



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	Flash Controlled	
				Controlled to 0.010 in. max Tubing (c,d)	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

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



- (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.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



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

Wall Thickness Tolerances (inches)

Wall Thickness		Outside Diameter, in. (a)											
in. (a)	Bwg (b)	3/4 to 1		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

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



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

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



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.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.

COLD ROLLED ELECTRIC RESISTANCE WELDED (CREW) ROUND TUBING - ASTM A513 TYPE 2
Diameter Tolerances (inches)

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

Outside Diameter Range, in. (a)	Wall Thickness		Flash-in Tubing (b)	Flash Controlled to 0.010 In.	Flash Controlled (d) to 0.005 In. max Tubing	
				max Tubing (c)		
	Bwg (a)	In. (e)	Outside Diameter Plus and Minus	Outside Diameter Plus and Minus	Outside Diameter Plus and Minus	Inside Diameter Plus and Minus
			Tolerances, in. (f,g)			
3/8 to 5/8, incl.	24 to 16	0.022 to 0.065	0.003	—	—	—
Over 5/8 to 1-1/8, incl.	24 to 19	0.022 to 0.042	0.0035	0.0035	0.0035	0.013
Over 5/8 to 1-1/8, incl.	18	0.049	0.0035	0.0035	0.0035	0.015
Over 5/8 to 1-1/8, incl.	16 to 14	0.065 to 0.083	0.0035	0.0035	0.0035	0.019
Over 3/4 to 1-1/8, incl.	13	0.095	0.0035	0.0035	0.0035	0.019
Over 7/8 to 1-1/8, incl.	12 to 11	0.109 to 0.120	0.0035	0.0035	0.0035	0.021
Over 1-1/8 to 2, incl.	22 to 18	0.028 to 0.049	0.005	0.005	0.005	0.015
Over 1-1/8 to 2, incl.	16 to 13	0.065 to 0.095	0.005	0.005	0.005	0.019
Over 1-1/8 to 2, incl.	12 to 10	0.109 to 0.134	0.005	0.005	0.005	0.022
Over 2 to 2-1/2, incl.	20 to 18	0.035 to 0.049	0.006	0.006	0.006	0.016
Over 2 to 2-1/2, incl.	16 to 13	0.065 to 0.095	0.006	0.006	0.006	0.02
Over 2 to 2-1/2, incl.	12 to 10	0.109 to 0.134	0.006	0.006	0.006	0.023
Over 2-1/2 to 3, incl.	20 to 18	0.035 to 0.049	0.008	0.008	0.008	0.018
Over 2-1/2 to 3, incl.	16 to 13	0.065 to 0.095	0.008	0.008	0.008	0.022
Over 2-1/2 to 3, incl.	12 to 10	0.109 to 0.134	0.008	0.008	0.008	0.025
Over 3 to 3-1/2, incl.	20 to 18	0.035 to 0.049	0.009	0.009	0.009	0.019
Over 3 to 3-1/2, incl.	16 to 13	0.065 to 0.095	0.009	0.009	0.009	0.023
Over 3 to 3-1/2, incl.	12 to 10	0.109 to 0.134	0.009	0.009	0.009	0.026
Over 3-1/2 to 4, incl.	20 to 18	0.035 to 0.049	0.010	0.010	0.010	0.020
Over 3-1/2 to 4, incl.	16 to 13	0.065 to 0.095	0.010	0.010	0.010	0.024
Over 3-1/2 to 4, incl.	12 to 10	0.109 to 0.134	0.010	0.010	0.010	0.027
Over 4 to 6, incl.	16 to 13	0.065 to 0.095	0.020	0.020	0.020	0.034
Over 4 to 6, incl.	12 to 10	0.109 to 0.134	0.020	0.020	0.020	0.037
Over 6 to 8, incl.	14 to 13	0.083 to 0.095	0.025	0.025	0.025	0.039
Over 6 to 8, incl.	12 to 10	0.109 to 0.134	0.025	0.025	0.025	0.042

(a) 1 in. – 25.4 mm.

(b) Flash-In tubing is produced to outside diameter tolerances and wall thickness tolerances only, and the height of the inside welding flash does not exceed the wall thickness of 3/32 in. whichever is less.

(c) Flash controlled to 0.010 in. maximum tubing consists of tubing over 5/8 in. outside diameter which is commonly produced to outside diameter tolerances and wall thickness tolerances only, in which the height of the remaining inside welding flash is controlled not exceed 0.010 in.

