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Fifteenth Edition

Electrical Rigid Metal Conduit – Steel

November 28, 2022

ANSI/UL 6-2022

Standard for Safety for Electrical Rigid Metal Conduit – Steel

Third Edition, Dated November 28, 2022

Summary of Topics

This new edition dated November 28, 2022 includes the following:

– Updated references in Annex A

– Correction of typo in the measurement for length in millimeters; 5.5.2

– Introduction of a range for specific gravity of copper sulfate solution; 6.2.2.1

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 anytime. 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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The Department of Defense (DoD) has adopted UL 6 on May 10, 1982. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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Preface

This is the harmonized ANCE, CSA Group, and UL standard for Electrical Rigid Metal Conduit – Steel. It is the third edition of NMX-J-534-ANCE, the third edition of CSA C22.2 No. 45.1, and the fifteenth edition of UL 6. This edition of NMX-J-534-ANCE supersedes the previous edition published 2019. This edition of CSA C22.2 No. 45.1 supersedes the previous edition published 2007. This edition of UL 6 supersedes the previous edition published 2019.

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 conduit manufacturing industry and the Technical Harmonization Subcommittee for Conduit and Tubing of the Council of the Harmonization of Electrotechnical Standards for 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. This standard has been developed in compliance with the Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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 an IEC format, but is not based on, nor is it to be considered 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 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 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 – Steel

1 Scope

1.1 These requirements cover electrical rigid metal conduit – steel (ERMC-S), elbows, couplings, and nipples for use as a metal raceway for installation of wires and cables in accordance with CSA C22.1, Canadian Electrical Code, Part I, NOM-001-SEDE, Standard for Electrical Installations, and NFPA 70, National Electrical Code (see Reference Item No. 1, Annex A). ERMC-S is provided with a zinc, zinc-based, nonmetallic, or other alternate corrosion-resistant exterior coating and an organic or zinc interior coating. It is the user's responsibility to determine the appropriate product for their application.

1.2 Non-ferrous and stainless steel conduits are 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 referenced installation codes and standards noted in Annex A 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 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 to that edition up to the time the standard was approved.

3 Definitions

3.1 The following definitions apply in this standard.

3.2 BARE THREADED TUBE – A standard length of threaded tube intended to be coated with an alternate corrosion-resistant coating and having a separate coupling.

3.3 COATING(S), ALTERNATE CORROSION-RESISTANT – A primary coating(s) other than one consisting solely of zinc, which upon evaluation has demonstrated the ability to provide the level of corrosion resistance required on the exterior of conduit. See 6.2.4.

Note: The coating(s) may include zinc.

3.4 COATING(S), ORGANIC – An interior coating(s), other than one consisting solely of zinc, which, upon evaluation, has demonstrated the ability to provide the level of corrosion resistance necessary where the coating is not subject to physical damage. See 6.2.3.

Note: The coating(s) may include zinc.

3.5 COATING(S), ZINC – A primary coating consisting solely of zinc, which upon evaluation has demonstrated the ability to provide the level of corrosion resistance required on the exterior or interior of conduit as applicable. See 6.2.2.

3.6 ELBOW – A manufactured curved section of ERMC-S threaded on each end.

3.7 ELECTRICAL RIGID METAL CONDUIT – STEEL (ERMC-S) – ERMC-S is a threadable 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.

3.8 FINISHED CONDUIT – A straight conduit with one coupling attached.

3.9 NIPPLE – A straight section of ERMC-S generally not more than 0.6 m (2 ft) long and threaded on each end.

3.10 PRIMARY COATING – A coating on the outside of the conduit for protection against corrosion. See 5.3.1.1.

3.11 STRAIGHT CONDUIT – A straight length of ERMC-S with the protective coating applied but without coupling.

3.12 SUPPLEMENTARY COATING – A coating on the outside of the conduit, in addition to the primary coating, for protection against severe corrosive conditions. See 5.3.5.

3.13 THREADED COUPLING – An internally threaded cylinder that connects two sections of ERMC-S.

4 Units of Measurement and General Requirements

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.

4.2 In Canada, general requirements applicable to this standard are given in CSA C22.2 No. 0.

5 Construction

5.1 Tube

5.1.1 Each tube shall be of steel, shall be straight and shall have a circular cross-section, with dimensions as specified in Table 5.1, thereby facilitating the cutting of clean, true threads. The wall thickness shall be uniform throughout the length of the tube. All seams shall be thoroughly welded.

5.1.2 A welded seam shall not have metal trimmings, sharp edges, or sharp projections on the interior or exterior surfaces of the tube. 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 the trade size 12 – 53 (3/8 – 2) or 0.51 mm (0.020 in) in height for the trade size 63 – 155 (2-1/2 – 6).

5.1.3 Before the protective coating is applied, the interior and exterior surfaces of each tube shall be freefrom scale, flash, or any other protrusion other than as specified in 5.1.2.

Table 5.1
Dimensions of ERMC-S

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
103	114.30	4	4.500
129	141.30	5	5.563
155	168.28	6	6.625

[a] Tolerances: Trade Size 12 – 41 (3/8 – 1-1/2) ±0.38 mm (±0.015 in)

Trade Size 53 – 155 (2 – 6) ±1 %

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

5.2 Finished conduit

5.2.1 The length of straight conduit, and the weight of finished zinc-coated conduit or bare threaded tube to be coated with an alternate corrosion-resistant coating with one coupling, shall be as indicated in 5.2.2 and Table 5.2. Typical dimensions of conduit complying with the requirements in 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 in Table 5.2 shall be applicable for standard and non-standard lengths.

5.2.3 Standard lengths of finished conduit with a primary coating of zinc shall be provided with one threaded coupling attached or shall have one assembled-on integral coupling. Conduit produced from bare threaded tube provided with an alternate corrosion-resistant coating shall have one separate coupling.

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

Table 5.2
Length and Weight of Standard 3.05-m (10-ft) Lengths of Conduit

Metric designator	Length of straight conduit[a] ±6 mm	Minimum acceptable weight of ten lengths of conduit with ten couplings, kg		Trade size	Length of straight conduit, feet and inches[a] ±1/4 in	Minimum acceptable weight of ten lengths of conduit with ten couplings, lbs	
		Finished zinc coated conduit[b]	Bare threaded tube[c]			Finished zinc coated conduit[b]	Bare threaded tube[c]
12[d]	3035	23.4	22.0	3/8[d]	9 – 11-1/2	51.5	48.6
16	3030	35.8	34.2	1/2	9 – 11-1/4	79.0	75.4
21	3030	47.6	45.5	3/4	9 – 11-1/4	105.0	100.4
27	3025	69.4	66.8	1	9 – 11	153.0	147.2
35	3025	91.2	87.8	1-1/4	9 – 11	201.0	193.5
41	3025	112.9	109.0	1-1/2	9 – 11	249.0	240.4
53	3025	150.6	145.6	2	9 – 11	332.0	321.1
63	3010	239.0	233.1	2-1/2	9 – 10-1/2	527.0	513.9
78	3010	309.6	302.4	3	9 – 10-1/2	682.0	666.6
91	3005	376.9	368.6	3-1/2	9 – 10-1/4	831.0	812.6
103	3005	441.0	431.6	4	9 – 10-1/4	972.3	951.6
129	2995	595.8	584.2	5	9 – 10	1313.6	1288.0
155	2995	791.7	777.8	6	9 – 10	1745.3	1714.7

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

[b] This conduit is protected with a zinc or zinc-based coating consisting primarily of zinc.

