











































## 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	4 Over 4 thru 7		105,000-95,000-85,000	125,000-115,000-100,000
 B8	ASTM A193 Grade B8		AISI 304		—	30,000	75,000
 B8C	ASTM A193 Grade B8C		AISI 347	1/4 and larger			
 B8M	ASTM A193 Grade B8M		AISI 316				
 B8T	ASTM A193 Grade B8T	AISI 321	1/4 and larger				
 B8	ASTM A193 Grade B8	Bolts, Screws, Studs for High-Temperature Service	AISI 304 Strain Hardened	1/4 thru 3/4 Over 3/4 thru 1 Over 1	—	100,000-80,000-65,000	125,000-115,000-105,000





 B8C	ASTM A193Grade B8C		AISI 347Strain Hardened	thru 1-1/4Over 1-1/4 thru 1-1/2		50,000	0100,000
 B8M	ASTM A193Grade B8M		AISI 316Strain Hardened			95,00080,00065,000	110,000100,00095,000
 B8T	ASTM A193Grade B8T		AISI 321Strain Hardened			50,000	090,000
 L7	ASTM A320Grade 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 A320Grade L7A		AISI 4037				
 L7B	ASTM A320Grade L7B		AISI 4137				
 L7C	ASTM A320Grade LC7		AISI 8740				
 L43	ASTM A320Grade L43		AISI 4340	1/4 thru 4	—	105,000	125,000
 B8	ASTM A320Grade B8	Bolts,Screws,Studs for Low-Temperature Service	AISI 304	1/4 and larger	—	30,000	75,000
 B8C	ASTM A320Grade B8C		AISI 347				
 B8T	ASTM A320Grade B8T		AISI 321				
 B8F	ASTM A320Grade B8F		AISI 303or 303Se				
 B8M	ASTM A320Grade B8M		AISI 316				
 B8	ASTM A320Grade B8		AISI 304				
 B8C	ASTM A320Grade B8C		AISI 347	1/4 thru 3/4Over 3/4 thru 1Over 1 thru 1-1/4Over 1-1/4 thru 1-1/2	—	100,00080,00065,000	100,00080,00065,000
 B8F	ASTM A320Grade B8F		AISI 303or 303Se			50,00	50,00










 B8M	ASTM A320 Grade B8M		AISI 316							
 B8T	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	85,00074,000	92,00081,000	120,000105,000			
	ASTM A449			1/4 thru 1 Over 1 to 1-1/2 Over 1-1/2 thru 3	85,00074,000 55,000			92,00081,00058,000	120,000105,00090,000	
	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			
 A325	ASTM A325 Type 1	High Strength Structural Bolts	Medium Carbon Steel, Quenched and Tempered	1/2 thru 1 1-1/8 thru 1-1/2	85,00074,000	92,00081,000	120,000105,000			
 A325	ASTM A325 Type 2			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			85,00074,000	92,00081,000	120,000105,000
 BB	ASTM A354 Grade BB			Bolts, Studs	Alloy Steel, Quenched			1/4 thru 2-1/2-3/4 thru	80,00075,000	83,00078,000

 BC	ASTM A354 Grade BC		Quenched and Tempered	4	105,000 95,000	109,000 99,000	125,000 115,000
	SAE J429 Grade 7	Bolts, Screws,	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 1-1/2	105,000	115,000	133,000
	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				
 No GradeMark	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	ISO R898 Class 4.6	Bolts, Screws, Studs	Medium Carbon Steel,	All Sizes thru 1-1/2	33,000	36,000	60,000

GradeMark			Quenched and Tempered			
 No GradeMark	ISO R898Classes 5.8				55,000	57,000 74,000
 8.8 or 88	ISO R898Classes 8.8		Alloy Steel, Quenched and Tempered		85,000	92,000 120,000
 10.9 or 109	ISO R898Classes 10.9				120,000	130,000 150,000

## FASTENER IDENTIFICATION MARKING

GradeIdentification Marking	Specification	Material	Nominal SizeIn .	ProofLoadStrengthksi	HardnessRockwell		SeeNote
					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	120	B69	C32	3,4
	over 1 thru 1-1/2		105				
	ASTM A563 – Grade C	Carbon SteelMay be Quenchedand Tempered	1/4 thru 4	144	B78	C38	5
	ASTM A563 – Grade C3	AtmosphericCorrosion Resistant SteelMay be Quenchedand Tempered	1/4 thru 4	144	B78	C38	5,9
	ASTM A563 – Grade D	Carbon SteelMay be Quenchedand 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:

1. In addition to the indicated grade marking, all grades, except A563 grades O, A and B, must be marked for manufacturer identification.
2. 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'.
3. 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.
4. Properties shown are those of nonplated or noncoated coarse thread hex nuts.
5. Properties shown are those of coarse thread heavy hex nuts.

6. Properties shown are those of coarse thread heavy hex nuts.
7. Properties shown are those of coarse 8-pitch thread heavy hex nuts.
8. Hardnesses are Brinell Hardness Numbers.
9. The nut manufacturer, at his option, may add other markings to indicate the use of atmospheric corrosion resistant steel.
10. Specifications —
11. ASTM A563 — Carbon and Alloy Steel Nuts.

ASTM A194/A194M — Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.