



HOT ROLLED ELECTRIC RESISTANCE WELDED (HREW) ROUND TUBING - ASTM A513 TYPE 1

Diameter Tolerances (inches)

NOTE: Measurements for diameter are to be taken at least 2 inches (a) from the ends of the tubes

Outside Diameter Range, in. (a)	Wall Thickness		Flash-in Tubing (b,c)	Flash Controlled to 0.010 in. max Tubing (c,d)	Flash Controlled to 0.005 In. max Tubing (e,d)	
	Bwg (f)	in. (a)	Outside	Outside	Outside	Inside
			Diameter	Diameter	Diameter	Diameter
			Plus and Minus	Plus and Minus	Plus and Minus	Plus and Minus
Tolerances, in. (a,g)						
1/2 to 1-1/8, incl.	16 to 10	0.065 to 0.134	0.0035	0.0035	0.0035	0.0200
Over 1-1/8 to 2, incl.	16 to 14	0.065 to 0.083	0.0050	0.0050	0.0050	0.0210
Over 1-1/8 to 2, incl.	13 to 7	0.095 to 0.180	0.0050	0.0050	0.0050	0.0250
Over 1-1/8 to 2, incl.	6 to 5	0.203 to 0.220	0.0050	0.0050	0.0050	0.0290
Over 1-1/8 to 2, incl.	4 to 3	0.238 to 0.259	0.0050	0.0050	0.0050	0.0390
Over 2 to 2-1/2, incl.	16 to 14	0.065 to 0.083	0.0060	0.0060	0.0060	0.0220
Over 2 to 2-1/2, incl.	13 to 5	0.095 to 0.220	0.0060	0.0060	0.0060	0.0240
Over 2 to 2-1/2, incl.	4 to 3	0.238 to 0.259	0.0060	0.0060	0.0060	0.0400
Over 2-1/2 to 3, incl.	16 to 14	0.065 to 0.083	0.0080	0.0080	0.0080	0.0240
Over 2-1/2 to 3, incl.	13 to 5	0.095 to 0.220	0.0080	0.0080	0.0080	0.0260
Over 2-1/2 to 3, incl.	4 to 3	0.238 to 0.259	0.0080	0.0080	0.0080	0.0400
Over 2-1/2 to 3, incl.	2 to 0.320	0.284 to 0.320	0.0100	0.0100	0.0100	0.0480
Over 3 to 3-1/2, incl.	16 to 14	0.065 to 0.083	0.0090	0.0090	0.0090	0.0250
Over 3 to 3-1/2, incl.	13 to 5	0.095 to 0.220	0.0090	0.0090	0.0090	0.0270
Over 3 to 3-1/2, incl.	4 to 3	0.238 to 0.259	0.0090	0.0090	0.0090	0.0430
Over 3 to 3-1/2, incl.	2 to 0.360	0.284 to 0.360	0.0120	0.0120	0.0120	0.0500
Over 3-1/2 to 4, incl.	16 to 14	0.065 to 0.083	0.0100	0.0100	0.0100	0.0260
Over 3-1/2 to 4, incl.	13 to 5	0.095 to 0.220	0.0100	0.0100	0.0100	0.0280
Over 3-1/2 to 4, incl.	4 to 3	0.238 to 0.259	0.0100	0.0100	0.0100	0.0440
Over 3-1/2 to 4, incl.	2 to 0.500	0.284 to 0.500	0.0150	0.0150	0.0150	0.0530
Over 4 to 5, incl.	16 to 14	0.065 to 0.083	0.0200	0.0200	0.0200	0.0360
Over 4 to 5, incl.	13 to 5	0.095 to 0.220	0.0200	0.0200	0.0200	0.0450
Over 4 to 5, incl.	4 to 3	0.238 to 0.259	0.0200	0.0200	0.0200	0.0540
Over 4 to 5, incl.	2 to 0.500	0.284 to 0.500	0.0200	0.0200	0.0200	0.0580
Over 5 to 6, incl.	16 to 14	0.065 to 0.134	0.0200	0.0200	0.0200	0.0360
Over 5 to 6, incl.	9 to 5	0.148 to 0.220	0.0200	0.0200	0.2000	0.0400
Over 5 to 6, incl.	4 to 3	0.238 to 0.259	0.0200	0.0200	0.0200	0.0540
Over 5 to 6, incl.	2 to 0.500	0.284 to 0.500	0.0200	0.0200	0.0200	0.0580
Over 6 to 8, incl.	11 to 10	0.120 to 0.134	0.0250	0.0250	0.0250	0.0430
Over 6 to 8, incl.	9 to 5	0.148 to 0.220	0.0250	0.0250	0.0250	0.0450
Over 6 to 8, incl.	4 to 3	0.238 to 0.259	0.0250	0.0250	0.0250	0.0590
Over 6 to 8, incl.	2 to 0.500	0.284 to 0.500	0.0250	0.0250	0.0250	0.0630

