

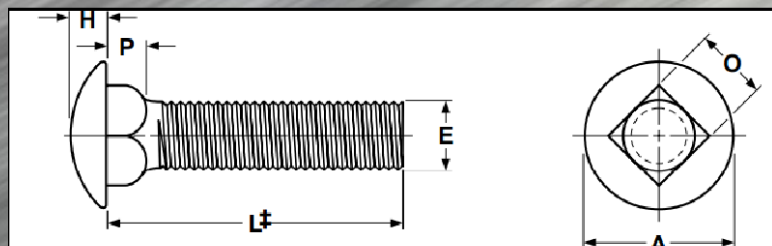


545 Basket Road
Webster, NY 14580

Toll Free: 800.691.0292 | Local: 585.265.1990 | Fax: 585.265.6678

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SQUARE NECK CARRIAGE BOLTS



		E		A		H		O		P	
Basic Bolt Diameter		Body Diameter		Head Diameter		Head Height		Square Width		Square Depth	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
*8	0.1640	0.173	0.157	0.328	0.298	0.102	0.083	0.169	0.155	0.108	0.078
10	0.1900	0.199	0.182	0.469	0.436	0.114	0.094	0.199	0.185	0.125	0.094
*12	0.2160	0.225	0.2069	0.500	0.468	0.149	0.125	0.215	0.197	0.135	0.105
1/4	0.2500	0.260	0.237	0.597	0.563	0.145	0.125	0.260	0.245	0.156	0.125
5/16	0.3125	0.324	0.298	0.719	0.688	0.176	0.156	0.324	0.307	0.187	0.156
3/8	0.3750	0.388	0.360	0.844	0.782	0.208	0.188	0.388	0.368	0.219	0.188
7/16	0.4375	0.452	0.421	0.969	0.907	0.239	0.219	0.452	0.431	0.250	0.219
1/2	0.5000	0.515	0.483	1.094	1.032	0.270	0.250	0.515	0.492	0.281	0.250
5/8	0.6250	0.642	0.605	1.344	1.219	0.344	0.313	0.642	0.616	0.344	0.313
3/4	0.7500	0.768	0.729	1.594	1.469	0.406	0.375	0.768	0.741	0.406	0.375



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Tolerance on Length	Nominal Bolt Size	Nominal Screw Length				
		Up to 1 in., Incl.	Over 1 in. to 2-1/2 in., incl.	Over 2-1/2 in. to 4 in., incl.	Over 4 in. to 6 in., incl.	Over 6 in.
	#8 thru 3/8	+0.02	+0.02	+0.04	+0.06	+0.10
		-0.03	-0.04	-0.06	-0.10	-0.18
	7/16 and 1/2	+0.02	+0.04	+0.06	+0.08	+0.12
		-0.03	-0.05	-0.08	-0.10	-0.18
	9/16 thru 3/4	+0.02	+0.06	+0.08	+0.10	+0.14
		-0.03	-0.08	-0.10	-0.10	-0.18

- + / - Length of a carriage bolt is measured from the underhead bearing surface to the extreme end of the bolt.
- ASME B18.5-1990 does not specify dimensions for the #8 or #12 diameters. Data listed for these sizes is independent of the ASME specification.

Low Carbon & Hot-Dipped Galvanized Carriage Bolt

DESCRIPTION: *Low Carbon Steel Carriage:* Round head bolt with a square neck under the head, and a unified thread pitch. Made from low or medium carbon steel. *Hot-dipped Galvanized Steel Carriage:* Carriage bolts made from low or medium carbon steel with a galvanic zinc finish applied.

APPLICATIONS/ADVANTAGES: *Low Carbon Steel Carriage:* The square neck is designed to keep the bolt from turning as a nut is tightened. *Hot-dipped Galvanized Steel Carriage:* Same design advantages as a low carbon carriage bolt but with a thicker protective coating for outdoor use. Often used in outdoor furniture.

MATERIAL: *Low Carbon Steel & Hot-dipped Galvanized Steel Carriage:* AISI 1006—1050 or equivalent steel

CORE HARDNESS: *Low Carbon Steel & Hot-dipped Galvanized Steel Carriage:* Rockwell B70-100



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SQUARE NECK CARRIAGE BOLTS

Low Carbon & Hot-Dipped Galvanized Carriage Bolt (Continued)

PROOF LOAD: *Low Carbon Steel Carriage:* 33,000 psi

YIELD STRENGTH*: *Low Carbon Steel Carriage:* 36,000 psi minimum

TENSILE STRENGTH: *Low Carbon Steel:* 60,000 psi minimum

ELONGATION*: *Low Carbon Steel:* 18% minimum

REDUCTION AREA*: *Low Carbon Steel:* 35% minimum (all sizes)

MINIMUM THREAD LENGTH: The minimum length of thread shall be equal to twice the basic bolt diameter plus 0.25 in. for bolts 6 in. or shorter, and twice the diameter plus 0.50 in. for bolts longer than 6in.

*These properties are tested only on machined specimens when the testing machine cannot provide for full test of the parts.

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

Grade 5 & 8 Carriage Bolts

DESCRIPTION: *Grade 5:* Carriage bolt made from medium carbon steel and heat-treated.

Grade 8: Carriage bolt made from medium carbon alloy steel and heat-treated.

APPLICATIONS / ADVANTAGES: *Grade 5:* Same design advantages as a low carbon carriage bolt but with significantly greater load carrying capacity.

