



# UL 2515A

## STANDARD FOR SAFETY

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

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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 December 13, 2019 includes a clarification on where to measure the minimum inside diameter of socket specified in [Table 3.2](#).***

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated August 23, 2019.

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**ANSI/UL 2515A-2019**

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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 December 13, 2019.

The most recent designation of ANSI/UL 2515A as an American National Standard (ANSI) occurred on December 13, 2019. 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 UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line 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 <sup>a</sup>		
		Minimum	Maximum	Nominal	Maximum	
(metric Trade size 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
(metric Trade size designator)	(inches)					

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Table 3.1 Continued

		Inside diameter minimum	Wall thickness		Outside diameter <sup>a</sup>	
			Minimum	Maximum	Nominal	Maximum
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

<sup>a</sup> 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

Trade size (metric designator)		Socket depth minimum		Inside diameter of socket at entrance minimum		Socket wall thickness minimum	
		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
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

Table 3.2 Continued on Next Page

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)
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:

- An inside micrometer or telescopic gauge and a micrometer caliper;
- 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.

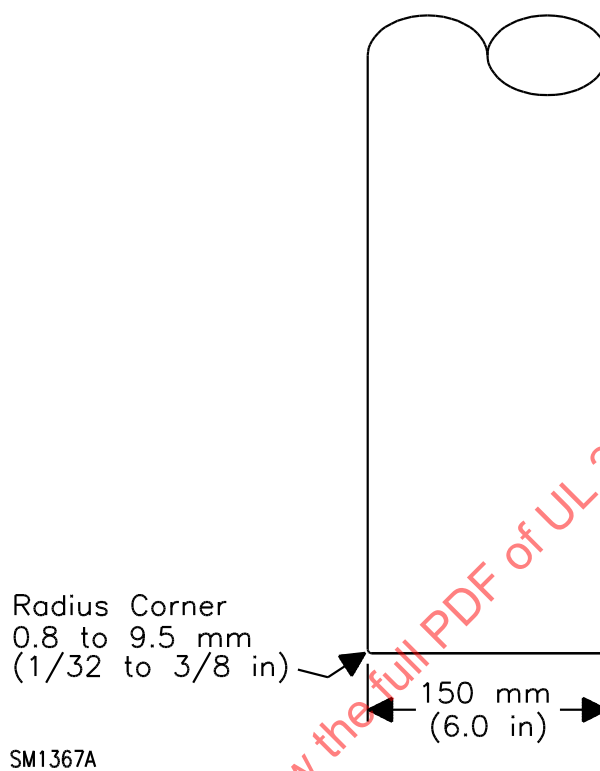
### 4.2 Impact Resistance (for Type XW conduit)

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
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.

#### 4.3.3 Specimen preparation

4.3.3.1 Two specimens for each conduit size and type shall be tested. Suitable lengths are joined at 1/4 of the extended support spacing distance using the manufacturer's recommended straight section connection method. Total length, including the connection joint, shall allow the joint to be placed at 1/4 of the extended support spacing with a minimum 600-mm (24-in) overhang at each end.

4.3.3.2 All specimens shall be pre-conditioned for at least 24 hours in still air at a temperature of 10°C to 40°C (50°F to 104°F). Ambient temperature shall be in the range of 10°C to 40°C (50°F to 104°F).