[c] This conduit is intended to be protected with an alternate corrosion-resistant coating.

[d] In the United States and Mexico, 12 (3/8) trade size may be used for special applications. In Canada, 12 (3/8) trade size is not permitted according to the Canadian Electrical Code, Part I.

5.3 Protective coatings

5.3.1 General

5.3.1.1 The exterior surface of ERMC-S shall be protected against corrosion by a coating solely of zinc as described in 5.3.2 or an alternate corrosion-resistant coating as described in 5.3.3. If evaluated for two or more primary coatings, the conduit shall be marked in accordance with 7.11. The interior surface of ERMC-S shall be protected against corrosion by a coating of zinc or an organic coating, as described in 5.3.2 and 5.3.4 respectively. See Annex C for an overview.

5.3.1.2 Primary coatings applied over other primary coatings on conduit, elbows, and nipples shall comply with 6.2.4.9.

5.3.1.3 Conduit, elbows, or nipples provided with a primary coating that is prepared or modified for the application of an additional primary coating shall undergo the preparation process before being subjected to the tests in 6.2.

5.3.2 Zinc coating

5.3.2.1 A protective coating of zinc shall cover completely, shall adhere firmly at all points, shall be smooth and free from blisters and other defects that can lessen the protective value of the coating, shall be in metal-to-metal contact with the steel, and shall comply with 6.2.2. See 5.4.2 regarding threads.

5.3.3 Alternate corrosion-resistant coating

5.3.3.1 An alternate corrosion-resistant coating shall cover completely, shall adhere firmly at all points, and shall be smooth and free from blisters and other defects that can lessen the protective value of the coating. See 5.4.2 regarding threads.

5.3.3.2 An alternate corrosion-resistant coating shall comply with the requirements of 6.2.4. 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 6.2.4 and be subjected to the assembly, bending, resistance, pull, and fault current tests, without removal of the alternate corrosion-resistant coating, in accordance with the relevant standard for fittings for cable and conduit as indicated in Reference Item No. 3, Annex A. Conduit, elbows, and nipples provided with an alternate corrosion-resistant coating and marked in accordance with 7.6 are not suitable for use with these couplings and therefore do not require evaluation.

5.3.3.3 Conduit provided with a nonmetallic alternate corrosion-resistant coating that is not marked with a temperature designation, or is marked "90 °C" ("200 °F") is for use in ambient temperatures not to exceed 90 °C (200 °F). It is not prohibited that conduit provided with a nonmetallic alternate corrosion-resistant coating that is for use at temperatures in excess of 90 °C (200 °F) be marked with a rating which has been evaluated in accordance with 6.2.4.4.1.

5.3.3.4 Conduit provided with a nonmetallic alternate corrosion-resistant coating that is not marked with a temperature designation, or is marked "0 °C" ("32 °F"), is for use in ambient temperatures not below 0 °C (32 °F). It is not prohibited that conduit provided with a nonmetallic alternate corrosion-resistant coating that is for use at temperatures below 0 °C (32 °F) be marked with a rating which has been evaluated in accordance with 6.1.2 and 6.2.4.10.

5.3.4 Organic coating

5.3.4.1 An organic coating shall cover evenly the surface to which it is applied, shall be of uniform quality throughout, shall have a smooth and even appearance, and shall comply with 6.2.3 and the bending requirements of 6.2.1.1.

5.3.5 Supplementary coating

5.3.5.1 The supplementary coating or coatings are not required to meet the requirements for primary corrosion-resistant coatings. The use of one or more coatings is not prohibited. Conduit, elbows, or nipples that are provided with supplementary coatings that have not been evaluated for their corrosion resistance characteristics shall be marked in accordance with 7.10.

5.3.5.2 Supplementary nonmetallic coatings shall be evaluated with respect to:

a) Flame propagation,

b) Detrimental effects on the corrosion resistance provided by the primary protective coatings,

c) The fit of the couplings, and

d) Electrical continuity with couplings.

See Reference Item No. 4, Annex A. The supplementary coating shall be provided in addition to the full primary corrosion-resistant coating.

5.3.6 Surface treatment

5.3.6.1 When one or more surface treatments not exceeding 0.0038 mm (0.00015 in) are employed as a top coat or conversion coating, the coatings shall not be required to meet the requirements for an alternate corrosion-resistant coating or organic coating.

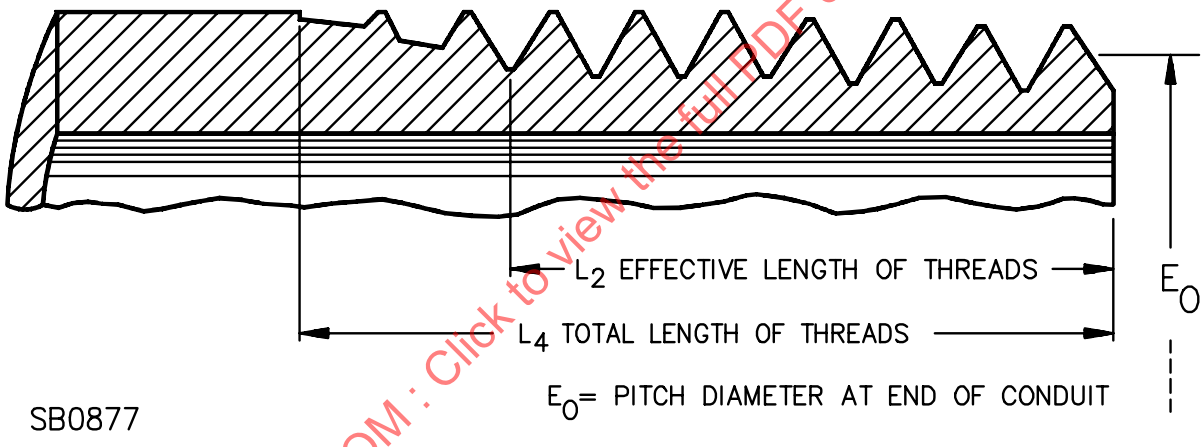
5.4 Threading and chamfering

5.4.1 General

5.4.1.1 Each elbow, nipple, and straight length of conduit shall be threaded the same on both ends. Each end shall be chamfered on the interior surface to remove burrs and sharp edges formed by the cut-off tool. All the effective length of threads (L_2) shall be full and clean cut. See Figure 5.1 and Reference Item No. 5, Annex A.

