

# Seamless Stainless Mechanical Tubing

## ASTM A-511 TUBING

### Permissible Variations in Outside Diameter, Wall Thickness, and Cut-Length Variations (Hot-Finished Round Tubing)

Specified Size, Outside Diameter, in.	Ratio of Wall Thickness to Outside Diameter	Outside Diameter and Wall Thickness Tolerances										Permissible Variations in Cut Length, in. <sup>A</sup>	
		Outside Diameter, in.		Wall Thickness, %									
		Over	Under	0.109 in. and under		0.109 to 0.172 in., incl.		Over 0.172 to 0.203 in., incl.		Over 0.203 in.		Over	Under
Under 3	all wall thicknesses	0.023	0.023	16.5	16.5	15	15	14	14	12.5	12.5	3/16	0
3 to 5-1/2, excl.	all wall thicknesses	0.031	0.031	16.5	16.5	15	15	14	14	12.5	12.5	3/16	0
5-1/2 to 8, excl.	all wall thicknesses	0.047	0.047	-	-	-	-	14	14	12.5	12.5	3/16	0
8 to 10-3/4, excl.	5% and over	0.047	0.047	-	-	-	-	-	-	12.5	12.5	3/16	0
10-3/4 to 12-3/4, excl.	under 5%	0.063	0.063	-	-	-	-	-	-	12.5	12.5	3/16	0

<sup>A</sup>These tolerances apply to cut lengths up to and including 24 ft. (7.3 m). For lengths over 24 ft., an additional over tolerance of 1/8 in. (3.1 mm) for each 10 ft. (3 m) or fraction thereof shall be permissible, up to a maximum tolerance of 1/2 in. (12.7 mm).

## ASTM A-511 TUBING

### Permissible Variations in Outside Diameter, Ovality, Wall Thickness, and Cut-Length Variations (Cold Finished Round Tubing)<sup>A</sup>

Outside Diameter, in.	Outside Diameter Tolerance, <sup>B</sup> in. Over and Under	Ovality <sup>B</sup> Double Outside Diameter Tolerance when wall is:	Wall Thickness in % <sup>C, D</sup>		Permissible Variations in Cut Length, in. <sup>E</sup>	
			Over	Under	Over	Under
Under 1/2	0.005	less than 0.015 in.	15	15	1/8	0
1/2 to 1-1/2, excl.	0.005	less than 0.065 in.	10	10	1/8	0
1-1/2 to 3-1/2, excl.	0.010	less than 0.095 in.	10	10	3/16	0
3-1/2 to 5-1/2, excl.	0.015	less than 0.150 in.	10	10	3/16	0
5-1/2 to 8, excl.	0.030	less than 0.240 in.	10	10	3/16	0
8 to 8-5/8, excl.	0.045	less than 0.300 in.	10	10	3/16	0
8-5/8 to 12-3/4, incl.	0.062	less than 0.350 in.	10	10	3/16	0

<sup>A</sup> Tolerances of tubes produced by the rod or bar mandrel process and which have an inside diameter under 1/2 in. (12.7 mm) (or an inside diameter under 5/8 in. [15.8 mm] when the wall thickness is more than 20% of the outside diameter) are as shown in this table, except that wall thickness tolerances are 10% over and under the specified wall thickness.

<sup>B</sup> For ovality values, the tolerance for average outside diameter at any one cross section does not exceed the outside diameter tolerance value for the applicable outside diameter.

<sup>C</sup> Many tubes with wall thicknesses more than 25% of outside diameter or with wall thicknesses over 1-1/4 in. (31.7 mm), or weighing more than 90 lb./ft., are difficult to draw over a mandrel. Therefore, the wall thickness can vary 12-1/2% over and under that specified. Also see Footnote (B).

<sup>D</sup> For those tubes with inside diameter under 1/2 in. (12.7 mm) (or under 5/8 in. [15.8 mm] 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 the wall thickness can vary 15% over and under that specified, and the inside diameter is governed by both the outside diameter and wall thickness tolerances.

<sup>E</sup> These tolerances apply to cut lengths up to and including 24 ft. (7.3 m). For lengths over 24 ft., an additional over tolerance of 1/8 in. (3.1 mm) for each 10 ft. (3 m) or fraction thereof shall be permissible, up to a maximum tolerance of 1/2 in. (12.7 mm).