




















































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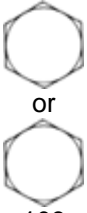

ASTM, SAE AND ISO GRADE MARKINGS AND MECHANICAL PROPERTIES FOR STEEL FASTENERS

Identification Grade Mark	Specification	Fastener Description	Material	Nominal Size Range (in.)	Mechanical Properties		
					Proof Load (psi)	Yield Strength Min (psi)	Tensile Strength Min (psi)
 No Grade Mark	SAE J429 Grade 1	Bolts, Screws, Studs	Low or Medium Carbon Steel	1/4 thru 1-1/2	33,000	36,000	60,000
	ASTM A307 Grades A&B		Low Carbon Steel	1/4 thru 4	--	--	
	SAE J429 Grade 2		Low or Medium Carbon Steel	1/4 thru 3/4 Over 3/4 to 1-1/2	55,000 33,000	57,000 36,000	74,000 60,000
 No Grade Mark	SAE J429 Grade 4	Studs	Medium Carbon Cold Drawn Steel	1/4 thru 1-1/2	--	100,000	115,000
 B5	ASTM A193 Grade B5		AISI 501	1/4 Thru 4	--	80,000	100,000
 B6	ASTM A193 Grade B6		AISI 410			85,000	110,000
 B7	ASTM A193 Grade B7		AISI 4140, 4142, OR 4105	1/4 thru 2-1/2 Over 2-1/2 thru 4	--	105,000 95,000 75,000	125,000 115,000 100,000
 B16	ASTM A193 Grade B16		CrMoVa Alloy Steel	Over 4 thru 7	--	105,000 95,000 85,000	125,000 115,000 100,000
	ASTM A193			AISI 304			








 B8	Grade B8						
 B8C	ASTM A193 Grade B8C		AISI 347	1/4 and larger	--	30,000	75,000
 B8M	ASTM A193 Grade B8M		AISI 316				
 B8T	ASTM A193 Grade B8T		AISI 321	1/4 and larger	--	30,000	75,000
 B8	ASTM A193 Grade B8	Bolts, Screws, Studs for High- Temperature Service	AISI 304 Strain Hardened	1/4 thr 3/4 Over 3/4 thru 1 Over 1 thru 1-1/4 Over 1-1/4 thru 1-1/2	-- -- -- --	100,000	125,000
 B8C	ASTM A193 Grade B8C		AISI 347 Strain Hardened			80,000	115,000
 B8M	ASTM A193 Grade B8M		AISI 316 Strain Hardened			65,000	105,000
 B8T	ASTM A193 Grade B8T		AISI 321 Strain Hardened			50,000	100,000
						95,000	110,000
 L7	ASTM A320 Grade L7	Bolts, Screws, Studs for Low- Temperature Service	AISI 4140, 4142 or 4145	1/4 thru 2- 1/2	--	105,000	125,000
 L7A	ASTM A320 Grade L7A		AISI 4037				
 L7B	ASTM A320 Grade L7B		AISI 4137				
 L7C	ASTM A320 Grade LC7		AISI 8740				
 L43	ASTM A320 Grade L43		AISI 4340				
 B8	ASTM A320 Grade B8		AISI 304				







	ASTM A320 Grade B8C	Bolts, Screws, Studs for Low- Temperature Service	AISI 347	1/4 and larger	--	30,000	75,000
	ASTM A320 Grade B8T		AISI 321				
	ASTM A320 Grade B8F		AISI 303 or 303Se				
	ASTM A320 Grade B8M		AISI 316				
	ASTM A320 Grade B8		AISI 304	1/4 thru 3/4 Over 3/4 thru 1 Over 1 thru 1-1/4 Over 1-1/4 thru 1-1/2	--	100,000 80,000 65,00 50,00	100,000 80,000 65,00 50,00
	ASTM A320 Grade B8C		AISI 347				
	ASTM A320 Grade B8F		AISI 303 or 303Se				
	ASTM A320 Grade B8M		AISI 316				
	ASTM A320 Grade B8T		AISI 321				
	ASTM A320 Grade B8C		AISI 347				
	ASTM A320 Grade B8F	AISI 303 or 303Se					
	ASTM A320 Grade B8M	AISI 316					
	ASTM A320 Grade B8T	AISI 321					
	SAE J429 Grade 5	Bolts, Screws, Studs	Medium Carbon Steel, Quenched and Tempered	1/4 thru 1 Over 1 to 1-1/2	85,000 74,000	92,000 81,000	120,000 105,000
	ASTM A449			1/4 thru 1 Over 1 to 1-1/2 Over 1-1/2 thru 3	85,000 74,000 55,000	92,000 81,000 58,000	120,000 105,000 90,000
	SAE J429 Grade 5.1	Sems	Low or Medium Carbon Steel, Quenched and Tempered	No. 6 thru 3/8	85,000	--	120,000
	SAE J429 Grade 5.2	Bolts, Screws, Studs	Low Carbon Martensitic Steel, Quenched and Tempered	1/4 thru 1	85,000	92,000	120,000
	ASTM A325 Type 1		Medium Carbon Steel, Quenched and Tempered	1/2 thru 1 1-1/8 thru 1-1/2	85,000 74,000	92,000 81,000	120,000 105,000

