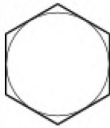





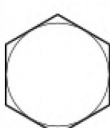
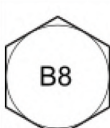



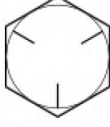









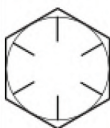
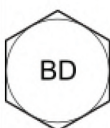


Bolt Strength Requirements

BY GRADE

Grade Marking	Specification	Material and Treatment	Nominal Size (In.)	Mechanical Properties					Hardness Rockwell	
				Proof Load Min (ksi)	Yield Strength Min (ksi)	Tensile Strength Min (ksi)	Elong % Min ^[9]	RA % Min ^[10]	Min	Max
	SAE J429 Grade 1	Low or Medium Carbon Steel	1/4" - 1 1/2"	33	36	60	18	35	B70	B100
	A307 Grade A	Low or Medium Carbon Steel	1/4" - 4"	-	-	60	18	-	B69	B100
	A307 Grade B	Low or Medium Carbon Steel	1/4" - 4"	-	-	60 min 100 max	18	-	B69	B95
 One End Green	A307 Grade C ^[7]	Low or Medium Carbon Steel	1/4" - 4"	-	36	58 min 80 max	23	-	-	-
 One End Blue	F1554 Grade 36	Low or Medium Carbon Steel	1/2" - 4"	-	36	58 min 80 max	23	40	-	-
 One End Yellow	F1554 Grade 55	Low or Medium Carbon Steel	1/2" - 2" 2 1/4" - 2 1/2" 2 3/4" - 3" 3 1/4" - 4"	-	55	75 min 95 max	21 21 21 21	30 30 30 30	-	-
	SAE J429 Grade 2 ^[8]	Low or Medium Carbon Steel	1/4" - 3/4" 7/8" - 1 1/2"	55 33	57 36	74 60	18 18	35	B80 B70	B100 B100
	A193/A320 Grade B8 Class 1	AISI SS304 Stainless	No Restrictions	-	30	75	30	50	-	B96

Grade Marking	Specification	Material and Treatment	Nominal Size (In.)	Mechanical Properties					Hardness Rockwell	
				Proof Load Min (ksi)	Yield Strength Min (ksi)	Tensile Strength Min (ksi)	Elong % Min ^[9]	RA % Min ^[10]	Min	Max
 B8M	A193/A320 Grade B8M	AISI SS316 Stainless Steel	No Restrictions	-	30	75	30	50	-	B96
 A325	F3125 Grade A325 Type 1	Medium Carbon Steel, Q & T	1/2" - 1 1/2"	85	92	120	14	35	C24	C35
 A325	F3125 Grade A325 Type 3	Atmospheric Corrosion Resistant Steel, Q & T	1/2" - 1 1/2"	85	92	120	14	35	C24	C35
 SAE J429 Grade 5	Medium Carbon Steel, Q & T	1/4" - 1"	85	92	120	14	35	C25	C34	
		1 1/8" - 1 1/2"	74	81	105			C19	C30	
 A449	A449 Type 1	Medium Carbon Steel, Q & T	1/4" - 1"	85	92	120	14	35	C25	C34
			1 1/8" - 1 1/2"	74	81	105			C19	C30
			1 5/8" - 3"	55	58	90			B91	B100
 A449	A449 Type 3	Weathering Steel, Q & T	1/4" - 1"	85	92	120	14	35	C25	C34
			1 1/8" - 1 1/2"	74	81	105			C19	C30
			1 5/8" - 3"	55	58	90			B91	B100
 B7	A193 Grade B7	Medium Carbon Alloy Steel, Q & T	1/4" - 2 1/2"	-	105	125	16	50	-	C35
			2 5/8" - 4"		95	115	16	50		C35
			4 1/8" - 7"		75	100	18	50		C35
 BC	A354 Grade BC	Medium Carbon Alloy Steel, Q & T	1/4" - 2 1/2"	105	109	125	16	50	C26	C36
			2 5/8" - 4"	95	94	115	16	45	C22	C33
 AB105 One End Red	F1554 Grade 105	Medium Carbon Alloy Steel, Q & T	1/2" - 3"	-	105	125 min 150 max	15	45	-	-
 L7	A320 Grade L7	AISI 4140, 4142, or 4145	1/4" - 2 1/2"	-	105	125	16	50	-	-

Grade Marking	Specification	Material and Treatment	Nominal Size (In.)	Mechanical Properties					Hardness Rockwell	
				Proof Load Min (ksi)	Yield Strength Min (ksi)	Tensile Strength Min (ksi)	Elong % Min ^[9]	RA % Min ^[10]	Min	Max
 L43	A320 Grade L43	AISI 4340	1/4" - 4"	-	105	125	16	50	-	-
 A 490	F3125 Grade A490 Type 1	Medium Carbon Alloy Steel, Q & T	1/2" - 1 1/2"	120	130	150 min 173 max	14	40	C33	C38
 A 490	F3125 Grade A490 Type 3	Atmospheric Corrosion Resistant Steel, Q & T	1/2" - 1 1/2"	120	130	150 min 173 max	14	40	C33	C38
 SAE J429 Grade 8	SAE J429 Grade 8	Medium Carbon Alloy Steel, Q & T	1/4" - 1 1/2"	120	130	150	12	35	C33	C39
 BD	A354 Grade BD ^[6]	Medium Carbon Alloy Steel, Q & T	1/4" - 2 1/2"	120	130	150	14	40	C33	C39
			2 5/8" - 4"	105	115	140			C31	C39

1. All specifications are ASTM unless otherwise noted.
2. All specifications shall be marked by the manufacturer with a unique identifier to identify the manufacturer or private label distributor, as appropriate.
3. Q & T - Quenched and Tempered.
4. Although markings are shown on hex heads, stamping is a requirement on one end of rods and studs. The exception is F1554 and A307 grade C in which stamping is a supplemental requirement while color coding is required.
5. Although markings are shown on hex heads, grade markings apply equally to products with other head configurations.
6. All Grade BD products shall be marked "BD". In addition to the "BD" marking, the product may be marked with 6 radial lines 60° apart.
7. ASTM A307 grade C has been replaced by ASTM F1554 grade 36.
8. Grade 2 requirements for diameters ranging from 1/4" through 3/4" only apply to headed fasteners up to and including 6" in length, and to studs of all lengths. For headed fasteners longer than 6", see SAE J429 grade 1.
9. Percent Elongation
10. Percent Reduction of Area
11. In 2016, ASTM specifications A325 and A490 were officially withdrawn and replaced by F3125.

"-" = no requirement.