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- (a) 1 inch = 25.4 mm.
- (b) Flash-In tubing is produced only to outside diameter tolerances and wall thickness tolerances and the inside diameter welding flash does not exceed the wall thickness or 3/32 inch, whichever is less.
- (c) Flash controlled to 0.010 in. max tubing consists of tubing which is commonly produced only to outside diameter tolerances and wall thickness tolerances, in which the height of the remaining inside welding flash is controlled not to exceed 0.010 inch.
- (d) No-flash tubing is further processed by DOM for closer tolerances , produced to outside diameter and wall, inside diameter and wall, or outside diameter and inside diameter , with no dimensional indication of inside diameter flash, and is available in types 5 and 6.
- (e) Flash controlled to .005 in. maximum tubing is produced to outside diameters and wall thickness, tolerance inside diameter and wall thickness tolerances, or outside diameters and inside diameter tolerances, in which the height of the remaining flash is controlled not to exceed 0.005 in. Any remaining flash is considered to be part of the applicable inside diameter tolerances.
- (f) Birmingham Wire Gauge.
- (g) The ovality shall be within the above tolerances except when the wall thickness is less than 3 percent of the outside diameter, in such cases see 10.6.1.

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Wall Thickness Tolerances (inches)

Wall Thickness		Outside Diameter, in. (a)											
in. (a)	Bwg (b)	3/4 to 1 incl.		Over 1 to 1-15/16, incl.		Over 1-15/16 to 3-3/4, incl.		Over 3-3/4 to 4-1/2, incl.		Over 4-1/2 to 6, incl.		Over 6 to 8, incl.	
		Wall Thickness Tolerances, in., plus and minus (c)											
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
0.065	16	0.005	0.009	0.004	0.01	0.003	0.011	0.002	0.012	0.002	0.012	—	—
0.072	15	0.005	0.009	0.004	0.01	0.003	0.011	0.002	0.012	0.002	0.012	—	—
0.083	14	0.006	0.01	0.005	0.011	0.004	0.012	0.003	0.013	0.003	0.013	—	—
0.095	13	0.006	0.01	0.005	0.011	0.004	0.012	0.003	0.013	0.003	0.013	—	—
0.109	12	0.006	0.01	0.005	0.011	0.004	0.012	0.003	0.013	0.003	0.013	0.003	0.013
0.120	11	0.006	0.01	0.005	0.011	0.004	0.012	0.003	0.013	0.003	0.013	0.003	0.013
0.134	10	0.006	0.01	0.005	0.011	0.004	0.012	0.003	0.013	0.003	0.013	0.003	0.013
0.148	9	—	—	0.006	0.012	0.005	0.013	0.004	0.014	0.004	0.014	0.004	0.014
0.165	8	—	—	0.006	0.012	0.005	0.013	0.004	0.014	0.004	0.014	0.004	0.014
0.180	7	—	—	0.006	0.012	0.005	0.013	0.004	0.014	0.004	0.014	0.004	0.014
0.203	6	—	—	—	—	0.007	0.015	0.006	0.016	0.005	0.017	0.005	0.017
0.220	5	—	—	—	—	0.007	0.015	0.006	0.016	0.005	0.017	0.005	0.017
0.238	4	—	—	—	—	0.012	0.02	0.011	0.021	0.01	0.022	0.01	0.022
0.259	3	—	—	—	—	0.013	0.021	0.012	0.022	0.011	0.023	0.011	0.023
0.284	2	—	—	—	—	0.014	0.022	0.013	0.023	0.012	0.024	0.012	0.024
0.300	1	—	—	—	—	0.015	0.023	0.014	0.024	0.013	0.025	0.013	0.025
0.320	—	—	—	—	—	0.016	0.024	0.015	0.025	0.014	0.026	0.014	0.026
0.344	—	—	—	—	—	0.017	0.025	0.016	0.026	0.015	0.027	0.015	0.027
0.360	—	—	—	—	—	0.017	0.025	0.016	0.026	0.015	0.027	0.015	0.027
0.375	—	—	—	—	—	—	—	0.016	0.026	0.015	0.027	0.015	0.027
0.406	—	—	—	—	—	—	—	0.017	0.027	0.016	0.028	0.016	0.028
0.438	—	—	—	—	—	—	—	0.017	0.027	0.016	0.028	0.016	0.028
0.469	—	—	—	—	—	—	—	—	—	0.016	0.028	0.016	0.028
0.500	—	—	—	—	—	—	—	—	—	0.016	0.028	0.016	0.028