Figure 5.1

Conduit Threads



5.4.2 Protection of threads

5.4.2.1 Threads that are cut after the protective coatings are applied shall be treated to keep corrosion from taking place before the conduit is installed. Threading oils shall not be used for protection of threads. Protective coatings shall not interfere with electrical continuity through couplings and other fittings when the conduit is installed.

5.4.2.2 Threads that are cut before the application of the final coating that protects the exterior surface of the tube from corrosion, which are therefore treated with the same coating when the tube is given its final coat, are deemed to be protected.

5.4.3 Pitch of threads

5.4.3.1 The pitch, the number of threads per 25.4 mm (1 in), and the length of the threaded portion at each end of an elbow, nipple, or straight length of conduit shall be as indicated in Figure 5.1 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 in	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 may be used for special applications. In Canada, 12 (3/8) trade size is not permitted according to the Canadian Electrical Code, Part I.

5.4.4 Taper of threads

5.4.4.1 The taper of threads shall be 1 in 16 (3/4 inch per foot), and the perfect thread (See L_2 in Figure 5.1) shall be tapered for its entire length.

5.4.4.2 The angle between the sides of the thread shall be 60° 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 according to the applicable requirements for conduit, and shall not exceed 0.6 m (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 from the expression:

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

where

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

W_4 = the weight from Table 5.4 of metal removal from 100 nipples during threading, kg (lb)

L = the length of one nipplen mm (in)

Example – The minimum weight of one hundred pieces of trade size 1-1/2 (41) 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

Metric designator	Weight per unit length W_3 per 100 nipples, kg/mm	Weight W_4 of metal removed from 100 nipples during threading, kg	Trade Size	Weight per unit length W_3 per 100 nipples, lb/in	Weight W_4 of metal removed from 100 nipples during threading, lb
16	0.12	1.36	1/2	6.5	3.0
21	0.15	1.81	3/4	8.6	4.0
27	0.22	4.08	1	12.5	9.0
35	0.29	4.54	1-1/4	16.4	10.0
41	0.36	4.99	1-1/2	20.2	11.0
53	0.48	6.35	2	26.9	14.0
63	0.77	27.22	2-1/2	43.0	60.0
78	1.00	31.75	3	56.1	70.0
91	1.18	40.82	3-1/2	66.3	90.0
103	1.40	52.16	4	78.6	115.0
129	1.89	77.11	5	106.0	170.0
155	2.52	90.72	6	141.0	200.0

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 treated, coated, and threaded according to the requirements for conduit. Field-produced bends are not included in this standard. See Annex D.

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 as given in 5.5.2 and Table 5.4.

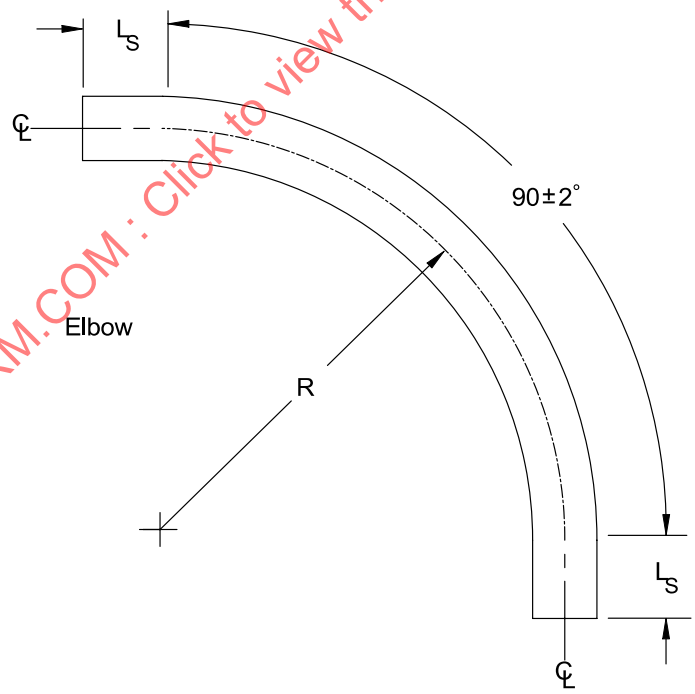
5.6.3 The curve of an elbow shall be formed using any suitable bending equipment capable of producing elbows with a radius of the curve to the centerline not less than that indicated in Table 5.5. The curved portion of an elbow shall be smooth and continuous throughout the bend and without creases when examined visually under an artificial light source using normal or corrected-to-normal vision. Elbows sharper than 90° are not included in this standard. The length L_s of the straight portions at the ends of an elbow shall not be smaller than indicated in Table 5.5. See Figure 5.2 for illustration.

Table 5.5
Minimum Acceptable Dimensions of Elbows

Metric designator	Radius R[a] to center of tube, mm	Straight length L_s at each end, mm	Trade size	Radius R[a] to center of tube, in	Straight length L_s at each end, in
16	102	38	1/2	4	1-1/2
21	114	38	3/4	4-1/2	1-1/2
27	146	48	1	5-3/4	1-7/8
35	184	51	1-1/4	7-1/4	2
41	210	51	1-1/2	8-1/4	2
53	241	51	2	9-1/2	2
63	267	76	2-1/2	10-1/2	3
78	330	79	3	13	3-1/8
91	381	83	3-1/2	15	3-1/4
103	406	86	4	16	3-3/8
129	610	92	5	24	3-5/8
155	762	95	6	30	3-3/4

[a] R and L_s are illustrated in Figure 5.2.

Figure 5.2
Conduit Elbows



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5.7 Threaded couplings

5.7.1 Threaded couplings shall be made of steel.

5.7.2 The outside surface of a coupling shall be protected against corrosion as required in 5.3.1.1. The inside surface shall be treated to inhibit corrosion from taking place before the conduit to which it is attached is installed.

5.7.3 A coupling shall be straight tapped.

5.7.4 The thread of a coupling shall have pitch diameters within the limits specified in Table 5.6. See Figure 5.3.

Note: Each end of a coupling may be chamfered in accordance with the industry standard; however, chamfering the ends of a coupling is not a requirement and is not required to be verified as a part of the certification program.

