



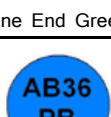






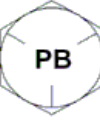












Bolt Strength Requirements by Grade

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	RA % Min	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		-	-	60	18	-	B69	B100	
	A307 Grade B		-	-	60 min 100 max	18	-	B69	B95	
	A307 Grade C *Replaced, See Notes		-	36	58 min 80 max	23	-	-	-	
	F1554 Grade 36		-	36	58 min 80 max	23	40	-	-	
	F1554 Grade 55		1/4" - 2"	-	55	75 min 95 max	21	30	-	-
			2 1/4" - 2 1/2"				21	22		
			2 3/4" - 3"				21	20		
			3 3/4" - 4"				21	18		
	SAE J429 Grade 2		1/4" - 3/4"	55	57	74	18	35	B80	B100
		7/8" - 1 1/2"	33	36	60	18	35	B70	B100	
	A193/A320 Grade B8	AISI SS304 Stainless	No Restrictions	-	30	75	30	50	-	B96
	A193/A320 Grade B8M	AISI SS316 Stainless Steel								

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				Proof Load Min (ksi)	Yield Strength Min (ksi)	Tensile Strength Min (ksi)	Elong % Min	RA % Min	Min	Max
	A325 Type 1	Medium Carbon Steel, Q & T	½" - 1"	85	92	120	14	35	C24	C35
	A325 Type 3	Atmospheric Corrosion Resistant Steel, Q & T	1⅛" - 1½"	74	81	105			C19	C31
	SAE J429 Grade 5	Medium Carbon Steel, Q & T	¼" - 1"	85	92	120	14	14	C25	C34
			1⅛" - 1½"	74	81	105	35	35	C19	C30
	A449 Type 1 Or Type 3		¼" - 1"	85	92	120	14	35	C25	C34
		1⅛" - 1½"	74	81	105	C19			C30	
		1⅝" - 3"	55	58	90	B91			B100	
	A193 Grade B7	Medium Carbon Alloy Steel, Q & T	¼" - 2½"		105	125	16	50		C35
			2⅝" - 4"	-	95	115	16	50	-	C35
			4⅞" - 7"		75	100	16	50		C35
	A354 Grade BC		¼" - 2½"	105	109	125	16	50	C26	C36
			2⅝" - 4"	95	94	115	16	45	C22	C33
 One End Red	F1554 Grade 105		¼" - 3"	-	105	125 min 150max	15	45	-	-
	A320 Grade L7	AISI 4140, 4142, or 4145	¼" - 2½"	-	105	125	16	50	-	-
	A320 Grade L43	AISI 4340	¼" - 4"	-	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	RA % Min	Min	Max
	A490 Type 1	Medium Carbon Alloy Steel, Q & T	½" - 1½"	120	130	150 min 173 max	14	40	C33	C38
	A490 Type 3	Atmospheric Corrosion Resistant Steel, Q & T								
	SAE J429 Grade 8	Medium Carbon Alloy Steel, Q & T	¼" - 1½"	120	130	150	12	35	C33	C39
	A354 Grade BD		¼" - 2½" 2⅝" - 4"	120 105	130 115	150 140	14	40	C33 C31	C39 C39

- All specifications are ASTM unless otherwise noted.
- All specifications shall be marked by the manufacturer with a unique identifier to identify the manufacturer or private label distributor, as appropriate.
- Q & T - Quenched and Tempered.
- Stamping of F1554 and A307 grade C bolts is a supplemental requirement while color coding is required.
- Although markings are shown on hex heads, grade markings apply equally to products with other head configurations.
- 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.
- Hex cap screws and bolts and one end of studs shall be marked "A449". In addition, fasteners shall be permitted to be marked with three radial lines 120° apart.
- ASTM A307 grade C has been replaced by ASTM F1554 grade 36.
- Elong % Min = Percent Elongation
- RA % Min = Percent Reduction of Area