A325								
 A325	ASTM A325 Type 2	High Strength Structural Bolts	Low Carbon Martensitic Steel, Quenched and Tempered	1/2 thru 1	85,000	92,000	120,000	
 A325	ASTM A325 Type 3		Atmospheric Corrosion Resisting Steel, Quenched and Tempered	1/2 thru 1 1-1/8 thru 1-1/2	85,000 74,000	92,000 81,000	120,000 105,000	
 BB	ASTM A354 Grade BB	Bolts, Studs	Alloy Steel, Quenched and Tempered	1/4 thru 2- 1/2 2-3/4 thru 4	80,000 75,000	83,000 78,000	105,000 100,000	
 BC	ASTM A354 Grade BC				105,000 95,000	109,000 99,000	125,000 115,000	
 No Grade Mark	SAE J429 Grade 7	Bolts, Screws,	Medium Carbon Alloy Steel, Quenched and Tempered ⁴	1/4 thru 1- 1/2	105,000	115,000	133,000	
 No Grade Mark	SAE J429 Grade 8	Bolts, Screws, Studs	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 1- 1/2	120,000	130,000	150,000	
	ASTM A354 Grade BD		Alloy Steel, Quenched and Tempered ⁴					
 No Grade Mark	SAE J429 Grade 8.1	Studs	Medium Carbon Alloy or SAE 1041 Modified Elevated Temperature Drawn Steel	1/4 thru 1- 1/2	120,000	130,000	150,000	
 A490	ASTM A490	High Strength Structural Bolts	Alloy Steel, Quenched and Tempered	1/2 thru 1- 1/2	120,000	130,000	150,000 min 170,000 max	
 No Grade Mark	ISO R898 Class 4.6	Bolts, Screws, Studs	Medium Carbon Steel, Quenched and Tempered	All Sizes thru 1-1/2	33,000	36,000	60,000	
 No Grade Mark	ISO R898 Class 5.8				55,000	57,000	74,000	
 or 	ISO R898 Class 8.8				85,000	92,000	120,000	

						
88						
10.9	ISO R898 Class 10.9	Alloy Steel, Quenched and Tempered		120,000	130,000	150,000
						
or						
						
109						

FASTENER IDENTIFICATION MARKING

Grade Identification Marking	Specification	Material	Nominal Size In.	Proof Load Stress ksi	Hardness Rockwell		See Note
					Min	Max	
 No Mark	ASTM A563 - Grade 0	Carbon Steel	1/4 thru 1-1/2	69	B55	C32	3,4
	ASTM A563 - Grade A	Carbon Steel	1/4 thru 1-1/2	90	B68	C32	3,4
	ASTM A563 - Grade B	Carbon Steel	1/4 thru 1 over 1 thru 1-1/2	120 105	B69	C32	3,4
	ASTM A563 - Grade C	Carbon Steel May be Quenched and Tempered	1/4 thru 4	144	B78	C38	5
	ASTM A563 - Grade C3	Atmospheric Corrosion Resistant Steel May be Quenched and Tempered	1/4 thru 4	144	B78	C38	5,9
	ASTM A563 - Grade D	Carbon Steel May be Quenched and Tempered	1/4 thru 4	150	B84	C38	6
	ASTM A563 - Grade DH	Carbon Steel Quenched and Tempered	1/4 thru 4	175	C24	C38	6
	ASTM A563 - Grade DH3	Atmospheric Corrosion Resistant Steel, Quenched and Tempered	1/4 thru 4	175	C24	C38	5,9
	ASTM A194 - Grade 1	Carbon Steel	1/4 thru 4	130	B70	--	7

	ASTM A194 - Grade 2	Medium Carbon Steel	1/4 thru 4	150	159	352	7,8
	ASTM A194 - Grade 2H	Medium Carbon Steel, Quenched and Tempered	1/4 thru 4	175	C24	C38	7
	ASTM A194 - Grade 2HM	Medium Carbon Steel, Quenched and Tempered	1/4 thru 4	150	159	237	7,8
	ASTM A194 - Grade 4	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 4	175	C24	C38	7
	ASTM A194 - Grade 7	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 4	175	C24	C38	7
	ASTM A194 - Grade 7M	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 4	150	159	237	7
See Note 1,2	10						

NOTES:

- In addition to the indicated grade marking, all grades, except A563 grades O, A and B, must be marked for manufacturer identification.
- The markings shown for all grades of A194 nuts are for cold formed and hot forged nuts. When nuts are machined from bar stock the nut must be additionally marked with the letter 'B'.
- Nuts are not required to be marked unless specified by the purchaser. When marked, the identification marking shall be the grade letter O, A or B.
- Properties shown are those of nonplated or noncoated coarse thread hex nuts.
- Properties shown are those of coarse thread heavy hex nuts.
- Properties shown are those of coarse thread heavy hex nuts.
- Properties shown are those of coarse 8-pitch thread heavy hex nuts.
- Hardnesses are Brinell Hardness Numbers.
- The nut manufacturer, at his option, may add other markings to indicate the use of atmospheric corrosion resistant steel.
- Specifications --
 ASTM A563 -- Carbon and Alloy Steel Nuts.
 ASTM A194/A194M -- Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.