5.7.5 The dimensions of a coupling shall not be less than indicated in Table 5.6.

Table 5.6
Dimensions of Straight-Tapped Conduit Couplings

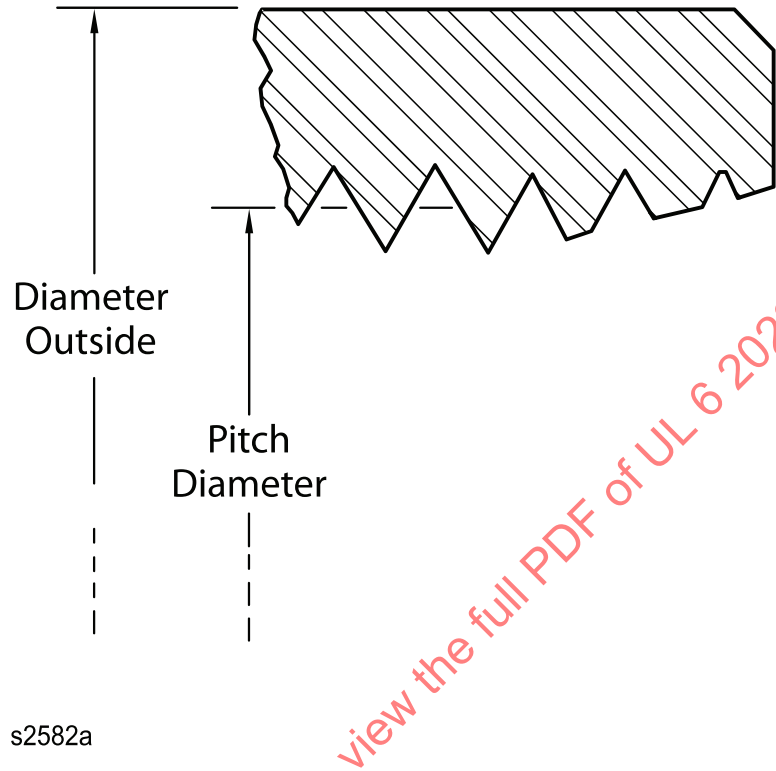
Metric designator	Minimum acceptable length of coupling, mm	Outside diameter of coupling* (not a requirement), mm	Pitch diameters		Trade Size	Minimum acceptable length of coupling, in	Outside diameter of coupling[a] (not a requirement), in	Pitch diameter	
			Max. mm	Min. mm				Max. in	Min. in
12[b]	32.9	22.2	16.6	16.4	3/8[b]	1-19/64	0.88	0.655	0.645
16	41.3	25.7	20.68	20.35	1/2	1-5/8	1.01	0.814	0.801
21	41.7	31.8	26.01	25.68	3/4	1-41/64	1.25	1.024	1.011
27	50.0	38.7	32.59	32.18	1	1-31/32	1.53	1.283	1.267
35	51.6	47.5	41.35	40.94	1-1/4	2-1/32	1.87	1.628	1.612
41	52.4	54.7	47.45	47.04	1-1/2	2-1/16	2.16	1.868	1.852
53	54.0	67.3	59.51	59.11	2	2-1/8	2.65	2.343	2.327
63	81.0	82.6	71.83	71.27	2-1/2	3-3/16	3.25	2.828	2.806
78	84.1	98.3	87.71	87.15	3	3-5/16	3.87	3.453	3.431
91	86.5	114.3	100.40	99.85	3-1/2	3-13/32	4.50	3.953	3.931
103	89.3	123.8	113.10	112.60	4	3-33/64	4.88	4.453	4.431
129	100.4	152.4	140.10	139.60	5	3-61/64	6.00	5.516	5.494
155	108.0	182.9	167.10	166.60	6	4-1/4	7.20	6.578	6.556

[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 [trade size 35 (1-1/4) and larger] or is not more than 0.38 mm (0.015 in) smaller than shown [trade size 27 (1) and smaller] if the coupling complies with the requirements in this standard.

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

Figure 5.3

Coupling Dimensions



5.7.6 Checking of thread dimensions shall be done on clean, undamaged threads before any protective coating has been applied.

5.7.7 Assembled-on integral couplings shall be subjected to the applicable pull and fault current fittings test as described in Reference Item No. 6, Annex A.

6 Test requirements

6.1 Tube

6.1.1 At ambient temperature, one specimen of the smallest available trade size shall be capable of being bent into a quarter of a circle, using any suitable bending equipment without developing cracks and without opening the weld.

6.1.2 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. The same specimen may also be used to determine compliance with the coating test in 6.2.1.1. Compliance shall be determined by bending the tube using any suitable bending equipment to a radius as described in Table 5.5. The tube shall not develop a crack and the weld shall not open. The test shall be conducted inside the cold chamber or begun within 15 s of the specimen's removal from the cold chamber. Tubing that is provided with a nonmetallic alternate corrosion-resistant coating and that is marked with a temperature rating below "0 °C" ("32 °F") shall be conditioned at the rated temperature. The rated temperature shall be any temperature below 0 °C (32 °F) in 5 °C (9 °F) increments.

6.2 Protective coatings

6.2.1 General

6.2.1.1 One specimen of the smallest available trade size of finished conduit shall be capable of being bent into a quarter of a circle, using any suitable bending equipment after being conditioned at a temperature of 0 °C (32 °F) for 60 min. The tube shall not develop a crack and a weld shall not open. The coatings shall not be damaged to the extent that bare metal is exposed or that the coating separates from the metal. The test shall be conducted inside the cold chamber or begun within 15 s of removal from the cold chamber. Conduit that is provided with a nonmetallic alternate corrosion-resistant coating and marked with a temperature rating below 0 °C (32 °F) shall be conditioned at the rated temperature. The rated temperature shall be any temperature below 0 °C (32 °F) in 5 °C (9 °F) increments.

6.2.1.2 For identification of compounds, a nonmetallic material used as an alternate corrosion-resistant or organic coating shall be subjected to the infrared spectroscopy (IR), thermogravimetric analysis (TGA), and differential scanning calorimetry (DSC) tests specified in the applicable standards for polymeric materials. See Reference Item No. 7, Annex A.

6.2.2 Zinc coating

6.2.2.1 A solution of copper sulfate for this test shall be made from distilled water and a reagent grade of cupric sulfate ($CuSO_4$). In a copper container or in a glass, polyethylene, or other chemically nonreactive container in which a bright piece of copper is present, a quantity of cupric sulfate shall be dissolved in hot distilled water. The purpose is to obtain a solution that has a specific gravity slightly within a range of 1.183 to 1.189 after the solution is cooled to a temperature of 18.3 °C (65.0 °F). As necessary, any free acid that might be present shall be neutralized by the addition of approximately 1 gram of cupric oxide (CuO) or 1 gram of cupric hydroxide ($Cu(OH)_2$) per liter of solution. The solution shall then be diluted with distilled water to obtain a specific gravity within a range of 1.183 to 1.189 at a temperature of 18.3 °C (65.0 °F). The solution shall then be filtered.

6.2.2.2 Several 150-mm (6-in) specimens shall be cut from a sample length of the finished zinc-coated conduit. With prudent attention to the risks to health and to the risk of fire, the specimens shall be cleaned with a suitable organic solvent. Each specimen shall then be examined for evidence of damage to the zinc coating, and only specimens that are not damaged shall be selected for use in the test. When a zinc coating is used on the inside and outside of the conduit, half of the specimens shall be longitudinally cut in half to expose the inside surface. If a zinc coating is used only on the outside of the conduit, none of the specimens shall be cut longitudinally.

6.2.2.3 The selected specimens shall be rinsed in water, and all surfaces shall be dried with clean cheesecloth. As much of the water as possible shall be removed in the drying operation because water slows the reaction between the zinc and the solution, thereby adversely affecting the test results. The surface of the zinc shall be dry and clean before a specimen is immersed in the solution of copper sulfate. The specimens shall not be touched by the hands or anything else that can contaminate or damage the surfaces.

