

# GRADE & MATERIAL IDENTIFICATION ASTM SPECIFICATIONS

Grade ID mark	ASTM spec number	Fastener Description	Material	Nominal Size range (inch)	Mechanical properties			
					Yield strength (min psi)	Tensile strength (min psi)	Proof load (psi)	Hardness
1	A194	Hot or cold forged nuts for high pressure & high temperature service	Carbon steel	1/4 and larger	-	-	130,000 120,000	121 min
2	A194	Hot or cold forged nuts for high pressure & high temperature service.	Carbon Steel	1/4 and larger	-	-	150,000 135,000	159/352
2H	A194	Hot or cold forged nuts for high pressure & high temperature service.	Carbon steel, heat treated	1/4 and larger	-	-	175,000 150,000	248/352
3	A194	Hot or cold forged nuts for high pressure & high temperature service.	AlSI 501, heat treated	1/4 and larger	-	-	175,000 150,000	248/342
4	A194	Hot or cold forged nuts for high pressure & high temperature service.	Carbon molybdenum, heat treated	1/4 and larger	-	-	175,000 150,000	248/352
6	A194	Hot or cold forged nuts for high pressure & high temperature service.	AlSI 1410, heat treated	1/4 and larger	-	-	150,000 135,000	228/271
7	A194	Hot or cold forged nuts for high pressure & high temperature service.	AlSI 14140/142/145, 4140H, 4142H, 4145H, heat treated	1/4 and larger	-	-	175,000 150,000	248/352
8	A194	Hot or cold forged nuts for high pressure & high temperature service.	AlSI 304	1/4 and larger	-	-	80,000 75,000	126/300
<b>Optional</b>								
F594 Group 1		Stainless steel nuts [properties for cold worked]	304, 305, 384, *303, XM7 [CW]	1/4 - 5/8 3/4 - 1-1/2	-	-	100,000 85,000	B95-C32 B80-C32
F594 Group 2		Stainless steel nuts [properties for cold worked]	316 [CW]	1-4 - 5/8 3/4 - 1-1/2	-	-	100,000 85,000	B95-C32 B80-C32

\* When approved by purchaser



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				Yield strength (min psi)	Tensile strength (min psi)	Proof load (psi)	Hardness
<b>B5</b>	A193	Bolts, screws, and studs for high temperature service	1/4 - 4	80,000	100,000	-	-
<b>B6</b>	A193	Bolts, screws, and studs for high temperature service	85,000	110,000	-	-	
<b>B7</b>	A193	Bolts, screws, and studs for high temperature service	AISI 4140, 4142, 4145, 4140H, 4142H, 4145H	1/4 - 2-1/2 Over 2-1/2 - 4	105,000 95,000	125,000 115,000	- -
<b>B16</b>	A193	Bolts, screws, and studs for high temperature service	Chromium, molybdenum, and vanadium alloy steel	1/4 - 2-1/2 Over 2-1/2 - 4 Over 4-7	105,000 95,000 85,000	125,000 110,000 100,000	- - -
<b>B8</b>	A193 A320	Bolts, screws, and studs for high or low temperature service, respectively—Class 1	AISI 304, carbide solution treated	1/4 and larger	30,000	75,000	- 223 max
<b>B8C</b>	A193 A320	Bolts, screws, and studs for high or low temperature service, respectively—Class 1	AISI 347, carbide solution treated	1/4 and larger	30,000	75,000	- 223 max
<b>B8M</b>	A193 A320	Bolts, screws, and studs for high or low temperature service, respectively—Class 1	AISI 316, carbide solution treated	1/4 and larger	30,000	75,000	- 223 max
<b>B8P</b>	A193 A320	Bolts, screws, and studs for high or low temperature service, respectively—Class 1	AISI 305 [with restricted carbon], carbide solution treated	1/4 and larger	30,000	75,000	- 223 max
<b>Optional</b>	F593 Group 1	Stainless steel bolts, hex capscrews and studs [properties for cold worked]	304, 305, 384, *303, XM7 [CW]	1/4 - 5/8 incl. 3/4 - 1-1/2 incl.	65,000 45,000	100,000 85,000	- B95 - C32 B80 - C32
<b>316</b>	F593 Group 2	Stainless steel bolts, hex capscrews and studs [properties for cold worked]	316 [CW]	1/4 - 5/8 incl. 3/4 - 1-1/2 incl.	65,000 45,000	100,000	- B95 - C32 B80 - C32

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Grade ID mark	ASTM spec number	Fastener Description	Material	Nominal Size range (inch)	Mechanical properties			
					Bolts, screws, studs Yield strength (min psi)	Tensile strength (min psi)	Nuts Proof load (psi)	Hardness Brinell
<b>8B</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 304	1/4 and larger	-	-	80,000	126/300
<b>8C</b>	A194	Hot or cold forged nuts for high pressure & high temperature service.	AISI 347	1/4 and larger	-	-	80,000	126/300
<b>8CB</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 347	1/4 and larger	-	-	80,000	126/300
<b>8M</b>	A194	Hot or cold forged nuts for high pressure & high temperature service.	AISI 316	1/4 and larger	-	-	80,000	126/300
<b>8MB</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 316	1/4 and larger	-	-	80,000	126/300
<b>8T</b>	A194	Hot or cold forged nuts for high pressure & high temperature service.	AISI 321	1/4 and larger	-	-	80,000	126/300
<b>8TB</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 321	1/4 and larger	-	-	80,000	126/300
<b>8P</b>	A194	Hot or cold forged nuts for high pressure & high temperature service.	AISI 305 [with restricted carbon]	1/4 and larger	-	-	80,000	126/300
<b>8PB</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 305 [with restricted carbon]	1/4 and larger	-	-	80,000	126/300