(a) 1 inch = 25.4 mm. (b) Birmingham Wire Gauge (c) Where the ellipsis (...) appears in this table, the tolerance is not addressed

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ELECTRIC RESISTANCE WELDED TUBING (ERW) FOR SQUARE AND RECTANGULAR TUBING - ASTM A513

Tolerances: Outside Dimensions (inches)

Largest Nominal Outside Dimension, in.	Wall Thickness, in.	Outside Tolerance at All Sides at Corners, in. Plus and Minus
3/16 to 5/8, incl.	0.020 to 0.083 incl.	0.004
Over 5/8 to 1-1/8, incl.	0.025 to 0.156 incl.	0.005
Over 1-1/8 to 1-1/2, incl.	0.025 to 0.192 incl.	0.006
Over 1-1/2 to 2, incl.	0.032 to 0.192 incl.	0.008
Over 2 to 3, incl.	0.035 to 0.259 incl.	0.010
Over 3 to 4, incl.	0.049 to 0.259 incl.	0.020
Over 4 to 6, incl.	0.065 to 0.259 incl.	0.020
Over 6 to 8, incl.	0.185 to 0.259 incl.	0.025

NOTE: Measurements should be taken at 2 inches from either end of tube.

ELECTRIC RESISTANCE WELDED TUBING (ERW) FOR SQUARE AND RECTANGULAR TUBING - ASTM A513

Wall Tolerances

Wall thickness tolerance on square and rectangular tubing is normally plus or minus 10 percent of the nominal wall. This tolerance exceeds the round tubing wall tolerance since stresses involved in forming round tubing into required square or rectangular sections cause wall deformation.

ELECTRIC RESISTANCE WELDED TUBING (ERW) FOR SQUARE AND RECTANGULAR TUBING - ASTM A513

Squareness

Permissible variations for Squareness to be determined by the following equation:

$$\pm b = c \times 0.006 \text{ in.}$$

where:

b = tolerance for out-of-square , and
 c = largest external dimension across flats

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ELECTRIC RESISTANCE WELDED TUBING (ERW) FOR SQUARE AND RECTANGULAR TUBING - ASTM A513

Twist Tolerances for Square and Rectangular Tubing

Twist tolerances are shown in the table below. The twist in square and rectangular tubing may be measured by holding one end of the tubing on a surface plate and noting the height of either corner of the opposite end of the same side above the surface plate. Twist may also be measured by the use of a beveled protractor equipped with a level, and noting the angular deviation on opposite ends, or at any point throughout the length.

Largest Dimension, in. (a)	Twist Tolerance in., 3 ft (b), in. (a)
1/2 and under	0.032
Over 1/2 to 1-1/2, incl.	0.050
Over 1-1/2 to 2-1/2, incl.	0.062
Over 2-1/2 to 4, incl.	0.075
Over 4 to 6, incl.	0.087
Over 6 to 8, incl.	0.100

(a) 1 in. = 25 mm.

(b) 1 ft. = 0.3 m.

ELECTRIC RESISTANCE WELDED TUBING (ERW) FOR SQUARE AND RECTANGULAR TUBING - ASTM A513

Straightness

Commercial tolerance for straightness is 1/16 inch in three feet.

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