



‡Length of a structural bolt is measured from the underhead bearing surface to the extreme end of the bolt.

STRUCTURAL BOLTS, A325 & A490														ASME 18.2.6-1996	
Nominal Size or Basic Product Diameter		E		F			G		H			R		L _T	Y
		Body Diameter		Width Across Flats			Width Across Corners		Head Height			Radius of Fillet		Thread Length	Transi- tion Thread Length
		Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min	Max	Min	Ref	Max, Ref
1/2	0.5000	0.515	0.482	7/8	0.875	0.850	1.010	0.969	5/16	0.323	0.302	0.031	0.009	1.00	0.19
5/8	0.6250	0.642	0.605	1-1/16	1.062	1.031	1.227	1.175	25/64	0.403	0.378	0.062	0.021	1.25	0.22
3/4	0.7500	0.768	0.729	1-1/4	1.250	1.212	1.443	1.383	15/32	0.483	0.455	0.062	0.021	1.38	0.25
7/8	0.8750	0.895	0.852	1-7/16	1.438	1.394	1.660	1.589	35/64	0.563	0.531	0.062	0.031	1.50	0.28
1	1.0000	1.022	0.976	1-5/8	1.625	1.575	1.876	1.796	39/64	0.627	0.591	0.093	0.062	1.75	0.31
1 1/8	1.1250	1.149	1.098	1-13/16	1.812	1.756	2.093	2.002	11/16	0.718	0.658	0.093	0.062	2.00	0.34
1 1/4	1.2500	1.277	1.223	2	2.000	1.938	2.309	2.209	25/32	0.813	0.749	0.093	0.062	2.00	0.38
1 3/8	1.3750	1.404	1.345	2-3/16	2.188	2.119	2.526	2.416	27/32	0.878	0.810	0.093	0.062	2.25	0.44
1 1/2	1.5000	1.531	1.470	2-3/8	2.375	2.300	2.742	2.622	15/16	0.974	0.902	0.093	0.062	2.25	0.44
Tolerance on Length		Nominal Screw Size		Nominal Screw Length											
				Through 6 in.						Over 6 in.					
		1/2		-0.12						-0.19					
		5/8		-0.12						-0.25					
		3/4 through 1		-0.19						-0.25					
		1 1/8 through 1 1/2		-0.25						-0.25					



ASTM A325 BOLTS, Type 1

Description	A heavy hex bolt made of medium carbon steel. The bearing surface shall be flat and washer faced, and the point is chamfered.
Applications/ Advantages	Commonly used in structural steel joints in heavy construction.
Material	Type 1 bolts shall be made from a carbon steel which conforms to the following chemical composition requirements-- <i>Carbon: 0.25-0.58%; Manganese: 0.57% minimum; Phosphorus: 0.048% maximum; Sulfur: 0.058% maximum</i>
Heat Treatment	Type 1 bolts shall be heat treated by quenching in a liquid medium from above the austenitizing temperature and then tempering by reheating to a temperature of at least 800°F.
Hardness	1/2" through 1" diameter, inclusive: Rockwell C24 - 35 1-1/8" through 1-1/2" diameter, inclusive: Rockwell C19 - 31
Proof Load	1/2" through 1" diameter, inclusive: 85,000 psi. 1-1/8" through 1-1/2" diameter, inclusive: 74,000 psi.
Yield Strength	1/2" through 1" diameter, inclusive: 92,000 psi. minimum 1-1/8" through 1-1/2" diameter, inclusive: 81,000 psi. minimum
Tensile Strength	1/2" through 1" diameter, inclusive: 120,000 psi. minimum 1-1/8" through 1-1/2" diameter, inclusive: 105,000 psi. minimum
Plating	See Appendix-A for plating information.



Type 1



Type 3

ASTM A490 BOLTS, Types 1 & 3

Description	A heavy hex bolt made of alloy steel. The bearing surface shall be flat and washer-faced, and the point is chamfered.
Applications/ Advantages	Used in structural steel joints in heavy construction when greater yield and tensile strengths than those of an A325 bolt are required. A Type 3 bolt is approximately twice as resistant to corrosion as a Type 1 bolt.
Material	Type 1 bolts shall be made from an alloy steel which conforms to the following chemical composition requirements-- <i>Carbon: 0.28-0.50% (for 1-1/2" diameter: 0.33-0.55%); Phosphorus: 0.045% maximum; Sulfur: 0.045% maximum.</i> Type 3 bolts shall be made from a corrosion resistant steel which conforms to the following chemical composition requirements-- <i>Carbon: 0.19-0.55%; Manganese: 0.37% minimum; Phosphorus: 0.045% maximum; Sulfur: 0.055% maximum; Copper: 0.63% maximum; Chromium: 0.42% minimum; Nickel: 0.17% minimum; Molybdenum: 0.14% minimum.</i>
Heat Treatment	Type 1 bolts shall be heat treated by quenching in oil from above the transformation temperature. Type 3 bolts shall be quenched in a suitable liquid from above the transformation temperature. Type 1 and Type 3 bolts shall be tempered by reheating to a temperature of at least 800°F.
Hardness	Rockwell C33 - 38
Proof Load	120,000 psi.
Yield Strength	130,000 psi. minimum
Tensile Strength	150,000 - 170,000 psi.
Plating	See Appendix-A for plating information.

**Product standards require the manufacturer's head marking to appear on the top of all cap screws 1/4" diameter and larger. "X" represents one location such a marking may appear.