6.2.2.4 A glass, polyethylene, or other chemically nonreactive beaker having a diameter equal to approximately twice the diameter measured over the specimen shall be filled with the solution of copper sulfate to a depth of not less than 76 mm (3 in). The temperature of the solution shall be maintained at 18.3 ±1.1 °C (65.0 ±2.0 °F). The specimen shall be immersed in the solution and supported on end in the center of the beaker so that not less than 64 mm (2-1/2 in) of its length is immersed. The specimen shall remain in the solution for 60 s, during which time it shall not be moved nor shall the solution be stirred.

6.2.2.5 At the end of the 60 s period, the specimen shall be removed from the beaker, rinsed immediately in running tap water, rubbed with clean cheesecloth until any loosely adhering deposits of copper are

removed, and shall then be dried with clean cheesecloth. Again, the hands and other damaging and contaminating objects and substances shall not touch the surfaces that were immersed. The part of the specimen that was immersed shall be examined, considering each broad surface separately and disregarding any threaded area and the portions of the specimen within 13 mm (1/2 in) of the cut ends on sizes 12 – 53 (3/8 – 2) and 25 mm (1 in) for sizes 63 – 155 (2-1/2 – 6) and within 3 mm (1/8 in) of any longitudinal edges cut in the process of preparing the specimen.

6.2.2.6 A record shall be made when the immersed part of the specimen has any deposit of bright, firmly adhering copper, exclusive of any threaded area, and the 13 mm (1/2 in) cut-end portions and any 3 mm (1/8 in) longitudinal cut-edge portions.

6.2.2.7 When bright adhering copper is not found, the process of immersing, washing, rubbing, drying, examining, and recording shall be repeated up to the required number of immersions, or until the presence of copper is noted, whichever comes first, using the same specimen and beaker of solution. After the dips are completed on any one specimen, the portion of the solution of copper sulfate used shall be discarded. A fresh portion of the solution shall be employed for each of any succeeding specimens.

6.2.2.8 A protective zinc coating that provides the sole means of primary corrosion resistance on the exterior of the conduit shall be such that a specimen of the finished conduit does not show a bright, adherent deposit of copper after four 60-s immersions in a copper sulfate solution.

6.2.2.9 A protective zinc coating that provides the sole means of primary corrosion resistance on the interior of the conduit shall be such that a specimen of the finished conduit does not show a bright, adherent deposit of copper after one 60-s immersion in a copper sulfate solution.

6.2.2.10 When it is desired to show the character of the bright metallic copper deposit on an exposed steel surface, prepare a reference standard for comparison as follows. Partially submerge a zinc-coated specimen in strong hydrochloric acid until violent action ceases. Immediately remove the specimen, wash, and wipe it dry. Then dip the specimen, with an area of bare surface thus exposed, including a portion with zinc coating intact, for a few seconds in the copper sulfate solution at a temperature of 16 – 20 °C (61 – 66 °F), remove it, wash it, and wipe it dry. Prepare this copper-coated reference standard at the time of testing.

6.2.2.11 For an alternate test method to the one described in 6.2.2.1 – 6.2.2.10 for determining compliance with the evaluation of zinc coating requirements, see Reference Item No. 8, Annex A.

6.2.3 Organic coating

6.2.3.1 Elasticity test

6.2.3.1.1 The organic coating used to protect the interior of the conduit, when applied to a sheet-steel test piece and baked in an oven for 5 h, shall withstand without damage 10 successive bends of the test piece back and forth through an angle of 180° against an edge having a radius of 1.6 mm (1/16 in).

6.2.3.1.2 The apparatus shall consist of flat test pieces of sheet steel 75 by 125 mm (3 by 5 in) long and approximately 0.25 mm (0.010 in) thick, an oven for baking the test pieces, and a vise with jaws at least 75 mm (3 in) wide for holding the test pieces during the bending test. The 75-mm (3-in) edge of each jaw shall be rounded to a radius of 1.6 mm (1/16 in).

6.2.3.1.3 Two test pieces shall be cleaned with a suitable organic solvent to remove any grease and foreign material and shall then be dipped in the organic coating. After air drying for 30 min, the test pieces shall be suspended by means of short wires in the oven. Samples shall be baked for 5 h at the normal baking temperature for the organic in question but, if the normal baking temperature is lower than 135 °C

(275 °F) or the enamel is regularly air dried, the oven temperature shall be maintained at 135 – 150 °C (275 – 302 °F).

6.2.3.1.4 At the end of 5 h, the test pieces shall be removed from the oven and cooled in still air to room temperature. Each flat test piece shall be secured in the vise, gripped at its free end, and then bent for 90° against one of the 75-mm (3-in) edges of the vise jaws. Each test piece shall then be bent back past its original position through 180° so that it ends bent 90° against the other 75-mm (3-in) edge of the vise jaws. It shall then be bent for 90° in the opposite direction, ending with the test piece in its original position. This cycle shall be repeated 5 times. The organic coating shall not be accepted if any test piece cracks, flakes off, or is damaged otherwise.

6.2.3.2 Warm humid air test

6.2.3.2.1 The test apparatus shall be an insulated specimen chamber with inside dimensions approximately 119 by 71 by 71 cm (47 by 28 by 28 in). It shall contain a temperature-controlled water reservoir, pump, spray chamber for humidifying the air, an air-circulating fan, provision for heating the air, specimen supports, and the necessary means of control.

6.2.3.2.2 The dry bulb temperature of the test chamber shall be maintained at 60 ±1 °C (140 ±2 °F) and at 98 ±2 % relative humidity throughout the test. The specimens shall be supported in racks at an angle of 15° from the vertical.

6.2.3.2.3 The test shall be conducted for a period of 60 d, at the end of which there shall not be any corrosion of the metal.

6.2.4 Alternate corrosion-resistant coatings

6.2.4.1 A coating other than one consisting solely of zinc, which is to be evaluated for its ability to provide corrosion resistance on the exterior of conduit, shall, in addition to the requirements in 6.2.4.2 – 6.2.4.10, be evaluated with respect to flame propagation. See 6.2.4.11. Additionally, the conduit, elbow, or nipple shall be subjected to the assembly, bending, resistance, pull, and fault current tests in accordance with Reference Item No. 9, Annex A, with both set-screw and compression-type couplings.

6.2.4.2 The coating shall comply with the salt-spray (fog), moist carbon dioxide-sulfur dioxide-air, and ultraviolet light and water tests after being conditioned in accordance with 6.2.4.5. Corrosion within 13 mm (1/2 in) of cut edges shall be disregarded.

