Diameter, Wall,[A] and Ovality Tolerances (All Conditions Except Tubing with Bead Removed)

NOTE 1 – Ovality is the difference between maximum and minimum outside diameters measured at any one cross section. There is no additional tolerance for ovality on tubes having a nominal wall thickness of more than 3 % of the outside diameter.

NOTE 2 – For sizes up to and including 5-in. (127.0-mm) outside diameter, an ovality tolerance of twice the tabular outside diameter tolerance spread shown is applied one half plus and one half minus to tubes having a nominal wall thickness of 3 % or less of the nominal outside diameter. The average of the maximum and minimum outside diameter readings should fall within the outside diameter tolerances as shown in this table.

NOTE 3 – For sizes over 5-in. (127.0-mm) to and including 16-in. (406.4-mm) outside diameter, when the specified wall thickness is 3 % or less of the outside diameter, the ovality shall not exceed 1.5 % of the specified outside diameter.

OD Size, in (mm)	Wall Thickness		OD, ±	
	in.	mm	in.	mm
Under 1/2 (12.7)	0.020 to 0.049	0.51 to 1.24	0.004	0.10
1/2 to 1 (12.7 to 25.4)	0.020 to 0.065	0.51 to 1.65	0.005	0.13
1/2 to 1 (12.7 to 25.4)	Over 0.065 to 0.134	Over 1.65 to 3.40	0.010	0.25
Over 1 to 1-1.2 (25.4 to 38.1), incl.	0.025 to 0.065	0.64 to 1.65	0.008	0.20
Over 1 to 1-1.2 (25.4 to 38.1), incl.	Over 0.065 to 0.134	Over 1.65 to 3.40	0.010	0.25
Over 1-1/2 to 2 (38.1 to 50.8), incl.	0.025 to 0.049	0.64 to 1.24	0.020	0.25
Over 1-1/2 to 2 (38.1 to 50.8), incl.	Over 0.049 to 0.083	Over 1.24 to 2.11	0.011	0.28
Over 1-1/2 to 2 (38.1 to 50.8), incl.	Over 0.083 to 0.149	Over 2.11 to 3.78	0.012	0.30
Over 2 to 2-1/2 (50.8 to 63.5), incl.	0.032 to 0.065	0.81 to 1.65	0.012	0.30
Over 2 to 2-1/2 (50.8 to 63.5), incl.	Over 0.065 to 0.190	Over 1.65 to 2.77	0.013	0.33
Over 2 to 2-1/2 (50.8 to 63.5), incl.	Over 0.109 to 0.165	Over 2.77 to 4.19	0.014	0.36
Over 2-1/2 to 3-1/2 (63.5 to 88.9), incl.	0.032 to 0.165	0.81 to 4.19	0.014	0.36
Over 2-1/2 to 3-1/2 (63.5 to 88.9), incl.	Over 0.165	Over 4.19	0.020	0.51
Over 3-1/2 to 5 (88.9 to 127.0), incl.	0.035 to 0.165	0.89 to 4.19	0.020	0.51
Over 3-1/2 to 5 (88.9 to 127.0), incl.	Over 0.165	Over 4.19	0.025	0.64
Over 5 to 16 (127.0 to 406.4), incl.	all	all	0.00125 in./in. or mm/mm of circumference	

[A] Wall tolerance ± 10 % of nominal wall thickness.

Diameter, Wall,[A] and Ovality Tolerances for Tubing with Bead Removed

NOTE 1 – Ovality is the difference between maximum and minimum outside diameters measured at any one cross section. There is no additional tolerance for ovality on tubes having a nominal wall thickness of more than 3 % of the outside diameter.

NOTE 2 – An ovality allowance of twice the outside diameter tolerance, shown in this table, is applied one half plus and one half minus to the outside diameter, for tubes having a nominal wall thickness of 3 % or less of the outside diameter. The average of the maximum and minimum outside diameter readings should fall within the outside diameter tolerances of this table.

NOTE 3 – Tubing may be specified to only two of the three following dimensions – outside diameter, inside diameter, or wall.

OD Size, in (mm)	OD, ±		ID, ±	
	in.	mm	in.	mm
UP to 3/32 (2.4) excl.	0.001	0.03	0.001	0.03
3/32 to 3/16 (2.4 to 4.8), excl.	0.0015	0.038	0.0015	0.038
3/16 to 1/2 (4.8 to 12.7), excl.	0.003	0.08	0.005	0.038
1/2 to 1 (12.7 to 25.4), excl.	0.004	0.10	0.006	0.15
1 to 1-1/2 (25.4 to 38.1), excl.	0.005	0.13	0.007	0.18
1-1/2 to 2 (38.1 to 50.8), excl.	0.006	0.15	0.008	0.20
2 to 2-1/2 (50.8 to 63.5), excl.	0.007	0.18	0.010	0.25
2-1/2 to 3-1/2 (63.5 to 88.9), excl.	0.010	0.25	0.014	0.36
3-1/2 to 5 (88.2 to 127.0), incl.	0.015	0.38	0.020	0.51
Over 5 to 16 (127.0 to 406.4), incl.	0.00125 in./in. or mm/mm of circumference		0.0013 in./in. or mm/mm of circumference	

[A] Wall tolerance ± 10 % of nominal wall thickness.

Square and Rectangular Tubing

Outside Dimension Tolerances

Largest Nominal Outside Dimension Across Flats, in. (mm)	Wall Thickness [A] in. (mm)	± in. (mm), across Flats, Convexity or Concavity, incl.
To 1-1/4 (31.8), incl.	all	0.015 (0.38)
Over 1-1/4 to 2-1/2 (31.8 to 63.5), incl.	all	0.020 (0.51)
Over 2-1/2 to 5-1/2 (63.5 to 139.7), incl.	all	0.030 (0.76)

[A] Wall tolerance is +/- 10% of Nominal Wall Thickness

Maximum Radii of Corners

Wall Thickness, in. (mm)	Radii of Corners, max, in. (mm)
Over 0.020 to 0.049 (0.51 to 1.24), incl.	3/32 (2.4)
Over 0.049 to 0.065 (1.24 to 1.65), incl.	1/8 (3.2)
Over 0.065 to 0.083 (1.65 to 2.11), incl.	9/64 (3.6)
Over 0.083 to 0.095 (2.11 to 2.42), incl.	3/16 (4.8)
Over 0.095 to 0.109 (2.42 to 2.77), incl.	13/34 (5.2)
Over 0.109 to 0.134 (2.77 to 3.40), incl.	7?32 (5.6)
Over 0.134 to 0.156 (3.40 to 3.96), incl.	1/4 (6.4)

Twist Tolerances

Largest Size, in. (mm)	Twist in 3 ft., max, in. (mm/m)
Under 1/2 (12.7)	0.050 (1.4)
1/2 to 1-1/2 (12.7 to 38.1), incl.	0.075 (2.1)
Over 1-1/2 to 2-1/2 (38.1 to 63.5), incl.	0.095 (2.6)
Over 2-1/2 (63.5)	0.125 (3.5)

Squareness of Sides

± B = C x 0.006

where:

B = tolerance for out-of-square, and
C = length of longest side

The straightness tolerance is 0.075 in in 3 ft.
or 2.1 mm in 1 m using a 3-ft. (1-m) straightedge and feeler gage.