6	3-3/4

[a] L_s is illustrated in Figure 2.

5.7 Threaded couplings

5.7.1 Threaded couplings shall be made from the same grade material as that used for straight lengths of conduit and shall be coated in accordance with the requirements for conduit in this standard.

5.7.2 The threads of a coupling shall have pitch diameters shall be within the limits specified in Table 5.7. See Figure 3.

5.7.3 The length of a coupling shall not be less than the applicable value specified in Table 5.7.

5.7.4 A coupling shall be straight tapped. See Reference Item No. 7, Annex A.

5.7.5 Checking of thread dimensions shall be done on clean, undamaged threads.

Table 5.7
Dimensions of straight-tapped conduit couplings

Metric designator	Minimum acceptable length of coupling, mm	Outside diameter of coupling (not a requirement)[a], mm	Pitch diameters, Max. mm	Pitch diameters, Min. mm	Trade size	Minimum acceptable length of coupling, in	Outside diameter of coupling (not a requirement)[a], in	Pitch diameter, Max. in	Pitch diameter, Min. in
12[b]	32.9	23.42	16.6	16.4	3/8[b]	1-19/64	0.922	0.655	0.645
16	41.3	27.38	20.68	20.35	1/2	1-5/8	1.078	0.814	0.801
21	41.7	33.73	26.01	25.68	3/4	1-41/64	1.328	1.024	1.011
27	50.0	39.67	32.59	32.18	1	1-31/32	1.562	1.283	1.267
35	51.6	49.61	41.35	40.94	1-1/4	2-1/32	1.953	1.628	1.612
41	52.4	56.36	47.45	47.04	1-1/2	2-1/16	2.219	1.868	1.852
53	54.0	69.85	59.51	59.11	2	2-1/8	2.750	2.343	2.327
63	81.0	83.34	71.83	71.27	2-1/2	3-3/16	3.281	2.828	2.806
78	84.1	96.84	87.71	87.15	3	3-5/16	3.812	3.453	3.431
91	86.5	112.71	100.40	99.85	3-1/2	3-13/32	4.438	3.953	3.931
103	89.3	127.00	113.10	112.60	4	3-33/64	5.000	4.453	4.431
129	100.4	157.96	140.10	139.60	5	3-61/64	6.219	5.516	5.494
155	108.0	185.74	167.10	166.60	6	4-1/4	7.312	6.578	6.556

Table 5.7 Continued on Next Page

Table 5.7 Continued

Metric designator	Minimum acceptable length of coupling, mm	Outside diameter of coupling (not a requirement)[a], mm	Pitch diameters, Max. mm	Pitch diameters, Min. mm	Trade size	Minimum acceptable length of coupling, in	Outside diameter of coupling (not a requirement)[a], in	Pitch diameter, Max. in	Pitch diameter, Min. in
[a] Although the outside diameter of a coupling is not specified, it usually is larger than shown (no limit), or is not more than 1.0 % smaller than shown [35 (1-1/4) trade size and larger], or is not more than 0.38 mm (0.015 in) smaller than shown [27 (1) trade size and smaller] when the coupling complies with the requirements of this standard.									
[b] In the United States and Mexico, 12 (3/8) trade size is permitted for special applications. In Canada, 12 (3/8) trade size is not permitted by the Canadian Electrical Code, Part I.									

6 Test requirements

6.1 Tube

6.1.1 After being conditioned at a temperature of 0°C (32°F) for 60 min, one specimen of the smallest available trade size of finished tube shall be capable of being bent into a quarter of a circle, using any suitable bending equipment capable of producing elbows with a radius of the curve to the centerline not less than that indicated in CSA C22.1, NOM-001-SEDE, and NFPA 70. The tube shall not develop a crack and a weld shall not open. The test shall be conducted inside the cold chamber or within 15 s of the specimen's removal from the cold chamber.

6.2 Protective coatings

6.2.1 A protective coating shall be subjected to the assembly, bending, resistance, pull, and fault current tests in accordance with Reference Item No. 4B, Annex A, with both set-screw and compression-type couplings.

7 Markings

Advisory Note: In Canada there are two official languages, English and French, and in Mexico the official language is Spanish. Annex D provides translations in French and Spanish of the English markings specified in this standard. Markings required by this standard may have to be provided in other languages to conform with the language requirements of the country where the product is to be used.

7.1 Each straight length of finished conduit, nipple, elbow, and coupling shall be marked with the manufacturer's name, the trade name for the product, or both, or other distinctive marking by means of which the organization responsible for the product can readily be identified.

7.2 In the United States and Mexico, when the conduit, nipples, or elbows are produced in more than one factory, each finished straight length of conduit, each nipple, and each elbow shall have a distinctive marking by means of which it can be identified as the product of a particular factory. This marking may be in code.

In Canada, this requirement does not apply.

7.3 Each straight length of conduit, elbow, and nipple shall be marked "electrical rigid metal conduit – __" or "ERMC-A", "ERMC-SS", or "ERMC-RB" as applicable. The blank shall be filled in with an applicable designation such as "aluminum", "stainless steel", or "red brass".

