

SEAMLESS MECHANICAL TUBING

Outside Diameter Tolerances for Round Hot-Finished Tubing^{a, b, c}

Outside Diameter Size Range, in. (mm)	Outside Diameter Tolerance in. (mm)	
	Over	Under
Up to 2.999 (76.17)	0.020 (0.51)	0.020 (0.51)
3.000-4.499 (76.20-114.27)	0.025 (0.64)	0.025 (0.64)
4.500-5.599 (114.30-152.37)	0.031 (0.79)	0.031 (0.79)
6.000-7.499 (152.40-190.47)	0.037 (0.94)	0.037 (0.94)
7.500-8.999 (190.50-228.57)	0.045 (1.14)	0.045 (1.14)
9.000-10.750 (228.60-273.05)	0.050 (1.27)	0.050 (1.27)

^a Diameter tolerances are not applicable to normalized and tempered or quenched and tempered conditions.
^b The common range of sizes of hot finished tubes is 1½ in. (38.1 mm) to 10¾ in. (273.0 mm) outside diameter with wall thickness at least 3% or more of outside diameter, but not less than 0.095 in. (2.41mm).
^c Larger sizes are available; consult manufacturer for sizes and tolerances.

Outside and Inside Diameter Tolerances for Round Cold-Worked Tubing^{a, b, c}

Outside Diameter Size Range, in. ^d	Wall Thickness As Percent of Outside Diameter	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				Quenched and Tempered			
		OD, in. d		ID, in. d		OD, in. d		ID, in. d		OD, in. d		ID, in. d	
		Over	Under	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under
Up to 0.499	all	0.004	0.000	—	—	0.005	0.002	—	—	0.010	0.010	0.010	0.010
0.500-1.699	all	0.005	0.000	0.000	0.005	0.007	0.002	0.002	0.007	0.015	0.015	0.015	0.015
1.700-2.099	all	0.006	0.000	0.000	0.006	0.006	0.005	0.005	0.996	0.020	0.020	0.020	0.020
2.100-2.499	all	0.007	0.000	0.000	0.007	0.008	0.005	0.005	0.008	0.023	0.023	0.023	0.023
2.500-2.899	all	0.008	0.000	0.000	0.008	0.009	0.005	0.005	0.009	0.025	0.025	0.025	0.025
2.900-3.299	all	0.009	0.000	0.000	0.009	0.011	0.005	0.005	0.011	0.028	0.028	0.028	0.028
3.300-3.699	all	0.010	0.000	0.000	0.010	0.013	0.005	0.005	0.013	0.030	0.030	0.030	0.030
3.700-4.099	all	0.011	0.000	0.000	0.011	0.013	0.007	0.010	0.010	0.033	0.033	0.033	0.033
4.100-4.499	all	0.012	0.000	0.000	0.012	0.014	0.007	0.011	0.011	0.036	0.036	0.036	0.036
4.500-4.899	all	0.013	0.000	0.000	0.013	0.016	0.007	0.012	0.012	0.038	0.038	0.038	0.038
4.900-5.299	all	0.014	0.000	0.000	0.014	0.018	0.007	0.013	0.013	0.041	0.041	0.041	0.041
5.300-5.549	all	0.015	0.000	0.000	0.015	0.020	0.007	0.014	0.014	0.044	0.044	0.044	0.044
5.550-5.999	under 6	0.010	0.010	0.010	0.010	0.018	0.018	0.018	0.018				
	6 to 7½	0.009	0.009	0.009	0.009	0.016	0.016	0.016	0.016				
	over 7½	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 7½	0.010	0.010	0.010	0.010	0.018	0.018	0.018	0.018				
	over 7½	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 7½	0.012	0.012	0.012	0.012	0.021	0.021	0.021	0.021				
	over 7½	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 7½	0.013	0.013	0.013	0.013	0.023	0.023	0.023	0.023				
	over 7½	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 7½	0.015	0.015	0.015	0.015	0.026	0.026	0.026	0.026				
	over 7½	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 7½	0.016	0.016	0.016	0.016	0.028	0.028	0.028	0.028				
	over 7½	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 7½	0.017	0.017	0.017	0.017	0.030	0.030	0.030	0.030				
	over 7½	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 7½	0.019	0.019	0.019	0.019	0.033	0.033	0.033	0.033				
	over 7½	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 7½	0.020	0.020	0.020	0.020	0.035	0.035	0.035	0.035				
	over 7½	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 7½	0.022	0.022	0.022	0.022	0.039	0.039	0.039	0.039				
	over 7½	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 7½	0.025	0.025	0.025	0.025	0.045	0.045	0.045	0.045				
	over 7½	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 1¼ 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 ½ in. (or less than ⅝ 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 7b.

^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 overallity tolerance of ½% over and under nominal diameter, this being in addition to the tolerances indicated in this table.

^d 1 in. = 25.4 mm.