UL 2515A

STANDARD FOR SAFETY

Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

UL Standard for Safety for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, UL 2515A

First Edition, Dated November 21, 2011

Summary of Topics

This revision of ANSI/UL 2515A dated November 28, 2023 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.

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 October 13, 2023.

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UL 2515A

Standard for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

The requirements for products covered by this standard were previously published in the first edition of the Standard for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, UL 1684A, which has now been renumbered as UL 2515A.

First Edition

November 21, 2011

This ANSI/UL Standard for Safety consists of the First Edition including revisions through November 28, 2023.

The most recent designation of ANSI/UL 2515A as a Reaffirmed American National Standard (ANS) occurred on November 28, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

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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1 Scope

1.1 These requirements are supplementary to the applicable requirements in the Standard for Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, UL 2515. Products covered by these requirements are for use in the United States only. References to requirements in UL 2515 are in *italics* for easy identification.

1.2 This standard covers aboveground (AG) extra heavy wall conduit, Type XW (dimensions based on wall thicknesses). Trade sizes (metric designators) are 1/2 (16), 3/4 (21), 1 (27), 1-1/4 (35), 1-1/2 (41), 2 (53), 2-1/2 (63), 3 (78), 3-1/2 (91), 4 (103), 4-1/2 (116), 5 (129), and 6 (155).

Note: The values in parenthesis are metric size designations of conduit and fittings and do not necessarily reflect metric trade sizes.

1.3 AG Type XW is suitable for concealed or exposed work where subject to physical damage.

2 General

2.1 Units of measurement

2.1.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.2 Undated references

2.2.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3 Construction

3.1 Only materials that are acceptable for the particular use shall be employed.

3.2 **Conduit with an integral belled end** – The dimensions of conduit with an integral coupling on one end shall be in accordance with the values specified in Table 3.1. They shall also meet the requirements of *Clause 5.7* of the Standard for Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, UL 2515.

Table 3.1
Conduit dimensions – Type XW

		Inside diameter minimum	Wall thickness		Outside diameter[a]	
			Minimum	Maximum	Nominal	Maximum
Trade size	(metric designator)	(millimeters)				
Type XW-IPS						
3/4	21	22.61	5.59	6.73	35.31	36.58
1	27	29.34	5.59	6.73	42.04	43.31
1-1/4	35	38.10	5.59	6.73	50.80	52.07
1-1/2	41	44.20	5.59	6.73	56.90	58.17

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Table 3.1 Continued

		Inside diameter minimum	Wall thickness		Outside diameter[a]	
			Minimum	Maximum	Nominal	Maximum
Trade size	(metric designator)	(inches)				
3/4	21	0.890	0.220	0.265	1.390	1.440
1	27	1.155	0.220	0.265	1.655	1.705
1-1/4	35	1.500	0.220	0.265	2.000	2.050
1-1/2	41	1.740	0.220	0.265	2.240	2.290
Type XW-ID						
Trade size	(metric designator)	(millimeters)				
2	53	50.29	5.59	6.73	62.99	64.26
2-1/2	63	63.00	5.59	6.73	75.69	76.96
3	78	75.69	5.59	6.73	88.39	89.66
3-1/2	91	88.39	5.59	6.73	101.10	102.36
4	103	101.09	5.59	6.73	113.79	115.06
5	129	126.24	5.59	6.73	138.94	140.46
6	155	151.64	5.59	6.73	164.34	165.86
Trade size	(metric designator)	(inches)				
2	53	1.980	0.220	0.265	2.480	2.530
2-1/2	63	2.480	0.220	0.265	2.980	3.030
3	78	2.980	0.220	0.265	3.480	3.530
3-1/2	91	3.480	0.220	0.265	3.980	4.030
4	103	3.980	0.220	0.265	4.480	4.530
5	129	4.970	0.220	0.265	5.470	5.530
6	155	5.970	0.220	0.265	6.470	6.530

[a] Measured circumferentially.

3.3 **Couplings** – Couplings shall be straight with belled ends, or 5 degree angle couplings. Dimensions of couplings are shown in Table 3.2. Couplings shall also meet the requirements of *Clause 5.7* of the Standard for Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, UL 2515.

Table 3.2
Dimensions for integral couplings – Type XW

		Socket depth minimum		Inside diameter of socket at entrance minimum		Socket wall thickness minimum	
Trade size	(metric designator)	mm	(in)	mm	(in)	mm	(in)
3/4	21	50.80	2.00	35.69	1.405	5.59	0.220
1	27	50.80	2.00	42.42	1.670	5.59	0.220
1-1/4	35	50.80	2.00	51.18	2.015	5.59	0.220

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Table 3.2 Continued

Trade size	(metric designator)	Socket depth minimum		Inside diameter of socket at entrance minimum		Socket wall thickness minimum	
		mm	(in)	mm	(in)	mm	(in)
1-1/2	41	50.80	2.00	57.28	2.255	5.59	0.220
2	53	50.80	2.00	63.37	2.495	5.59	0.220
2-1/2	63	50.80	2.00	76.07	2.995	5.59	0.220
3	78	50.80	2.00	88.77	3.495	5.59	0.220
3-1/2	91	50.80	2.00	101.47	3.995	5.59	0.220
4	103	57.15	2.25	114.17	4.495	5.59	0.220
5	129	74.68	2.94	139.57	5.495	5.59	0.220
6	155	74.68	2.94	164.97	6.495	5.59	0.220

4 Performance

4.1 Compression Test (for Type XW conduit)

4.1.1 The internal diameter of conduit shall not decrease by more than 25 percent during application of an 8900 N (2000 lb) force when tested in accordance with 4.1.2 – 4.1.4. The conduit shall show no evidence of cracking or buckling after removal from the compression machine.