Grade 8: Same design advantages as a Grade 5 carriage bolt but with greater load carrying capacity.

MATERIAL: *Grade 5:* AISI 1030-1050 or equivalent steel.

Grade 8: Medium carbon alloy steel.

HEAT TREATMENT: *Grade 5:* Bolts shall be heat-treated, oil or water-quenched, at the option of the manufacturer, and tempered at a minim temperature of 800* F.

Grade 8: Grade 8 carriage bolts shall be heat-treated, oil-quenched and tempered at a minim temperature of 80* F.

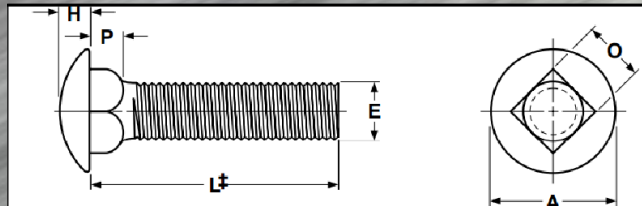


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SQUARE NECK CARRIAGE BOLTS



Grade 5 & 8 Carriage Bolts (Continued)

CORE HARDNESS: Grade 5: 1/4" through 1 in. diameters: Rockwell C25—C34
Grade 8: 1/4" through 1 in. diameters: Rockwell C33—C39

SURFACES HARDNESS: Grade 5: 1/4 through 1 in. diameters: Rockwell 30N54 maximum
Grade 8: 1/4 through 1 in. diameters: Rockwell 30N 58.6 maximum

PROOF LOAD: Grade 5: 1/4 through 1 in. diameters: 85,000 psi
Grade 8: 1/4 through 1 in. diameters: 120,000 psi

YIELD STRENGTH*: Grade 5: 1/4 through 1 in. diameters 92,000 psi minimum
Grade 8: 1/4 through 1 in. diameters: 130,000 psi minimum

TENSILE STRENGTH: Grade 5: 1/4 through 1 in. diameters: 120,000 psi minimum
Grade 8: 1/4 through 1 in. diameters: 150,000 psi minimum

ELONGATION*: Grade 5: 14% minimum
Grade 8: 12% minimum (all diameters)

REDUCTION OF AREA: Grade 5: 35% minimum (all sizes)
Grade 8: 35% minimum (all sizes)

MINIMUM THREAD LENGTH: The minimum length of thread shall be equal to twice the basic bolt diameter plus 0.25 in. for bolts 6 in. or shorter, and twice the diameter plus 0.50 in. for bolts longer than 6 in.

PLATING: Grade 8 carriage bolts are typically provided with a zinc yellow finish.

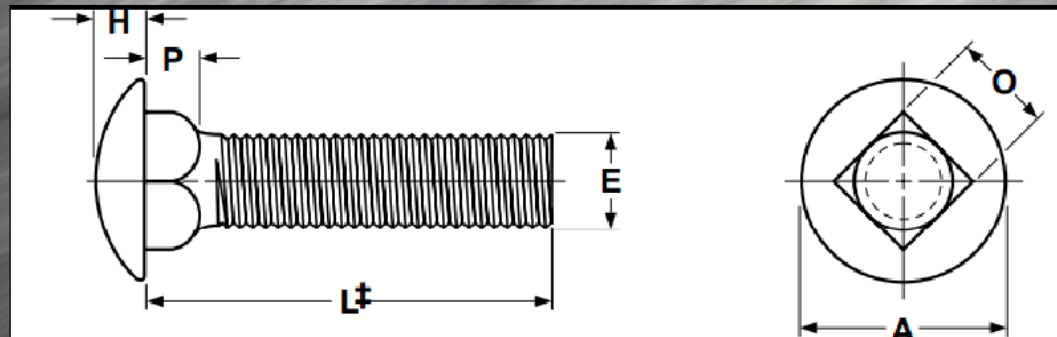


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18-8 Stainless Steel Carriage Bolts

DESCRIPTION: Round head bolt with a square neck under the head, and unified thread pitch, made from austenitic alloy stainless steel.

APPLICATIONS / ADVANTAGES: Same design advantages as a low carbon carriage bolt but for use in environments which require general atmospheric corrosion resistance.

MATERIAL: 18-8 stainless steel carriage bolts are made from one of the following austenitic alloys: 302 HQ, 303, 303Se, 304, XM7, all of which are characterized as having a chromium content of 17-19% and nickel content of 8-10%

HEAT TREATMENT: The austenitic alloys develop their strength through work hardening during the fasteners manufacturing process, as seen from the hardness properties below. The only heat treatment normally available on austenitic stainless alloy is annealing, which is done at approximately 1900°F to a dead soft condition and is not normally thermally reversible.

HARDNESS: 1/4 through 1/2 in. diameter: Rockwell B95—C32

YIELD STRENGTH: 1/4 through 1/2 in. diameter, 2.25D and longer: 65,000 psi minimum

TENSILE STRENGTH: 1/4 through 1/2 in. diameter, 2.25D and longer: 100,000—150,000 psi minimum

ELONGATION IN 4D: 1/4 through 1/2 in. diameter: 20% minimum

MINIMUM THREAD LENGTH: The minimum length of thread shall be equal to twice the basic bolt diameter plus 0.25 in. for bolts 6 in. or shorter.