Mechanical Requirements for Stainless Steel & Non-Ferrous Fasteners

Grade(1)	General Description of Material	Bolts, Screws and Studs						Nuts	
		Full Size Bolts, Screws, Studs		Machine Test Specimens of Bolts, Screws, Studs			Hardness Rockwell	Proof Load Stress	Hardness Rockwell
		Yield (2) Strength	Tensile Strength	Yield (2) Strength	Tensile Strength	Elong-ation(3)			
		Min psi	Min psi	Min psi	Min psi	% Min.	Min	psi	Min
303A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B75	75,000	B75
304-A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B75	75,000	B75
304	Austenitic Stainless Steel- Cold Worked	50,000	90,000	45,000	85,000	20	B85	90,000	B85
304-SH	Austenitic Stainless Steel- Strain Hardened	See Note 6	See Note 6	See Note 6	See Note 6	15	C25	See Note 6	C20
305-A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B70	75,000	B70
305	Austenitic Stainless Steel- Cold Worked	50,000	90,000	45,000	85,000	20	B85	90,000	B85
305-SH	Austenitic Stainless Steel- Strain Hardened	See Note 6	See Note 6	See Note 6	See Note 6	15	C25	See Note 6	C20
316-A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B70	75,000	B70
316	Austenitic	50,000	90,000	45,000	85,000	20	B85	90,000	B85

	Stainless Steel- Cold Worked								
316-SH	Austenitic Stainless Steel- Strain Hardened	See Note 6	See Note 6	See Note 6	See Note 6	15	C25	See Note 6	C20
XM7-A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B70	75,000	B70
XM7	Austenitic Stainless Steel- Cold Worked	50,000	90,000	45,000	85,000	20	B85	90,000	B85
384-A	Austenitic Stainless Steel- Sol. Annealed	30,000	75,000	30,000	75,000	20	B70	75,000	B70
384	Austenitic Stainless Steel- Cold Worked	50,000	90,000	45,000	85,000	20	B85	90,000	B85
410-H	Martensitic Stainless Steel- Hardened and Tempered	95,000	125,000	95,000	125,000	20	C22	125,000	C22
410-HT	Martensitic Stainless Steel- Hardened and Tempered	135,000	180,000	135,000	180,000	12	C36	180,000	C36
416-H	Martensitic Stainless Steel- Hardened and Tempered	95,000	125,000	95,000	125,000	20	C22	125,000	C22
416-HT	Martensitic Stainless Steel- Hardened and Tempered	135,000	180,000	135,000	180,000	12	C36	180,000	C36
430	Ferritic Stainless Steel	40,000	70,000	40,000	70,000	20	B75	70,000	B75
464-HF	Naval Brass	15,000	52,000	14,000	50,000	25	B56	52,000	B56
464	Naval Brass	27,000	60,000	25,000	57,000	25	B65	60,000	B65
462	Naval Brass	27,000	52,000	24,000	50,000	20	B65	52,000	B65
642	Aluminum	35,000	72,000	35,000	72,000	15	B75	72,000	B75

	Bronze								
630	Aluminum Bronze	50,000	105,000	50,000	105,000	10	B90	105,000	B90
614	Aluminum Bronze	40,000	75,000	40,000	75,000	30	B70	75,000	B70
510	Phosphor Bronze	35,000	60,000	35,000	60,000	15	B60	60,000	B60
675	Manganese Bronze	22,000	55,000	22,000	55,000	20	B60	55,000	B60
655-HF	Silicon Bronze	20,000	52,000	18,500	50,000	20	B60	52,000	B60
655	Silicon Bronze	38,000	70,000	36,000	68,000	15	B75	70,000	B75
651	Silicon Bronze	45,000	75,000	42,500	72,000	8	B75	75,000	B75
661	Silicon Bronze	38,000	70,000	38,000	70,000	15	B75	70,000	B75
NICU-A-HF	Nickel-Copper Alloy A	25,000	70,000	25,000	70,000	20	B70	70,000	B70
NICU-A	Nickel-Copper Alloy A	40,000	80,000	40,000	80,000	20	B80	80,000	B80
NICU-B	Nickel-Copper Alloy B	40,000	80,000	40,000	80,000	20	B80	80,000	B80
NICU-K(7)	Nickel-Copper Aluminum Alloy	90,000	130,000	90,000	130,000	20	C24	130,000	C24
2024-T4	Aluminum Alloy	40,000	55,000	40,000	55,000	14	B70	55,000	B70
6061-T6	Aluminum Alloy	35,000	42,000	35,000	42,000	12	B50	42,000	B50

Note 6. Austenitic stainless steel, strain hardened bolts, screws, studs, and nuts shall have the following strength per properties.

Product Size	Bolts, Screws, Studs				Nuts
	Tested Full Size		Machine Test Specimens,		Proof Load Stress
	Yield Strength	Tensile Strength	Yield Strength	Tensile Strength	
in.	min psi	min psi	min psi	min psi	psi
to 5/8 in.	100,000	125,000	90,000	115,000	125,000
over 5/8 to 1 in.	70,000	105,000	65,000	100,000	105,000
over 1 to 1-1/2 in.	50,000	90,000	45,000	85,000	90,000