4.1.2 The apparatus for this test shall consist of:

a) An inside micrometer or telescopic gauge and a micrometer caliper;

b) A compression machine having 2 steel platens at least 150 mm (6.0 in) long and 10 mm (0.4 in) thick and capable of running at a speed within the range of 10 – 15 mm/min (0.4 – 0.6 in/min).

4.1.3 The specimens shall consist of three 150 ±3 mm (6.0 ±0.125 in) lengths of conduit.

4.1.4 The inside diameter of the specimen shall be measured and recorded. The specimen shall be placed between the plates of the compression machine such that the measured inside diameter is perpendicular to the platens. The machine shall be set in motion until the force specified in 4.1.1 has been applied to the specimen. The machine shall be stopped and the inside diameter remeasured. The percent decrease in the internal diameter shall be calculated and recorded.

4.2 Impact Resistance (for Type XW conduit)

4.2.1 When tested in accordance with 4.2.2 and 4.2.3 there shall not be any fracture or break in the laminate surface of seven out of ten 200 mm (8.0 in) specimens of the finished conduit. A fracture or break is considered to have occurred where a broken section of the laminate forms a protrusion within the inside diameter or extends beyond the outside diameter of the conduit. The portions of the conduit within 50 mm (2.0 in) from the cut ends of the specimen shall not be examined.

4.2.2 The specimens are to be cut from finished lengths of each trade size of conduit. Each specimen is to be tested separately while resting on a solid, flat, steel plate that is at least 13 mm (1/2 in) thick and is firmly anchored with its upper surface horizontal. A protective cage is to surround the plates and the specimen to reduce the likelihood of injury.

4.2.3 The impact energy is to be provided by a weight of 34.1 kg (75 lbs) in the form of a 150 mm (6.0 in) solid right-circular steel cylinder with a flat impact face having rounded edges, as shown in Figure 4.1, falling freely through a vertical guide and supplying the impact force specified in . The flat face of the weight is to strike the center of the specimen. Provision is to be made for keeping the weight from striking the specimen more than once.

Figure 4.1

Impact resistance for Type XW – tup geometry

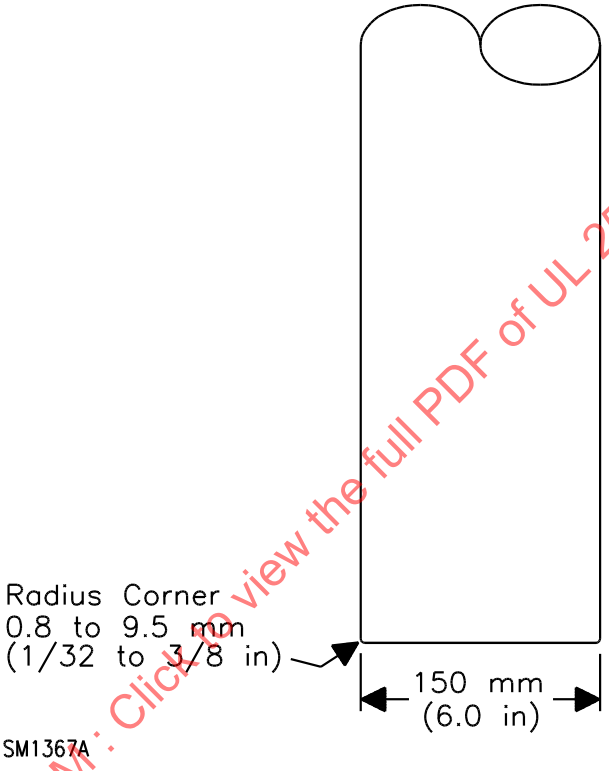

Table 4.1
Impact resistance – Type XW

Trade size	(metric designator)	Force	
		j	(ft.lbs)
1/2	16	127	94
3/4	21	127	94
1	27	203	150
1-1/4	35	229	169
1-1/2	41	255	188
2	53	407	300
2-1/2	63	509	375
3	78	712	525
3-1/2	91	712	525

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Table 4.1 Continued

Trade size	(metric designator)	Force	
		j	(ft.lbs)
4	103	712	525
4-1/2	116	712	525
5	129	712	525
6	155	712	525

4.3 Extended support distance test (optional)

4.3.1 General

4.3.1.1 Conduit intended to be marked in accordance with 5.2(h), for use at support distances greater than those in the National Electrical Code, ANSI/NFPA 70, shall have a Maximum Deflection not greater than 15.9 mm (5/8 inch) after 7 days when tested in accordance with 4.3.2 – 4.3.5. The conduit under test shall have a center point load as shown in 4.3.2. Representative sample sizes shall be selected.

Table 4.2
Wire fill loading for extended support distances

Trade size	Metric designator	Wire fill 40% maximum fill	
		kg/m	lbs/ft
3/4	X21	0.707	0.475
1	X27	1.506	1.012
1-1/4	X35	2.463	1.655
1-1/2	X41	3.494	2.348
2	X53	4.274	2.872
2-1/2	X63	7.388	4.965
3	X78	9.925	6.670
3-1/2	X91	13.98	9.392
4	X103	17.86	12.00
5	X129	29.55	19.86
6	X155	41.87	28.14

4.3.2 Center point load

4.3.2.1 The center point load shall be calculated by multiplying the wire fill from Table 4.2 as follows:

$$L_c = (W \times D) / 2$$

where:

L_C = the center point load;

W = wire fill as noted above;

D = the extended support distance.