(d) Flash controlled to 0.005 in. maximum tubing is produced to outside diameter tolerances and wall thickness tolerances, inside diameter tolerances and wall thickness tolerances, or outside diameter tolerances and inside diameter tolerances, in which the height of the remaining inside welding flash is controlled not to exceed 0.005 in. Any remaining flash is considered to be part of the applicable inside diameter tolerances.

(e) Birmingham Wire Gage.

(f) The ovality shall be within the above tolerances except when the wall thickness is less than 3% of the outside diameter, in such cases see 8.6.1.

(g) Where the ellipsis (...) appears in this table, the tolerance is not addressed.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



COLD ROLLED ELECTRIC RESISTANCE WELDED (CREW) ROUND TUBING - ASTM A513 TYPE 2
Wall Thickness Tolerances (inches)

Wall Thickness		Outside Diameter, in. (a)											
in. (a)	Bwg (b)	3/8 to 7/8, incl.	Over 7/8 to 1-7/8, incl.	Over 1-7/8 to 3-3/4, incl.	Over 3-3/4 to 5, incl.	Over 5 to 6, incl.	Over 6 to 8, incl.						
		Wall Thickness Tolerances, in. (a, c) Plus and Minus											
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
0.022	24	0.001	0.005	0.001	0.005								
0.028	22	0.001	0.005	0.001	0.005	—	—	—	—	—	—	—	—
0.035	20	0.002	0.005	0.001	0.005	0.001	0.005	—	—	—	—	—	—
0.049	18	0.003	0.006	0.002	0.006	0.002	0.006	—	—	—	—	—	—
0.065	16	0.005	0.007	0.004	0.007	0.004	0.007	0.004	0.007	0.004	0.007	—	—
0.083	14	0.006	0.007	0.005	0.007	0.004	0.007	0.004	0.007	0.004	0.008	0.004	0.008
0.095	13	0.006	0.007	0.005	0.007	0.004	0.007	0.004	0.007	0.004	0.008	0.004	0.008
0.109	12	—	—	0.006	0.008	0.005	0.008	0.005	0.008	0.005	0.009	0.005	0.009
0.120	11	—	—	0.007	0.008	0.006	0.008	0.005	0.008	0.005	0.009	0.005	0.009
0.134	10	—	—	0.007	0.008	0.006	0.008	0.005	0.008	0.005	0.009	0.005	0.009

(a) 1 inch = 25.4 mm.

(b) Birmingham Wire Gauge.

(c) Where the ellipsis appears in this table, the tolerance is not addressed

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



DRAWN OVER MANDREL (DOM) MECHANICAL TUBING - ASTM 513 TYPE 5

Diameter Tolerances (inches)

Notes: Measurements for diameter are to be taken at least 2 in. from the ends of the tubes. Our typical inventory is purchased to OD & ID dimensions. Although we can special order material made to OD & Wall dimensions.

OD Size Range (a)	Wall Percent of OD	OD, in. (b,c)		ID, in. (b,c)	
		Over	Under	Over	Under
Up to 0.499	All	0.004	0.000	—	—
0.500-1.699	All	0.005	0.000	0.000	0.005
1.700-2.099	All	0.006	0.000	0.000	0.006
2.100-2.499	All	0.007	0.000	0.000	0.007
2.500-2.899	All	0.008	0.000	0.000	0.008
2.900-3.299	All	0.009	0.000	0.000	0.009
3.300-3.699	All	0.010	0.000	0.000	0.010
3.700-4.099	All	0.011	0.000	0.000	0.011
4.100-4.499	All	0.012	0.000	0.000	0.012
4.500-4.899	All	0.013	0.000	0.000	0.013
4.900-5.299	All	0.014	0.000	0.000	0.014
5.300-5.549	All	0.015	0.000	0.000	0.015
5.550-5.999	Under 6	0.010	0.010	0.010	0.010
	6 and Over	0.009	0.009	0.009	0.009
6.000-6.499	Under 6	0.013	0.013	0.013	0.013
	6 and Over	0.010	0.010	0.010	0.010
6.500-6.999	Under 6	0.015	0.015	0.015	0.015
	6 and Over	0.012	0.012	0.012	0.012
7.000-7.499	Under 6	0.018	0.018	0.018	0.018
	6 and Over	0.013	0.013	0.013	0.013
7.500-7.999	Under 6	0.020	0.020	0.020	0.020
	6 and Over	0.015	0.015	0.015	0.015
8.000-8.499	Under 6	0.023	0.023	0.023	0.023
	6 and Over	0.016	0.016	0.016	0.016
8.500-8.999	Under 6	0.025	0.025	0.025	0.025
	6 and Over	0.017	0.017	0.017	0.017
9.000-9.499	Under 6	0.028	0.028	0.028	0.028
	6 and Over	0.019	0.019	0.019	0.019
9.500-9.999	Under 6	0.030	0.030	0.030	0.030
	6 and Over	0.020	0.020	0.020	0.020
10.000-10.999	All	0.034	0.034	0.034	0.034
11.000-11.999	All	0.035	0.035	0.035	0.035
12.000-12.999	All	0.036	0.036	0.036	0.036
13.000-13.999	All	0.037	0.037	0.037	0.037
14.000-14.999	All	0.038	0.038	0.038	0.038