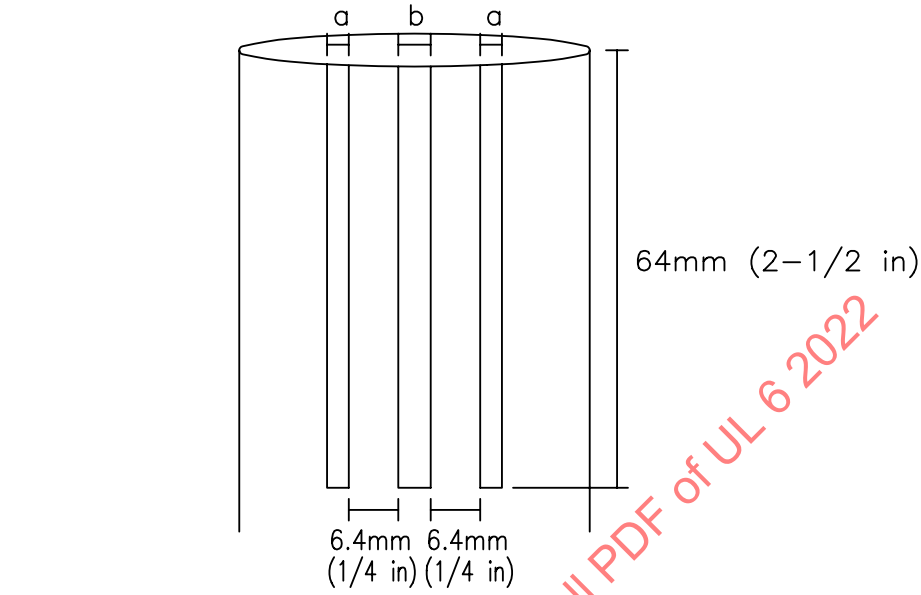
6.2.4.3 Preparation of specimens

6.2.4.3.1 Thirty 152 – 203 mm (6 – 8 in) long specimens, provided with the corrosion-resistant coating, of trade size 2 (53), or the closest trade size manufactured, shall be tested.

6.2.4.3.2 Half of the specimens to be exposed shall be scribed using a rotary tool operating at a speed of 15,000 – 30,000 rpm. The specimens shall be scribed in accordance with Figure 6.1, using a 1.14 mm (0.045 in) thick fiberglass reinforced cut-off wheel, until bright base metal is exposed. The specimens shall be free of grease or dirt. The coating thickness of each specimen shall be measured prior to exposing it to the test environments.

Figure 6.1

Scribe Pattern



a = 1.3mm (0.050 in) – 2.5mm (0.1 in)
b = 3.2mm (0.125 in) – 5mm (0.2 in)

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6.2.4.4 Air oven conditioning exposure

6.2.4.4.1 Six scribed and six unscribed specimens of each coating shall be conditioned for 240 h at a temperature of 100 ±2 °C (212 ±4 °F) in an air-circulating oven. Conduit that is marked with a temperature rating above 90 °C (200 °F) shall be conditioned at the rated temperature plus 10 °C (18 °F), for which the rated temperature shall be any temperature in excess of 90 °C (200 °F) at 25 °C (45 °F) increments. These specimens shall be used for the resistance to salt spray (fog) (6.2.4.6) and the resistance to moist carbon dioxide-sulfur dioxide-air (6.2.4.7) tests.

6.2.4.5 Resistance to ultraviolet light and water

6.2.4.5.1 Three scribed and three unscribed specimens shall be exposed to ultraviolet light and water by either of the methods specified in 6.2.4.5.3 and 6.2.4.5.4.

6.2.4.5.2 As a result of the exposure, the unscribed specimens shall not show any base metal corrosion or any blisters. For the scribed specimens, the average creeping distance of red rust from the scribe shall not be greater than Rating No. 6 (1.6 – 3.2 mm (1/16 – 1/8 in)) as designated in Reference Item No. 10, Annex A, with maximum isolated spot not exceeding 9.5 mm (3/8 in). There shall not be any visual evidence of pitting of the substrate and only the beginning of a buildup of red rust beneath the coating uplifted from the scribe.

6.2.4.5.3 For twin enclosed carbon-arc, the specimens shall be exposed for 360 h to light and water in accordance with Reference Item No. 11, Annex A, using the apparatus designated as type DH. Method 1, continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of 120 min consisting of a 102-min light exposure and an 18-min exposure to water spray with light, shall be used. The apparatus shall operate with a black-panel temperature of 63 ±3 °C (145 ±5 °F).

6.2.4.5.4 For xenon-arc, the specimens shall be exposed for 500 h to light and water in accordance with Reference Item 12, Annex A, using the apparatus designated as type BH. Test Method A, continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of 120 min consisting of a 102-min light exposure and an 18-min exposure to water spray with light, shall be used. The apparatus shall operate with a 6500 W, water-cooled xenon-arc lamp, borosilicate glass inner and outer optical filters, a spectral irradiance of 0.35 W/m^2/nm at 340 nm, and a black-panel temperature of 63 ±3 °C (145 ±5 °F).

6.2.4.6 Resistance to salt spray (fog)

6.2.4.6.1 Six as-received and six air-oven conditioned specimens shall be exposed to the salt spray (fog) for 600 h in accordance with Reference Item No. 13, Annex A. Three of the as-received and three of the air-oven conditioned specimens shall be scribed as described in 6.2.4.6.2.

6.2.4.6.2 As a result of the conditioning, the unscribed specimens shall not show more than a light corrosion beneath the coating system, with no visible pitting of the substrate and only the beginning of a buildup or weeping of red rust. For the scribed specimens, the average creeping distance of red rust from the scribe shall not be greater than Rating No. 5 (3.2 – 4.8 mm (1/8 – 3/16 in)) as designated in Reference Item No. 14, Annex A, with maximum isolated spot not exceeding 9.5 mm (3/8 in). There shall not be any separation of the coating from the substrate as a result of the exposure.

6.2.4.7 Resistance to moist carbon dioxide-sulfur dioxide-air

6.2.4.7.1 Six as-received and six air-oven conditioned specimens shall be exposed to the moist carbon dioxide-sulfur dioxide-air for 1200 h. The apparatus used for this exposure shall consist of a chamber having a volume of at least 0.085 m^3 (3 ft^3) with a water jacket and thermostatically controlled heater to maintain a temperature of 35 ±2 °C (95 ±3 °F). Three of the as-received and three of the air-oven conditioned specimens shall be scribed as described in 6.2.4.3.2.

6.2.4.7.2 As a result of the conditioning, the unscribed specimens shall not show more than a light corrosion beneath the coating system, with no visible pitting of the substrate and only the beginning of a buildup or weeping of red rust. For the scribed specimens, the average creeping distance of red rust from the scribe shall not be greater than Rating No. 6 (1.6 – 3.2 mm (1/16 – 1/8 in)) as designated in Reference Item No. 15, Annex A, with maximum isolated spot not exceeding 9.5 (3/8 in). There shall not be any separation of the coating from the substrate as a result of the exposure.

6.2.4.7.3 The carbon dioxide and sulfur dioxide shall be supplied to the test chamber from commercial cylinders containing the gases under pressure. An amount of carbon dioxide equivalent to 1 % of the volume of the test chamber and an equal volume of sulfur dioxide shall be introduced into the chamber each working day. Prior to introducing the new charge of gas each day the remaining gas-air mixture from the previous day shall be purged from the chamber. A small amount of water shall be maintained at the bottom of the chamber for humidity. This water shall not be changed during the exposure. The specimens shall be supported in plastic racks at an angle of 15° from the vertical.

