








Bolt Grade Markings and Strength Chart



Metric Bolts

US Bolts

Head Marking	Grade and Material	Nominal Size Range (inches)	Mechanical Properties		
			Proof Load (psi)	Min. Yield Strength (psi)	Min. Tensile Strength (psi)
 No Markings	Grade 2 Low or medium carbon steel	1/4" thru 3/4"	55,000	57,000	74,000
		Over 3/4" thru 1-1/2"	33,000	36,000	60,000
 3 Radial Lines	Grade 5 Medium carbon steel, quenched and tempered	1/4" thru 1"	85,000	92,000	120,000
		Over 1" thru 1-1/2"	74,000	81,000	105,000
 6 Radial Lines	Grade 8 Medium carbon alloy steel, quenched and tempered	1/4" thru 1-1/2"	120,000	130,000	150,000
 A325	Grade A325 Carbon or Alloy Steel with or without Boron	1/2" thru 1-1/2"	85,000	92,000	120,000
Stainless markings vary. Most stainless is non-magnetic	18-8 Stainless Steel alloy with 17-19% Chromium and 8-13% Nickel	All Sizes thru 1"		20,000 Min. 65,000 Typical	65,000 Min. 100,000 – 150,000 Typical

Head Marking	Class and Material	Nominal Size Range (mm)	Mechanical Properties		
			Proof Load (MPa)	Min. Yield Strength (MPa)	Min. Tensile Strength (MPa)
 8.8	Class 8.8 Medium carbon steel, quenched and tempered	All Sizes	580		800
		below 16mm		640	
 10.9	Class 10.9 Alloy steel, quenched and tempered	16mm - 72mm	600	660	830
		5mm - 100mm	830	940	1040
 12.9	Class 12.9 Alloy steel, quenched and tempered	1.6mm - 100mm	970	1100	1220
Stainless markings vary.	A2-50 Stainless Steel alloy with 17- 19% chromium and 8-13% nickel	All Sizes thru 20mm		210	500
Stainless markings vary.	A2-70 Stainless Steel alloy with 17- 19% chromium and 8-13% nickel	All Sizes thru 20mm		450	700
Stainless markings vary.	A4-80 Stainless Steel alloy with 17- 19% chromium and 8-13% nickel	All Sizes thru 20mm		600	800

Tensile Strength: The maximum load in tension (pulling apart) which a material can withstand before breaking or fracturing.

Yield Strength: The maximum load at which a material exhibits a specific permanent deformation

Proof Load: An axial tensile load which the product must withstand without evidence of any permanent set.

$$1\text{MPa} = 1\text{N/mm}^2 = 145 \text{ pounds/inch}^2$$