(a) Tubing, flash in or flash controlled which is further processed without mandrel to obtain tolerances closer than those shown in ASTM A513 tables 4 and 8.

(b) The ovality shall be within the above tolerances except when the wall thickness is less than 3% of the outside diameter, in such cases see table 8.6.2

(c) Tubing produced to outside diameter and wall thickness, or inside diameter and wall thickness, or outside diameter and inside diameter, by DOM to obtain tolerances closer than those shown in tables 4 and 8 and no dimensional indication of inside diameter flash.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



DRAWN OVER MANDREL (DOM) MECHANICAL TUBING - ASTM 513 TYPE 5

Wall Thickness Tolerances (inches)

Wall Thickness		Outside Diameter, In. (a)							
		3/8 to 7/8 incl.		Over 7/8 to 1-7/8 incl.		Over 1-7/8 to 3-3/4 incl.		Over 3-3/4 to 15 incl.	
in. (a)	Bwg (b)	Wall Thickness Tolerances, in.,(a,c) ±							
		+	−	+	−	+	−	+	−
0.035	20	0.002	0.002	0.002	0.002	0.002	0.002		
0.049	18	0.002	0.002	0.002	0.003	0.002	0.003		
0.065	16	0.002	0.002	0.002	0.003	0.002	0.003	0.004	0.004
0.083	14	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004
0.095	13	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004
0.109	12	0.002	0.003	0.002	0.004	0.003	0.003	0.005	0.005
0.120	11	0.003	0.003	0.002	0.004	0.003	0.003	0.005	0.005
0.134	10	...	...	0.002	0.004	0.003	0.003	0.005	0.005
0.148	9	...	...	0.002	0.004	0.003	0.003	0.005	0.005
0.165	8	...	...	0.003	0.004	0.003	0.004	0.005	0.005
0.180	7	...	...	0.004	0.004	0.003	0.005	0.006	0.006
0.203	6	...	...	0.004	0.005	0.004	0.005	0.006	0.006
0.220	5	...	...	0.004	0.006	0.004	0.006	0.007	0.007
0.238	4	...	...	0.005	0.006	0.005	0.006	0.007	0.007
0.259	3	...	...	0.005	0.006	0.005	0.006	0.007	0.007
0.284	2	...	...	0.005	0.006	0.005	0.006	0.007	0.007
0.300	1	...	...	0.006	0.006	0.006	0.006	0.008	0.008
0.320		...	...	0.007	0.007	0.007	0.007	0.008	0.008
0.344		...	...	0.008	0.008	0.008	0.008	0.009	0.009
0.375		...	...	...	...	0.009	0.009	0.009	0.009
0.400		...	...	...	...	0.010	0.010	0.010	0.010
0.438		...	...	...	...	0.011	0.011	0.011	0.011
0.460		...	...	...	...	0.012	0.012	0.012	0.012
0.480		...	...	...	...	0.012	0.012	0.012	0.012
0.531		...	...	...	...	0.013	0.013	0.013	0.013
0.563		...	...	...	...	0.013	0.013	0.013	0.013
0.580		...	...	...	...	0.014	0.014	0.014	0.014
0.600		...	...	...	...	0.015	0.015	0.015	0.015
0.625		...	...	...	...	0.016	0.016	0.016	0.016
0.650		...	...	...	...	0.017	0.017	0.017	0.017

(a) 1 in = 25.4 mm.

