



Fastener Detail Form

Varilla Roscada ASTM A193	Size	Tensile strength min. ksi	Yield Strength min. ksi	Elongation at break min. %	Reduction of Area min. %	Brinnell Hardness Max.	Temp. Range	Common nuts	Notes
B5	up to 4"	100,000	80,000	16	50		up to +815°C	A194 Gr. 3	5% Chrome - Stainless Steel used in Hi Temp and corrosive environments
B6	up to 4"	110,000	85,000	16	50		up to +450°C	A194 Gr. 6	13% Chrome - 410 Stainless Steel used in hi temp corrosive environments
B7	5/8" - 2-1/2"	125,000	105,000	16	50	321 HB	0°C to +480°C	A194 Gr. 2H	Common stud used for Petro jobs (Chromium-Molybdenum steel)
	2-1/2" - 4"	115,000	95,000	16	50	321 HB			
	4-1/8" - 7"	100,000	75,000	18	50	321 HB			
B7M	up to 4"	100,000	80,000	18	50	235 HB	0°C to +450°C	A194 Gr. 2HM	Similar to B7 except that the min. yield and tensile strength are reduced and the hardness is 235 HB ** Designed for corrosive environment
	4" - 7"	100,000	75,000	18	50	235 HB			
L7		125,000	105,000	16	50	321 HB	-100°C to +480°C	A194 Gr. 4 and Gr. 7	
L7M		100,000	80,000	18	50	235 HB	-101°C to +450°C		Similar to L7 except that the min. yield and tensile strength are reduced and the hardness is 235 HB ** Designed for low temperature corrosive environment
B16	5/8" - 2-1/2"	125,000	105,000	18	50	321 HB	0°C to +550°C	A194 Gr. 3 and Gr. 4	Used for higher temp and pressure ranges than B7 (Chromium-Molybdenum, Vanadium steel)
	2-1/2" - 4"	110,000	95,000	17	45	302 HB			
	4" - 7"	100,000	85,000	16	45	227 HB			
B8 Cl.1 (304)		75,000	30,000	30	50	223 HB	-268°C to +815°C	A194 Gr. 8	18% Cr - 8% Ni ** Has increased resistance to Chloride due to its added molybdenum
B8M Cl.1 (316)		75,000	30,000	30	50	223 HB	-200°C to +750°C	A194 Gr. 8M	16% Cr - 10% Ni ** Can withstand higher temp than B8 ** ** Has increased resistance to Chloride due to its added molybdenum
B8 Cl.2 (304)	up to 3/4"	125,000	100,000	12	35	321 HB	-268°C to +538°C	A194 Gr. 8	** All class 2 are STRAIN HARDENED
	3/4" - 1"	115,000	80,000	15	35	321 HB			
	1-1/8" - 1-1/4"	105,000	65,000	20	35	321 HB			
	1-3/8" - 1-1/2"	100,000	50,000	28	45	321 HB			
B8M Cl.2 (316)	up to 3/4"	110,000	95,000	15	45	321 HB	-200°C to +650°C	A194 Gr. 8M	16% Cr - 10% Ni ** Can withstand higher temp than B8 and is much harder than Class 1
	3/4" - 1"	100,000	80,000	20	45	321 HB			** All class 2 are STRAIN HARDENED
	1-1/8" - 1-1/4"	95,000	65,000	25	45	321 HB			
	1-3/8" - 1-1/2"	90,000	50,000	30	45	321 HB			

Varilla Roscada ASTM A320	Size	Tensile strength min. ksi	Yield Strength min. ksi	Elongation at break min. %	Reduction of Area min. %	Brinnell Hardness Max.	Temp. Range	Common nuts	Notes
L7		125,000	105,000	16	50	321 HB	-150°C to +538°C	A194 Grade 4 or 7	Charpy impact Test AT 20 FEET@ -101°C
L7M		100,000	80,000	18	50	235 HB			Has a harder Rockwell then the L7 with less tensile
B8 Cl. 1 (304)		75,000	30,000	30	50		-200°C to +650°C	A194 Grade 8	
B8M Cl. 1 (316)		75,000	30,000	30	50		-200°C to 750°C	A194 Grade 8M	
B8 Cl. 2 (304)	up to 3/4"	125,000	100,000	12	35			A194 Grade 8	
B8M Cl. 2 (316)	7/8" - 1"	115,000	80,000	15	35				
	1-1/8" - 1-1/4"	105,000	65,000	20	35				
	1-3/8" - 1-1/2"	100,000	50,000	28	45				
	up to 3/4"	110,000	95,000	15	45			A194 Grade 8M	
	7/8" - 1"	100,000	80,000	20	45				
	1-1/8" - 1-1/4"	95,000	65,000	25	45				
	1-3/8" - 1-1/2"	90,000	50,000	30	45				

Tuercas ASTM A194	Proof Load Stress ksi	Brinnell Hardness max	Temp. Range
2H	175,000	352 HB	-30°C to +538°C
2HM	150,000	237 HB	
Grade 4	175,000	352 HB	-150°C to +538°C
Grade 8 (304)	80,000	300 HB	-268°C to +815°C
Grade 8M (316)	80,000	300 HB	

Defination

Tensile Strength - The maximum amount of stress that a material can withsatnd while being stretched or pulled before failing ot breaking.

Yield Strength - Prior to the yield point, the material begins to deform elastically and will return to its original shape when the applied stress is removed.

Elongation at break - The distance a material will stretch lengthwise before rupture and is expressed as a percentage of the original length.

Reduction of Area % - While fastners are being pull tested to failure, the diameter of the breaking point is measured and compared to the original diameter.

Hardness - Is the resistance to deformation. This is tested through indentation or penetration by means of abrasion, drilling or impact.

Proof Load - Defined as a tension applied load that a material must support without any evidence of permanent deformation.