6.2.4.8 Tensile strength

6.2.4.8.1 PVC alternate corrosion-resistant coatings shall have a minimum tensile strength of 13.79 MPa (2000 psi) when tested in accordance with Reference Item No. 16, Annex A. Other materials shall be subject to special investigation.

6.2.4.9 Adhesion

6.2.4.9.1 The adhesion of an alternate corrosion-resistant coating that is 0.51 – 1.27 mm (0.020 – 0.050 in) thick shall be greater than the strength of the alternate corrosion-resistant coating itself. This shall be

determined by making two 38 mm (1-1/2 in) circumferential cuts 13 mm (1/2 in) apart through the alternate corrosion-resistant coating to the substrate. A third cut shall be made perpendicular to, and crossing, the circumferential cuts. The edge of the alternate corrosion-resistant coating shall be carefully lifted with a knife to form a tab. This tab shall be pulled perpendicular to the conduit with a pair of pliers. The tab shall tear rather than any additional alternate corrosion-resistant coating separating from the substrate.

6.2.4.9.2 The adhesion of an alternate corrosion-resistant coating that is 0.127 mm (0.005 in) thick or less shall be determined in accordance with the relevant standard in Reference No. 17, Annex A.

6.2.4.9.3 The adhesion of an alternate corrosion-resistant coating other than as specified in 6.2.4.9.1 or 6.2.4.9.2 shall be determined by special investigation.

6.2.4.10 Cold impact

6.2.4.10.1 Ten 152 – 203 mm (6 – 8 in) specimens of finished conduit provided with a nonmetallic alternate corrosion-resistant coating shall be conditioned at a temperature of 0 °C (32 °F) for a period of 60 min. Conduit that is marked with a temperature rating below "0 °C" ("32 °F") shall be conditioned at the rated temperature, for which the rated temperature shall be any temperature below 0 °C (32 °F) in 5 °C (9 °F) increments. The specimens shall then be subjected to an impact of 12.2 J (9 ft-lb) in accordance with 6.2.4.10.2. The coating shall not separate from the metal nor be damaged to the extent that bare metal is exposed.

6.2.4.10.2 The impact test described in 6.2.4.10.1 shall be performed using the Tup B falling mass, using the apparatus and method specified in Reference Item No. 18, Annex A. The test shall be conducted inside the cold chamber or within 15 s of removal from the cold chamber.

6.2.4.10.3 Alternatively, a combination of any height and weight that results in the same impact force specified in 6.2.4.10.1 may be used when the impact face remains unchanged.

6.2.4.11 Flammability

6.2.4.11.1 Vertical specimens of finished conduit provided with a nonmetallic alternate corrosion-resistant coating shall not flame for longer than 5 s following any of three 60-s applications of flame, the period between applications being 30 s. A specimen shall not:

a) Emit flaming or glowing particles or flaming drops at any time that ignite the cotton on the burner, wedge, or floor of the enclosure (flameless charring of the cotton shall be ignored),

b) Continue to flame longer than 5 s after any application of the gas flame, or

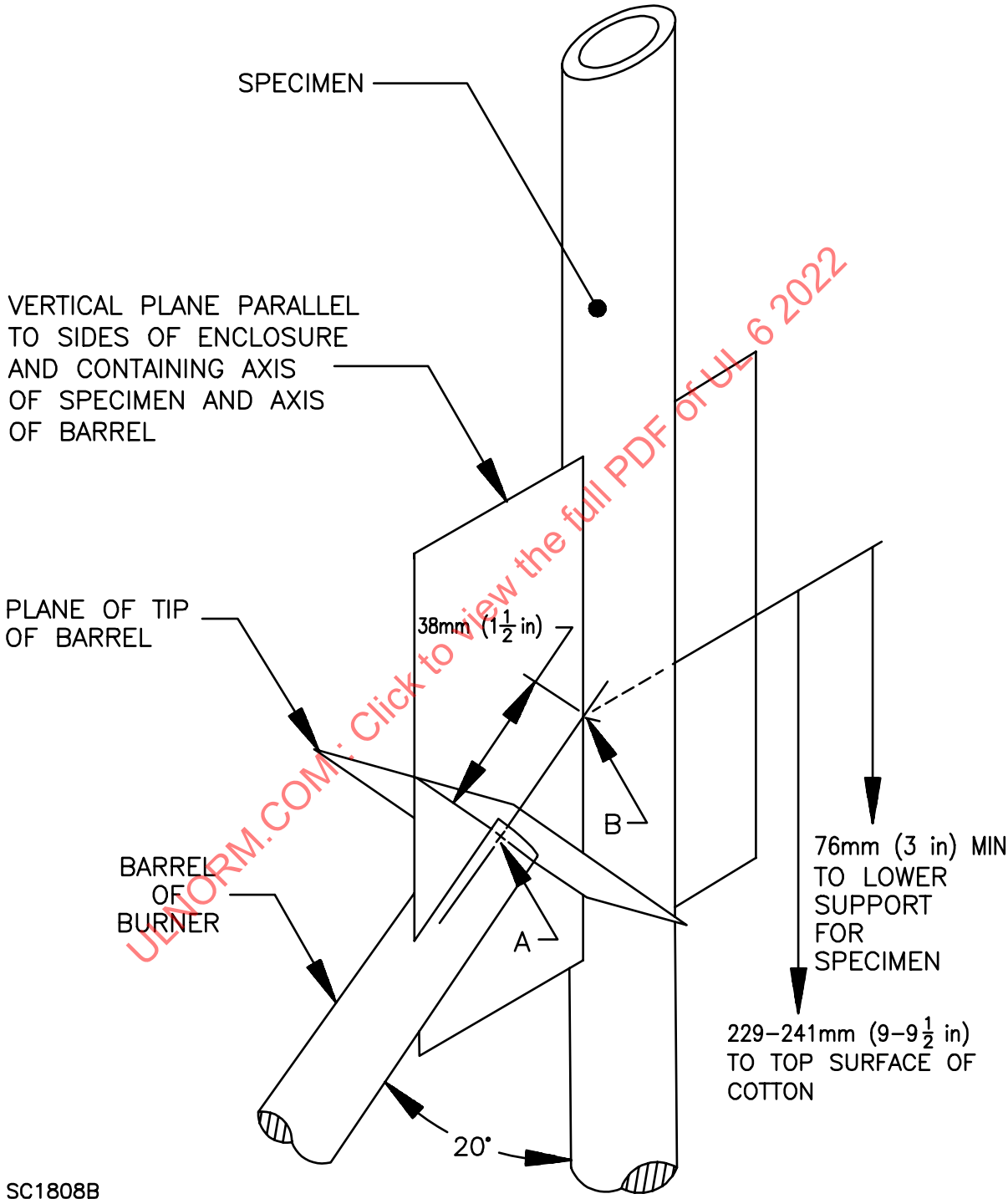
c) Have the coating completely consumed during or after any application of the gas flame.

