

TOLERANCES

HR CARBON AND ALLOY BARS

Rounds and Squares

Specified Size Inches	Variation from Size in Inches		Out of Round* or Square in Inches
	Over	Under	
Up to 1/8, incl.	.005	.005	.008
Over 1/8 to 1/4, incl.	.006	.006	.009
Over 1/4 to 3/8, incl.	.007	.007	.010
Over 3/8 to 1/2, incl.	.008	.008	.012
Over 1/2 to 3/4, incl.	.008	.008	.013
Over 3/4 to 1, incl.	.010	.010	.015
Over 1 to 1 1/4, incl.	.011	.011	.016
Over 1 1/4 to 1 1/2, incl.	.012	.012	.018
Over 1 1/2 to 1 3/4, incl.	.014	.014	.021
Over 1 3/4 to 2, incl.	3/4	3/4	.023
Over 2 to 2 1/4, incl.	3/4	0	.023
Over 2 1/4 to 2 1/2, incl.	3/4	0	.025
Over 2 1/2 to 2 3/4, incl.	3/4	0	.048
Over 2 3/4 to 3, incl.	3/4	0	.058
Over 3 to 3 1/4, incl.	3/4	0	.070
Over 3 1/4 to 3 1/2, incl.	3/4	0	.085
Over 3 1/2 to 3 3/4, incl.	3/4	0	.100
Over 3 3/4 to 4, incl.	3/4	0	.120

*Out-of-round is the difference between the maximum and minimum diameters of a round bar measured at the same cross section. Out-of-square is the difference in the two dimensions at the same cross section of a square bar—each dimension being the distance between opposite faces.

HEXAGONS AND OCTAGONS

Specified Sizes Between Opposite Sides, in.	Permissible Variations from Specified Size, in.		Out-of-Hexagon (Carbon Steel and Alloy Steel) or Out-of-Octagon (Alloy Steel), in.*
	Over	Under	
To 3/8, incl.	.007	.007	.009
Over 3/8 to 1, incl.	.010	.010	.015
Over 1 to 1 1/2, incl.	.021	.013	.025
Over 1 1/2 to 2, incl.	1/2	3/4	3/4
Over 2 to 2 1/2, incl.	3/4	3/4	3/4
Over 2 1/2 to 3, incl.	3/4	3/4	3/4
Over 3 to 3 1/2, incl.	3/4	3/4	3/4
Over 3 1/2 to 4 1/2, incl.	3/4	3/4	3/4

*Out-of-hexagon or out-of-octagon is the greatest difference between any two dimensions at the same cross section between opposite faces.

SQUARE EDGE AND ROUND EDGE FLATS

Tolerances apply to thickness in inches

Specified width Inches	.023 - 230 excl.	Variations from Thickness in Inches (Tolerances are over or under)							Variations from width in Inches
		Under	1/4 - 1/4	1/2 - 1/2	1 - 1	2 - 2	3 - 3	Over	
Up to 1	.007	.007	.008	.010	—	—	—	3/4	3/4
Over 1 - 2	.007	.007	.012	.015	3/4	—	—	3/4	3/4
Over 2 - 4	.008	.008	.015	.020	3/4	3/4	3/4	3/4	3/4
Over 4 - 6	.009	.009	.015	.020	3/4	3/4	3/4	3/4	3/4
Over 6 - 8	—	.015	.016	.025	3/4	3/4	3/4	3/4	3/4

* Not produced as bar flats.
** Thickness and width tolerances for flats over 6" to 8", incl., in width and over 3" in thickness should be established in each instance.

Standard Straightness — X'' in any 5 feet, or $X'' \times$ number of feet of length divided by 5.

Special Straightness — X'' in any 5 feet, or $X'' \times$ number of feet of length divided by 5.

NOTE — Straightness tolerances do not apply to hot rolled alloy steel bars if any subsequent heating operation has been performed.

TOLERANCES

CF CARBON BARS

Cold Drawn or Turned & Polished

Size Range in Inches	Undersize Variations in Inches				Max. Carbon Range Over 55% or all Grades Quenched & Tempered or Normal- ized and Tempered Before Cold Finishing
	Max. Carbon Range 28% or less	Max. Carbon Range Over 28% to 35% incl.	Max. Carbon Range Over 35% to 55% incl.	Max. Carbon Range Over 55% to 65% incl.	
1/8 or under	.002	.003	.004	.005	.005
Over 1/8 to 1/4, incl.	.003	.004	.005	.006	.006
Over 1/4 to 1/2, incl.	.004	.005	.006	.007	.007
Over 1/2 to 3/4, incl.	.005	.006	.007	.008	.008
Over 3/4 to 1, incl.	.006	.007	.008	.009	.009
Over 1 to 1 1/2, incl.	.007	.008	.009	.010	.010
Over 1 1/2 to 2, incl.	.008	.009	.010	.011	.011

COLD DRAWN HEXAGONS

Size Range in Inches	Undersize Variations in Inches			
	Max. Carbon Range 28% or less	Max. Carbon Range Over 28% to 35% incl.	Max. Carbon Range Over 35% to 55% incl.	Max. Carbon Range Over 55% to 65% incl.
3/8 or under	.002	.003	.004	.006
Over 3/8 to 1/2, incl.	.003	.004	.005	.007
Over 1/2 to 3/4, incl.	.004	.005	.006	.008
Over 3/4 to 1, incl.	.005	.006	.007	.009
Over 1 to 1 1/2, incl.	.006	.007	.008	.010
Over 1 1/2 to 2, incl.	.007	.008	.009	.011
Over 2 to 3, incl.	.008	.009	.010	.012
Over 3 to 4, incl.	.009	.010	.011	.013
Over 4 to 5, incl.	.010	.011	.012	.014
Over 5 to 6, incl.	.011	.012	.013	.015

COLD DRAWN SQUARES

Size Range in Inches	Undersize Variations in Inches			
	Max. Carbon Range 28% or less	Max. Carbon Range Over 28% to 35% incl.	Max. Carbon Range Over 35% to 55% incl.	Max. Carbon Range Over 55% to 65% incl.
3/8 or under	.002	.004	.005	.007
Over 3/8 to 1/2, incl.	.003	.005	.006	.008
Over 1/2 to 3/4, incl.	.004	.006	.007	.009
Over 3/4 to 1, incl.	.005	.007	.008	.010
Over 1 to 1 1/2, incl.	.006	.008	.009	.011
Over 1 1/2 to 2, incl.	.007	.009	.010	.012
Over 2 to 3, incl.	.008	.010	.011	.013
Over 3 to 4, incl.	.009	.011	.012	.014
Over 4 to 5, incl.	.010	.012	.013	.015
Over 5 to 6, incl.	.011	.013	.014	.016

COLD DRAWN FLATS

Tolerances for flats apply to thickness as well as width

Width in inches				
To 3/4, incl.	.003	.004	.006	.008
Over 3/4 to 1 1/2, incl.	.004	.005	.008	.010
Over 1 1/2 to 3, incl.	.005	.006	.010	.012
Over 3 to 4, incl.	.006	.008	.011	.016
Over 4 to 6, incl.	.008	.010	.012	.020
Over 6.013	.015	—	—	