





Mechanical Requirements for Carbon Steel Externally Threaded Fasteners



Grade Designation	Nominal Size of Product in.	Material and Treatment	Mechanical Requirements						Grade Identification Marking
			Proof Load Stress ksi	Yield Strength ksi Min	Tensile Strength ksi Min	Product, Hardness, Rockwell			
						Surface Max	Core Min.	Core Max.	
A307 Gr. A	1/4 to 4		-	-	60	-	B69	B100	307A
A307 Gr. B	1/4 to 4	low or medium carbon steel	-	-	60 min 100 max	-	B69	B95	307B
SAE Gr. 1	1/4 to 1-1/2		33	36	60	-	B70	B100	None Specified
SAE Gr. 2	1/4 to 3/4	low or medium carbon steel, cold worked	55	57	74	-	B80	B100	None Specified
SAE Gr. 5	1/4 to 1 1-1/8 to 1-1/2	medium carbon steel; the product is quenched and tempered	85	92	120	30N54	C25	C34	
A449 Type 1	1/4 to 1 1-1/8 to 1-1/2		74	81	105	30N50	C19	C30	
A325 Type 1	1/2 to 1 1-1/8 to 1-1/2		85	92	120	-	C25	C34	
A449 Type 2	1/4 to 1		74	81	105	-	C19	C30	
A325 Type 1	1/2 to 1 1-1/8 to 1-1/2		85	92	120	-	B91	B100	
SAE Gr. 5.2	1/4 to 1	low carbon boron steel; the product is quenched and tempered	85	92	120	30N56	C26	C36	
A449 Type 2	1/4 to 1	85	92	120	-	C25	C34		
A325 Type 3	1/2 to 1 1-1/8 to 1-1/2	atmospheric corrosion resistant steel; the product is quenched and tempered	85	92	120	-	C24	C35	<u>A325</u>
		74	81	105	-	C19	C31		
SAE Gr. 8	1/4 to 1-1/2	medium carbon alloy steel; the product is quenched and tempered	120	130	150	30N58.6	C33	C39	
A354 Gr. BD	1/4 to 2-1/2 2-3/4 to 4	120	130	150	-	C33	C39	BD	
A490 Type 1	1/2 to 1-1/2	105	115	140	-	C31	C38	A490	
SAE Gr. 8.2	1/4 to 1	low carbon boron steel; the product is quenched and tempered	120	130	150	30N58.6	C33	C39	
A490 Type 3	1/2 to 1-1/2	atmospheric corrosion resistant steel; the product is quenched and tempered	120	130	150 min 170 max	-	C33	C38	
See Notes 1, 4			2	2	2				3, 5

NOTES:

- For titles and sources of availability for referenced ASTM and SAE standards, refer to page N-38. For ASTM A307, see page B-90. For ASTM A449, see page B-97. For ASTM A325, see page E-28. For ASTM A354, see page B-139. For ASTM A490, see page E-37. For SAE J429, see page B-79.
- To compute the proof load, yield strength or tensile strength, in pounds, for a bolt, screw or stud, multiply the stress value, ksi, as given in Table 2 to the strength grade by 1000 and multiply this answer by the tensile stress area of the product's screw thread as given in Tables 1, 2 and 3 of ASME B1.1, pages A-36 thru A-38.
- In general, identification markings shall be located on the top of the product head and preferably shall be raised.
- SAE Grade 2 products are available in lengths 6 in. and shorter only.
- Six radial lines as for SAE Grade 8 are optional in addition to the mandatory BD mark for ASTM A354.