

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 2223 A

Issued 8-1-45

Revised 12-1-47

T O L E R A N C E S Copper and Copper Alloy Seamless Tubing

1. **PURPOSE:** To publish established manufacturing tolerances.
2. **APPLICATION:** Tolerances shown herein apply, unless otherwise agreed between purchaser and vendor. These tolerances apply to all conditions unless otherwise noted.
3. **DIAMETER:**

TABLE I

Nominal OD Inches	Tolerance Applies to	Mean Diameter Tolerance, Inch, Plus and Minus	
		Non-refractory	Refractory
1/8 and under	ID	0.002	0.003
1/8 and under	OD	0.002	0.0025
Over 1/8 - 5/8, incl	ID or OD	0.002	0.0025
Over 5/8 - 1, incl	ID or OD	0.0025	0.003
Over 1 - 2, incl	ID or OD	0.003	0.004
Over 2 - 3, incl	ID or OD	0.004	0.005
Over 3 - 4, incl	ID or OD	0.005	0.006
Over 4 - 5, incl	ID or OD	0.006	0.008
Over 5 - 6, incl	ID or OD	0.007	0.009
Over 6 - 8, incl	ID or OD	0.008	0.010
Over 8 - 10, incl	ID or OD	0.010	0.013

Note: Out-of roundness (difference between the major and the minor diameters) of unannealed tubing in straight lengths shall not exceed 2% of the nominal diameter.

4. **WALL THICKNESS:**

TABLE II
NON-REFRACTORY

Nominal Wall Thickness Inches	Tolerance, Inch, Plus and Minus OD Ranges, Inches							
	1/32 to 1/8 incl	Over 1/8 to 5/8 incl	Over 5/8 to 1 incl	Over 1 to 2 incl	Over 2 to 4 incl	Over 4 to 7 incl	Over 7 to 10 incl	
Under 0.018	0.002	0.001	0.0015	0.002	--	--	--	
0.018 - 0.025, excl	0.003	0.002	0.002	0.0025	--	--	--	
0.025 - 0.035, excl	0.003	0.0025	0.0025	0.003	0.004	--	--	
0.035 - 0.058, excl	0.003	0.003	0.0035	0.0035	0.005	0.007	--	
0.058 - 0.083, excl	--	0.0035	0.004	0.004	0.006	0.008	0.010	
0.083 - 0.120, excl	--	0.004	0.005	0.005	0.007	0.009	0.011	
0.120 - 0.165, excl	--	0.005	0.006	0.006	0.008	0.010	0.012	
0.165 - 0.220, excl	--	0.007	0.0075	0.008	0.010	0.012	0.014	
0.220 - 0.284, excl	--	--	0.009	0.010	0.012	0.014	0.016	
0.284 - 0.380, excl	--	--	0.011	0.012	0.014	0.016	0.018	
0.380 and over	--	--	--	5%	5%	6%	6%	

If tubing is ordered with tolerances all plus or all minus, double the above values shall be permitted.

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