Note: When an alternate corrosion protection system employs a thin exterior nonmetallic topcoat such as lacquer or paint, measuring less than or equal to 0.125 mm (0.005 in) in thickness, over a confirmed 3 dips worth of zinc, a specimen may display a total consumption of the top coat at the point of flame contact to the conduit without any measurable flame propagation as long as it meets the requirements of 6.2.4.11.1 (a) and (b). Confirmation of the presence of 3 dips of zinc coating is accomplished using the Zinc coating test, 6.2.2, as part of a separate test.

6.2.4.11.2 This test shall be performed on 3 unaged specimens tested separately with each positioned in a 3-sided metal enclosure in an exhaust hood or cabinet. The metal enclosure shall be 305 mm (12 in) wide, 355 mm (14 in) deep, and 610 mm (24 in) high, and the top and front shall be open. A 457-mm (18-in) specimen of finished conduit shall be secured with its longitudinal axis vertical in the center of the enclosure. A flat, horizontal layer of untreated surgical cotton 6 – 25 mm (1/4 – 1 in) thick shall cover the floor of the enclosure. The upper surface of the cotton shall be 229 – 241 mm (9 – 9-1/2 in) below point B, which is the point at which the tip of the blue inner cone of the test flame touches the specimen. This is shown in Figure 6.2.

Figure 6.2

Essential Dimensions for Flame Test



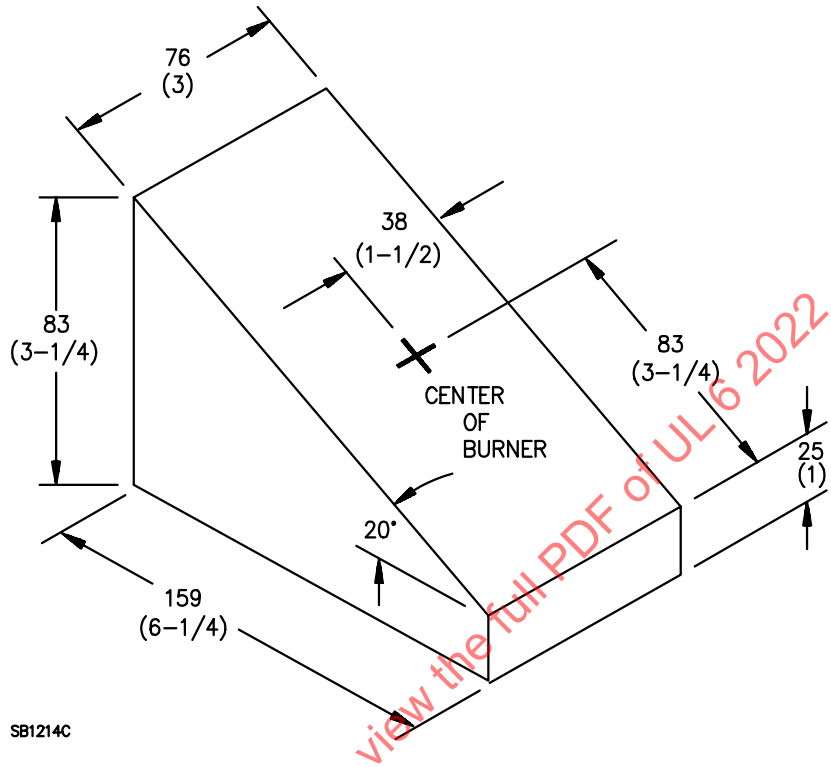
6.2.4.11.3 A burner shall conform to Reference Item No. 19, Annex A, having a bore of 9.5 ±0.3 mm and a length of 100 ±10 mm from the top of the air inlet openings to the top of the mixing tube, or an equivalent burner that meets the calibration requirements of Reference Item No. 20, Annex A shall be used. While the barrel is vertical and the burner is well away from the specimen, the overall height of the flame shall be adjusted to approximately 100 – 125 mm (4 – 5 in). The blue inner cone shall be 38 mm (1-1/2 in) high, and the temperature at its tip shall be 816 °C (1500 °F) or higher as measured using a chromel-alumel (nickel-chromium and nickel-manganese-aluminum) thermocouple. Without disturbing the adjustments for the height of the flame, the valve supplying gas to the burner flame and the separate valve supplying gas to any pilot flame shall be closed.

6.2.4.11.4 The gas used to supply the burner described in 6.2.4.11.3 shall be bottled, technical grade methane or natural gas, approximately 37 MJ/m^3 (1000 Btu/ft^3) at normal pressure, with a suitable regulator and meter for uniform gas flow.

6.2.4.11.5 A wedge, as shown in Figure 6.3, to which the base of the burner can be secured, shall be provided for tilting the barrel 20° from the vertical while the longitudinal axis of the barrel remains in a vertical plane. The burner shall be secured to the wedge, and the assembly shall be placed in an adjustable support jig. A layer of untreated surgical cotton 6 – 25 mm (1/4 – 1 in) thick shall be placed on the wedge and around the base of the burner. The jig shall be adjusted toward one side or the other of the enclosure to place the longitudinal axis of the barrel in the vertical plane that contains the longitudinal axis of the specimen. The plane shall be parallel to the sides of the enclosure. The jig shall also be adjusted toward the rear or front of the enclosure to position the point A, which is the intersection of the longitudinal axis of the barrel with the plane of the tip of the barrel, 38 mm (1-1/2 in) from the point B at which the extended longitudinal axis of the barrel meets the outer surface of the specimen. Point B is the point at which the tip of the blue inner cone touches the center of the front of the specimen. The specimen shall be adjusted vertically to keep point B from being any closer than 76 mm (3 in) to the lower clamp or other support for the specimen.

Figure 6.3

Dimensions of Wedge in mm (in)



6.2.4.11.6 In the absence of a gas pilot light on the burner, the support for the burner and wedge shall be arranged to enable the burner to be quickly removed from and precisely returned to the position described in 6.2.4.11.5 without disturbing the layer of cotton on the floor of the enclosure or the cotton on the wedge and around the base of the burner.

6.2.4.11.7 In instances where the burner has a gas pilot light, the valve supplying gas to the pilot shall be opened and the pilot lit. Where the burner does not have a gas pilot light, the burner shall be supported as indicated in 6.2.4.11.6 in a position away from the specimen and then lit. This operation, and the remainder of the test, shall be conducted under a forced-draft exhaust hood or cabinet operating to remove smoke and fumes without drafts that affect the flame.

6.2.4.11.8 When the burner has a gas pilot light, the valve supplying gas to the burner shall be opened to apply the flame to the specimen automatically. This valve shall be held open for 60 s and then closed for 30 s. This procedure shall be repeated twice for a total of 3 applications of flame to the specimen.

7 Markings

Advisory Note: In Canada, there are two official languages, English and French, and in Mexico, the official language is Spanish. Annex E 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.