



Material Properties

Material	Modulus of Elasticity E	Modulus of Rigidity G	Poisson's Ratio ν	Unit Weight		
				lbf/in ³	lbf/ft ³	kN/m ³
	Mpsi	Gpa				
Aluminum	10.4	71.7	0.333	0.098	169	26.6
Beryllium Copper	18.0	124.0	0.285	0.297	513	80.6
Brass	15.4	106.0	0.324	0.309	534	83.8
Carbon Steel	30.0	207.0	0.292	0.282	487	76.5
Cast Iron (Gray)	24.5	100.0	0.211	0.260	450	70.6
Copper	17.2	119.0	0.326	0.322	556	87.3
Douglas Fir	1.6	11.0	0.330	0.016	28	4.3
Glass	6.7	46.2	0.245	0.094	162	25.4
Inconel	31.0	214.0	0.290	0.307	530	83.3
Lead	5.3	36.5	0.425	0.411	710	111.5
Magnesium	6.5	44.8	0.350	0.065	112	17.6
Molybdenum	48.0	331.0	0.307	0.368	636	100.0
Monel Metal	26.0	179.0	0.320	0.319	551	86.6
Nickel Silver	18.5	127.0	0.322	0.316	546	85.8
Nickel Steel	30.0	207.0	0.291	0.280	484	76.0
Phosphor Bronze	16.1	111.0	0.349	0.295	510	80.1
Stainless Steel	27.6	190.0	0.305	0.280	484	76.0
Titanium Alloys	16.5	114.0	0.340	0.160	276	43.4



Aluminum Properties

Aluminum Association Number	Temper Condition	Yield, S_y , Mpa (kpsi)	Strength Tensile, S_{ut} Mpa(kpsi)	Fatigue, S_f , Mpa (kpsi)	Elongation 2 in, %	Brinell Hardness H_B
Wrought:						
2017	O	70 (10)	179 (26)	90 (13)	22	45
2024	O	76 (11)	186 (27)	90 (13)	22	47
	T3	345 (50)	482 (70)	138 (20)	16	120
3003	H12	117 (17)	131 (19)	55 (8)	20	35
	H16	165 (24)	179 (26)	65 (9.5)	14	47
3004	H34	186 (27)	234 (34)	103 (15)	12	63
	H38	234 (34)	276 (40)	110 (16)	6	77
5052	H32	186 (27)	234 (34)	117 (17)	18	62
	H36	234 (34)	269 (39)	124 (18)	10	74
Cast:						
319.0	T6	165 (24)	248 (36)	69 (10)	2.0	80
333.0	T5	172 (25)	234 (34)	83 (12)	1.0	100
	T6	207 (30)	289 (42)	103 (15)	1.5	105
335.0	T6	172 (25)	241 (35)	62 (9)	3.0	80
	T7	248 (36)	262 (38)	62 (9)	0.5	85

Titanium Alloy	Condition	Yield, S_y , (0.2% offset) Mpa (kpsi)	Strength Tensile, S_{ut} Mpa (kpsi)	Elongation 2 in, %	Hardness (Brinell or Rockwell)
Ti-35A					
Ti-50A	O	70 (10)	179 (26)	22	45
Ti-0.2 Pd	O	76 (11)	186 (27)	22	47
Ti-5 Al-2.5 Sn	T3	345 (50)	482 (70)	16	120
Ti-8 Al-1 Mo-1 V	H12	117 (17)	131 (19)	20	35
Ti-6 Al-6 V-2 Sn	H16	165 (24)	179 (26)	14	47
Ti-6Al-4V	H34	186 (27)	234 (34)	12	63
Ti-13 V-11 Cr-3 Al	H38	234 (34)	276 (40)	6	77