

Appendix C-1 Physical Properties of Common Metals

Metal	Modulus of Elasticity, E		Modulus of Rigidity, G		Poisson's Ratio, ν	Unit Weight, w (lb/in. ³)	Density, ρ (Mg/m ³)	Coefficient of Thermal Expansion, α		Thermal Conductivity		Specific Heat		
	Mpsi	GPa	Mpsi	GPa				10 ⁻⁶ /°F	10 ⁻⁶ /°C	Btu/h-ft ² -°F	W/m ² -°C		Btu/lbm-°F	J/kg-°C
Aluminum alloy	10.4 ^a	72	3.9	27	0.32	0.10	2.8	12.0	22	100	173	0.22	920	
Beryl. copper	18.5	127	7.2	50	0.29	0.30	8.3	9.3	17	85	147	0.10	420	
Brass, Bronze	16	110	6.0	41	0.33	0.31	8.7	10.5	19	45	78	0.10	420	
Copper	17.5	121	6.6	46	0.33	0.32	8.9	9.4	17	220	381	0.10	420	
Iron, gray cast ^b	15	103	6.0	41	0.26	0.26	7.2	6.4	12	29	50	0.13	540	
Magnesium alloy	6.5	45	2.4	17	0.35	0.065	1.8	14.5	26	55	95	0.28	1170	
Nickel alloy	30	207	11.5	79	0.30	0.30	8.3	7.0	13	12	21	0.12	500	
Steel, carbon	30	207	11.5	79	0.30	0.28	7.7	6.7	12	27	47	0.11	460	
Steel, alloy	30	207	11.5	79	0.30	0.28	7.7	6.3	11	22	38	0.11	460	
Steel, stainless	27.5	190	10.6	73	0.30	0.28	7.7	8.0	14	12	21	0.11	460	
Titanium alloy	16.5	114	6.2	43	0.33	0.16	4.4	4.9	9	7	12	0.12	500	
Zinc alloy	12	83	4.5	31	0.33	0.24	6.6	15.0	27	64	111	0.11	460	

^a Values given are representative. Exact values may vary with composition and processing, sometimes greatly.

^b See Appendix C-3 for more detailed elastic properties of cast irons.

Note: See Appendix C-18 for physical properties of some plastics.