(B) Birmingham Wire Gauge

(c) Where the ellipsis (...) appears in this table, the tolerance is not addressed

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



HOT FINISHED SEAMLESS ROUND TUBING - ASTM A519		
Outside Diameter Tolerances (inches), (a,b,c)		
Outside Diameter Size Range, in.	Outside Diameter Tolerance, in.	
	Over	Under
Up to 2.999	0.020	0.020
3.000-4.499	0.025	0.025
4.500-5.999	0.031	0.031
6.000-7.499	0.037	0.037
7.500-8.999	0.045	0.045
9.000-10.750	0.050	0.050

(a) Diameter tolerances are not applicable to normalized and tempered or quenched and tempered conditions.

(b) The common range sizes of hot finished tubes is 1-1/2 inch to 10-3/4 inch outside diameter with wall thickness at least 3 % or more of outside diameter, but not less than 0.095 inch .

(c) Larger sizes are available: consult manufacturer for sizes and tolerances.

HOT FINISHED SEAMLESS ROUND TUBING - ASTM A519			
Wall Thickness Tolerances (inches)			
Wall Thickness Range as Percent of Outside Diameter	Wall Thickness Tolerance (a) percent over and under nominal		
	Outside Diameter 2.999 in. and smaller	Outside Diameter 3.000 in. to 5.999 in.	Outside Diameter 6.00 in. to 10.750 in.
Under 15	12.50	10.00	10.00
15 and over	10.00	7.50	10.00

(a) Wall thickness tolerances may not be applicable to walls 0.199 in. and less: consult manufacturer for wall tolerances on such tube sizes.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



COLD DRAWN SEAMLESS ROUND TUBING - ASTM A519
Outside and Inside Diameter Tolerances (inches) (a,b,c)

