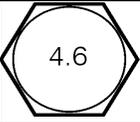
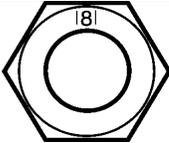
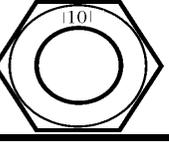
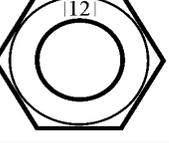




### Mechanical Properties Per ISO 898-1 (Externally Threaded Fasteners)

Metric Property Class	Material	Size Range	Min. Proof Strength MPa	Min. Tensile Strength MPa	Core Hardness Rockwell		Min. Yield Strength MPa	Grade Identification Marking
					Min.	Max.		
4.6	Low or medium carbon steel	M5 - M39	225	400 (58,000 PSI)	B67	B99.5	240	
8.8	Medium carbon steel: quenched & tempered	M5 - M16	580	800 (116,000 PSI)	C22	C32	640	
		M18 - M39	600	830 (120,000 PSI)	C23	C34	660	
10.9	Alloy steel: quenched & tempered	M5 - M39	830	1040 (150,800 PSI)	C32	C39	940	
12.9	Alloy steel: quenched & tempered	M1.6 - M39	970	1220 (177,000 PSI)	C39	C44	1100	

### Mechanical Properties Per DIN 267 Part 4 (Internally Threaded Fasteners)

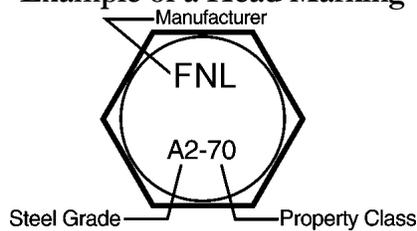
Property Class	Typical Material	Proof Stress MPa	Core Hardness Rockwell (max.)	Grade Identification Marking
Class 8	Low to Medium Carbon Steel	800	C30	
Class 10	Medium carbon steel; quenched & tempered	1000	C36	
Class 12	Medium carbon steel; quenched & tempered	1200	C36	



### Mechanical Properties of Metric Stainless Steel Per ISO 3506-1

Group	Grade	Property Class	Diameter Range	Bolts, Screws & Studs		Nuts
				Tensile Strength	Stress at 0.2% Permanent	Proof Load Stress
				MPa	MPa	MPa
Austenitic	A1, A2 & A4	50 (soft)	≤M39	500	210	500
		70 (cold-worked)	≤M20	700	450	700
		80 (high strength)	≤M20	800	600	800
Martensitic	C1	50 (soft)		500	250	500
		70 (hardened & tempered)		700	410	700
	C3	80 (hardened & tempered)		800	640	800
C4	50 (soft)		500	250	500	
	70 (hardened & tempered)		700	410	700	
Ferritic	F1	45 (soft)	≤M24	450	250	450
		60 (cold-worked)	≤M24	600	410	600

#### Example of a Head Marking



#### Metric Thread Stress Areas

Nom Dia. (mm)	Coarse Thread		Fine Thread	
	Thread Pitch (mm)	Tensile Stress Area (mm sq.)	Thread Pitch (mm)	Tensile Stress Area (mm sq.)
3	0.5	5.03		
3.5	0.6	6.78		
4	0.7	8.78		
5	0.8	14.2		
6	1	20.1		
7	1	28.9		
8	1.25	36.6	1	39.2
10	1.5	58	1.25	61.2
12	1.75	84.3	1.25	92.1
14	2	115	1.5	125
16	2	157	1.5	167
18	2.5	192	1.5	216
20	2.5	245	1.5	272
22	2.5	303	1.5	333
24	3	353	2	384
27	3	459	2	496
30	3.5	561	2	621
33	3.5	694	2	761
36	4	817	3	865
39	4	976	3	1030

Tensile Stress Area =  $0.7854[(d3+d2)/2]^2$   
 d2 = basic pitch diameter of the threads  
 d3 = minor diameter of the threads