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					Yield strength (min psi)	Tensile strength (min psi)	Nuts Proof load (psi)	Hardness Brinell
<b>8</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 304, strain hardened	1/4 - 3/4	-	-	125,000	
				7/8 - 1	-	-	115,000	
				1-1/8 - 1-1/4	-	-	105,000	
				1-3/8 - 1-1/2	-	-	100,000	90,000
<b>8C</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 347, strain hardened	1/4 - 3/4	-	-	125,000	
				7/8 - 1	-	-	115,000	
				1-1/8 - 1-1/4	-	-	105,000	95,000
				1-3/8 - 1-1/2	-	-	100,000	90,000
<b>8T</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 321, strain hardened	1/4 - 3/4	-	-	125,000	
				7/8 - 1	-	-	115,000	
				1-1/8 - 1-1/4	-	-	105,000	95,000
				1-3/8 - 1-1/2	-	-	100,000	90,000
<b>8M</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 316, strain hardened	1/4 - 3/4	-	-	110,000	
				7/8 - 1	-	-	100,000	
				1-1/8 - 1-1/4	-	-	95,000	85,000
				1-3/8 - 1-1/2	-	-	90,000	80,000



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					Yield strength (min psi)	Tensile strength (min psi)	Proof load (psi)	Hardness Brinell
<b>8F</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 303, with sulfur or 303Se with selenium strain hardened	1/4 - 3/4	-	-	125,000	
				7/8 - 1	-	-	110,000	
				1-1/8 - 1-1/4	-	-	115,000	
				1-3/8 - 1-1/2	-	-	100,000	
					-	-	90,000	
<b>8P</b>	A194	Nuts machined from bars for high pressure & high temperature service.	AISI 305 [with restricted carbon], strain hardened	1/4 - 3/4	-	-	125,000	
				7/8 - 1	-	-	110,000	
				1-1/8 - 1-1/4	-	-	115,000	
				1-3/8 - 1-1/2	-	-	100,000	
					-	-	95,000	
<b>L7</b>	A320	Bolts, screws, and studs for low temperature service	AISI 4140, 4142 or 4145, quenched & tempered	1/4 - 2-1/2	105.00	125.00	-	
							90,000	



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				Yield strength (min psi)	Tensile strength (min psi)	Proof load (psi)	Hardness Brinell		
<b>B8T</b>	A193,	Bolts, screws, and studs for high or low temperature service respectively — Class 1	AISI 321, carbide solution treated	1/4 and larger	30,000	75,000	-	223 max	
	A320								
<b>B8</b>	A193, A320	Bolts, screws, and studs for high or low temperature service respectively — Class 2	AISI 304, carbide solution treated & strain hardened	1/4 - 3/4	100,000	125,000	-	321 max	
				Over 3/4 - 1	80,000	115,000	-	321 max	
					Over 1 - 1-1/4	65,000	105,000	-	321 max
					Over 1-1/4 - 1-1/2	50,000	100,000	-	321 max
<b>B8C</b>	A193, A320	Bolts, screws, and studs for high or low temperature service respectively — Class 2	AISI 347, carbide solution treated & strain hardened	1/4 - 3/4	100,000	125,000	-	321 max	
				Over 3/4 - 1	80,000	115,000	-	321 max	
					Over 1 - 1-1/4	65,000	105,000	-	321 max
					Over 1-1/4 - 1-1/2	50,000	100,000	-	321 max
<b>B8P</b>	A193, A320	Bolts, screws, and studs for high or low temperature service respectively — Class 2	AISI 305 [with restricted carbon], carbide solution treated & strain hardened	1/4 - 3/4	100,000	125,000	-	321 max	
				Over 3/4 - 1	80,000	115,000	-	321 max	
					Over 1 - 1-1/4	65,000	105,000	-	321 max
					Over 1-1/4 - 1-1/2	50,000	100,000	-	321 max
<b>B8T</b>	A193, A320	Bolts, screws, and studs for high or low temperature service respectively — Class 2	AISI 321, carbide solution treated & strain hardened	1/4 - 3/4	100,000	125,000	-	321 max	
				Over 3/4 - 1	80,000	115,000	-	321 max	
					Over 1 - 1-1/4	65,000	105,000	-	321 max
					Over 1-1/4 - 1-1/2	50,000	100,000	-	321 max
<b>B8M</b>	A193, A320	Bolts, screws, and studs for high or low temperature service respectively — Class 2 [C]	AISI 316, carbide solution treated & strain hardened	1/4 - 3/4	95,000	110,000	-	321 max	
				Over 3/4 - 1	80,000	100,000	-	321 max	
					Over 1 - 1-1/4	65,000	95,000	-	321 max
					Over 1-1/4 - 1-1/2	50,000	90,000	-	321 max



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