7.4 Each straight length of red brass conduit and each elbow and nipple shall also be marked "For swimming pool and fountain installations".

7.5 Nipples need not be marked where the unthreaded portion is less than 62 mm (2.5 in) long. The required marking on these sizes shall be applied to the smallest unit container.

7.6 Each coupling shall be die-stamped "EC" in letters not less than 3 mm (1/8 in) high.

7.7 Each finished length of conduit, elbow, or nipple shall be legibly and durably marked "Consult manufacturer for proper installation" or an equivalent marking. Elbows and nipples trade sizes 2 (53) and smaller may be marked on the smallest shipping container instead of the product.

7.8 Conduit, elbows, or nipples provided with a protective coating or coatings that have not been evaluated for furnishing corrosion-resistance for the conduit shall be marked "Corrosion protection properties of the ____ coating were not investigated" or equivalent wording. The blank shall be filled in with the type of protective coating. Elbows and nipples trade sizes 2 (53) and smaller may be marked on the smallest shipping container instead of the product.

7.9 Each straight length of conduit, elbow, or nipple provided with a protective coating, and not meeting the requirements of Clause 6.2, shall be marked “Use Threaded Couplings Only”, or with an equivalent wording. The conduit shall be marked at a minimum of once every 3.05 m (10 ft) and no less than once per piece. Conduit, elbows, or nipples intended for use with fittings that have been subjected to the required assembly, bending resistance, pull, and fault current tests without removal of the protective coating are not required to be so marked.

Figures

Figure 1

Conduit threads

(See Clauses 5.4.1.1, 5.4.2.1, and 5.4.3.1)

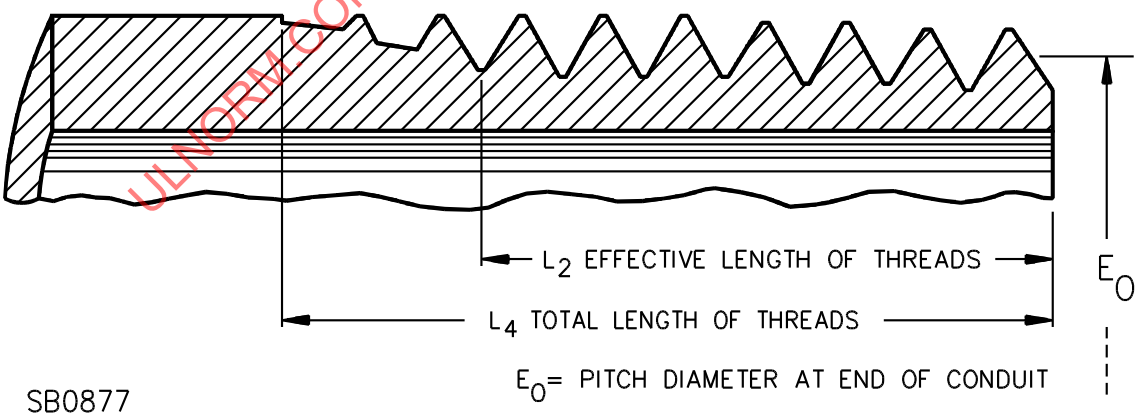

Figure 2

Conduit elbows

(See Clause 5.6.3)

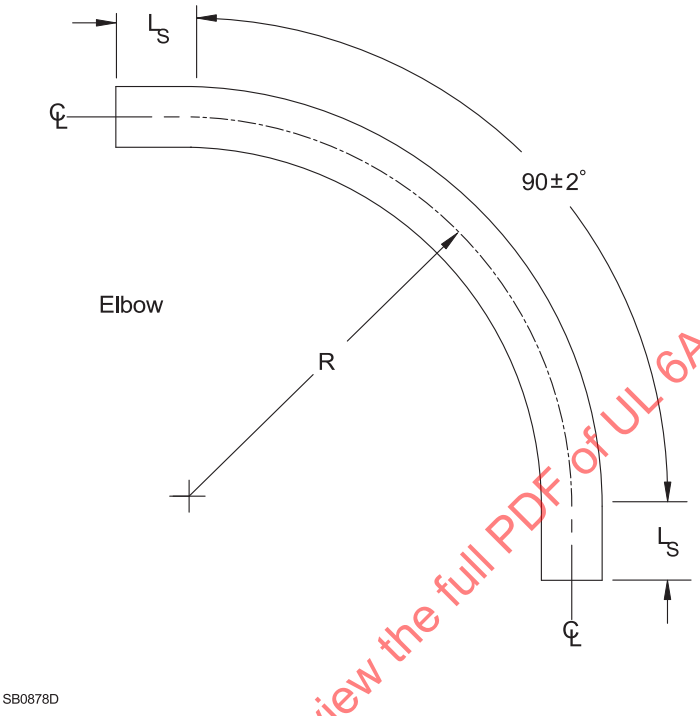

Figure 3

Coupling dimensions

(See Clause 5.7.2)