Outside Diameter Size Range in. (d)	Wall Thickness as Percent of OD	Thermal Treatment after Final Cold Work Producing Size							
		None, or not exceeding 1100°F. Nominal Temperature				Heated Above 1100°F. Nominal Temperature Without Accelerated Cooling			
		OD, in. (d)		ID, in. (d)		OD, in. (d)		ID, in. (d)	
		Over	Under	Over	Under	Over	Under	Over	Under
Up to 0.499	All	0.004	0.000	—	—	0.005	0.002	—	—
0.500-1.699	All	0.005	0.000	0.000	0.005	0.007	0.002	0.002	0.007
1.700-2.099	All	0.006	0.000	0.000	0.006	0.006	0.005	0.005	0.006
2.100-2.499	All	0.007	0.000	0.000	0.007	0.008	0.005	0.005	0.008
2.500-2.899	All	0.008	0.000	0.000	0.008	0.009	0.005	0.005	0.009
2.900-3.299	All	0.009	0.000	0.000	0.009	0.011	0.005	0.005	0.011
3.300-3.699	All	0.010	0.000	0.000	0.010	0.013	0.005	0.005	0.013
3.700-4.099	All	0.011	0.000	0.000	0.011	0.013	0.007	0.010	0.010
4.100-4.499	All	0.012	0.000	0.000	0.012	0.014	0.007	0.011	0.011
4.500-4.899	All	0.013	0.000	0.000	0.013	0.016	0.007	0.012	0.012
4.900-5.299	All	0.014	0.000	0.000	0.014	0.018	0.007	0.013	0.013
5.300-5.549	All	0.015	0.000	0.000	0.015	0.020	0.007	0.014	0.014
5.500-5.559	Under 6	0.010	0.010	0.010	0.010	0.018	0.018	0.018	0.018
	6 to 7-1/2	0.009	0.009	0.009	0.009	0.016	0.016	0.016	0.016
	over 7-1/2	0.018	0.000	0.009	0.009	0.017	0.015	0.016	0.016
6.000-6.499	Under 6	0.013	0.013	0.013	0.013	0.023	0.023	0.023	0.023
	6 to 7-1/2	0.010	0.010	0.010	0.010	0.018	0.018	0.018	0.018
	over 7-1/2	0.020	0.000	0.010	0.010	0.020	0.015	0.018	0.018
6.500-6.999	Under 6	0.015	0.015	0.015	0.015	0.027	0.027	0.027	0.027
	6 to 7-1/2	0.012	0.012	0.012	0.012	0.021	0.021	0.021	0.021
	over 7-1/2	0.023	0.000	0.012	0.012	0.026	0.015	0.021	0.021
7.000-7.499	Under 6	0.018	0.018	0.018	0.018	0.032	0.032	0.032	0.032
	6 to 7-1/2	0.013	0.013	0.013	0.013	0.023	0.023	0.023	0.023
	over 7-1/2	0.026	0.000	0.013	0.013	0.031	0.015	0.023	0.023
7.500-7.999	Under 6	0.020	0.020	0.020	0.020	0.035	0.035	0.035	0.035
	6 to 7-1/2	0.015	0.015	0.015	0.015	0.026	0.026	0.026	0.026
	over 7-1/2	0.029	0.000	0.015	0.015	0.036	0.015	0.026	0.026
8.000-8.499	Under 6	0.023	0.023	0.023	0.023	0.041	0.041	0.041	0.041
	6 to 7-1/2	0.016	0.016	0.016	0.016	0.028	0.028	0.028	0.028
	over 7 1/4	0.031	0.000	0.015	0.016	0.033	0.022	0.028	0.028
8.500-8.999	Under 6	0.025	0.025	0.025	0.025	0.044	0.044	0.044	0.044
	6 to 7-1/2	0.017	0.017	0.017	0.017	0.030	0.030	0.030	0.030
	over 7-1/2	0.034	0.000	0.015	0.019	0.038	0.022	0.030	0.030
9.000-9.499	Under 6	0.028	0.028	0.028	0.028	0.045	0.045	0.049	0.049
	6 to 7-1/2	0.019	0.019	0.019	0.019	0.033	0.033	0.033	0.033
	over 7-1/2	0.037	0.000	0.015	0.022	0.043	0.022	0.033	0.033
9.500-9.999	Under 6	0.030	0.030	0.030	0.030	0.045	0.045	0.053	0.053
	6 to 7-1/2	0.020	0.020	0.020	0.020	0.035	0.035	0.035	0.035
	over 7-1/2	0.040	0.000	0.015	0.025	0.048	0.022	0.035	0.035
10.000-10.999	Under 6	0.034	0.034	0.034	0.034	0.045	0.045	0.060	0.060
	6 to 7-1/2	0.022	0.022	0.022	0.022	0.039	0.039	0.039	0.039
	over 7-1/2	0.044	0.000	0.015	0.029	0.055	0.022	0.039	0.039
11.000-12.000	Under 6	0.035	0.035	0.035	0.035	0.050	0.050	0.065	0.065
	6 to 7- 1/2	0.025	0.025	0.025	0.025	0.045	0.045	0.045	0.045
	over 7-1/2	0.045	0.000	0.015	0.035	0.060	0.022	0.045	0.045

- (a) Many tubes with inside diameter less than 50% of outside diameter or with wall thickness more than 25% of outside diameter, or with wall thickness over 1-1/4 in., or weighing more than 90 lb./ft., are difficult to draw over a mandrel. Therefore, the inside diameter can vary over or under by an amount equal to 10% of the wall thickness. See also Footnote B.
- (b) For those tubes with inside diameter less than 1/2 in. (or less than 5/8 in. when the wall thickness is more than 20% of the outside diameter), which are not commonly drawn over a mandrel, Footnote A is not applicable. Therefore, for those tubes, the inside diameter is governed by the outside diameter tolerance shown in this table and the wall thickness tolerances shown in Table 9.
- (c) Tubing having a wall thickness less than 3% of the outside diameter cannot be straightened properly without a certain amount of distortion. Consequently such tubes, while having an average outside diameter and inside diameter within the tolerances shown in this table, require an ovality tolerance of 1/2 % over and under nominal outside diameter, this being in addition to the tolerances indicated in this table.
- (d) Larger sizes are available. Consult manufacturer for sizes and tolerances.

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.



COLD DRAWN SEAMLESS ROUND TUBING - ASTM A519		
Wall Thickness Tolerances (inches)		
Wall thickness range as % of Outside Diameter	Wall Thickness Tolerance Over and Under Nominal %	
	Up to 1.499 in. ID	1.500 in. and Over
25 and under	10.0	7.5
over 25	12.5	10.0

The information listed is correct to the best of our knowledge. Wisconsin Steel & Tube Corporation assumes no responsibility for errors or omissions. Wisconsin Steel & Tube Corporation publishes this for guidance of their customers and reserves the right to add or delete items without notification.