

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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### TOLERANCES Alloy Steel Bars

1. PURPOSE: To publish established manufacturing tolerances.
2. APPLICATION: Tolerances shown herein apply, unless otherwise agreed upon by purchaser and vendor. These tolerances apply to all conditions, unless otherwise noted.
3. DIAMETER OR THICKNESS:
  - 3.1 Cold Finished:

TABLE I

Nominal Diameter or Thickness Inches	Tolerances, Inch, Minus Only Maximum of Carbon Range, %		
	0.28 and under	over 0.28 to 0.55 incl	over 0.55 and all carbons Heat Treated or Stress Relieved
<b>ROUNDS</b>			
1.000 and under	0.003	0.005	0.007
Over 1.000 to 2.000, incl	0.004	0.006	0.009
Over 2.000 to 4.000, incl	0.005	0.007	0.011
Over 4.000 to 6.000, incl	0.006	0.008	0.013
Over 6.000 to 7.750, incl	0.007	0.010	0.017
<b>HEXAGONS</b>			
0.313 and under	0.003	0.005	0.007
Over 0.313 to 1.000, incl	0.004	0.006	0.009
Over 1.000 to 2.500, incl	0.005	0.007	0.011
Over 2.500 to 3.125, incl	0.006	0.008	0.013
<b>SQUARES</b>			
0.313 and under	0.004	0.006	0.009
Over 0.313 to 1.000, incl	0.005	0.007	0.011
Over 1.000 to 2.500, incl	0.006	0.008	0.013
Over 2.500 to 4.000, incl	0.007	0.010	0.017

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TABLE I (Cont'd)

Nominal Width Inches	Tolerances, Inch, Minus Only Maximum of Carbon Range, %		
	0.28 and under	over 0.28 to 0.55 incl	over 0.55 and all carbons Heat Treated or Stress Relieved

## FLATS

0.750 and under	0.004	0.006	0.009
Over 0.750 to 1.500, incl	0.005	0.007	0.011
Over 1.500 to 3.000, incl	0.006	0.008	0.013
Over 3.000 to 4.000, incl	0.007	0.010	0.017
Over 4.000 to 6.000, incl	0.009	0.012	0.021
Over 6.000	0.014	--	--

- 3.1.1 When rough turned round bars are permitted, the above tolerances shall be doubled.
- 3.1.2 The tolerance for flats applies space to both width and thickness.
- 3.1.3 The tolerances in the column headed "over 0.28 to 0.55 incl" also apply to all carbons up to 0.55 max, annealed before drawing.

3.2 Ground and Polished Rounds:

Nominal Diameter Inches	Tolerance, Inch, Minus Only
Under 2.5	0.002
2.5 and over	0.003

3.3 Hot Finished:

TABLE II

ROUNDS AND SQUARES

Nominal Diameter or Thickness Inches	Tolerance, Inch		Out of Round or Square Inch
	Plus	Minus	
0.313 and under	0.005	0.005	0.008
Over 0.313 to 0.438, incl	0.006	0.006	0.009
Over 0.438 to 0.625, incl	0.007	0.007	0.010
Over 0.625 to 0.875, incl	0.008	0.008	0.012
Over 0.875 to 1.000, incl	0.009	0.009	0.013
Over 1.000 to 1.125, incl	0.010	0.010	0.015
Over 1.125 to 1.250, incl	0.011	0.011	0.016
Over 1.250 to 1.375, incl	0.012	0.012	0.018
Over 1.375 to 1.500, incl	0.014	0.014	0.021
Over 1.500 to 2.000, incl	0.016	0.016	0.023
Over 2.000 to 2.500, incl	0.031	0	0.023
Over 2.500 to 3.500, incl	0.047	0	0.035
Over 3.500 to 4.500, incl	0.063	0	0.046
Over 4.500 to 5.500, incl	0.078	0	0.058
Over 5.500 to 6.500, incl	0.125	0	0.070
Over 6.500 to 8.000, incl	0.156	0	0.085

FLATS

Nominal Width Inches	Width and Thickness Tolerance, Inch						Width		
	Thickness, Plus and Minus						Plus Minus		
	Thickness Range, Inches								
	Under 0.25	0.25 to 0.50 incl	Over 0.50 to 1.0 incl	Over 1.0 to 2.0 incl	Over 2.0 to 4.0 incl				
1.0 and under	0.007	0.008	0.010	--	--	1/64	1/64		
Over 1.0 to 2.0, incl	0.007	0.012	0.015	1/32	--	1/32	1/32		
Over 2.0 to 4.0, incl	0.008	0.015	0.020	1/32	3/64	1/16	1/32		
Over 4.0 to 6.0, incl	0.009	0.015	0.020	1/32	1/16	3/32	1/16		

4. WIDTH: Included under Section 3.

5. LENGTH: None.

6. STRAIGHTNESS: None.

7. FLATNESS: None.