

مشخصات مکانیکی مصالح فلزی

Metal	Cost (UK£ (US\$) tonne ⁻¹)	Density (Mg m ⁻³)	Young's modulus (GPa)	Yield strength (MPa)	Tensile strength (MPa)
Iron	100 (140)	7.9	211	50	200
Mild steel	200-230 (260-300)	7.9	210	220	430
High-carbon steel	150 (200)	7.8	210	350-1600	650-2000
Low-alloy steels	180-250 (230-330)	7.8	203	290-1600	420-2000
High-alloy steels	1100-1400 (1400-1800)	7.8	215	170-1600	460-1700
Cast irons	120 (160)	7.4	152	50-400	10-800
Copper	1020 (1330)	8.9	130	75	220
Brasses	750-1060 (980-1380)	8.4	105	200	350
Bronzes	1500 (2000)	8.4	120	200	350
Nickel	3200 (4200)	8.9	214	60	300
Monels	3000 (3900)	8.9	185	340	680
Superalloys	5000 (6500)	7.9	214	800	1300
Aluminium	910 (1180)	2.7	71	25-125	70-135
1000 Series	910 (1180)	2.7	71	28-165	70-180
2000 Series	1100 (1430)	2.8	71	200-500	300-600
5000 Series	1000 (1300)	2.7	71	40-300	120-430
7000 Series	1100 (1430)	2.8	71	350-600	500-670
Casting alloys	1100 (1430)	2.7	71	65-350	130-400
Titanium	4630 (6020)	4.5	120	170	240
Ti-6 Al4 V	5780 (7510)	4.4	115	800-900	900-1000
Zinc	330 (430)	7.1	105		120
Lead-tin solder	2000 (2600)	9.4	40		
Diecasting alloy	800 (1040)	6.7	105		280-330

Metal	Ductility	Fracture toughness (MPa m ^{1/2})	Melting temperature (K)	Specific heat (J kg ⁻¹ K ⁻¹)	Thermal conductivity (W m ⁻¹ K ⁻¹)	Thermal expansion coefficient (MK ⁻¹)
Iron	0.3	80	1809	456	78	12
Mild steel	0.21	140	1765	482	60	12
High-carbon steel	0.1-0.2	20-50	1570	460	40	12
Low-alloy steels	0.1-0.2	50-170	1750	460	40	12
High-alloy steels	0.1-0.5	50-170	1680	500	12-30	10-18
Cast irons	0-0.18	6-20	1403			
Copper	0.5-0.9	>100	1356	385	397	17
Brasses	0.5	30-100	1190		121	20
Bronzes	0.5	30-100	1120		85	19
Nickel	0.4	>100	1728	450	89	13
Monels	0.5	>100	1600	420	22	14
Superalloys	0.2	>100	1550	450	11	12
Aluminium	0.1-0.5	45	933	917	240	24
1000 Series	0.1-0.45	45	915			24
2000 Series	0.1-0.25	10-50	860		180	24
5000 Series	0.1-0.35	30-40	890		130	22
7000 Series	0.1-0.17	20-70	890		150	24
Casting alloys	0.01-0.15	5-30	860		140	20
Titanium	0.25		1940	530	22	9
Ti-6 Al4 V	0.1-0.2	50-80	1920	610	6	8
Zinc	0.4		693	390	120	31
Lead-tin solder			456			
Diecasting alloy	0.07-0.15		650	420	110	27

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Engineering Materials 2, An Introduction to Microstructures, Processing and Design, Second Edition, Michael F. Ashby, David R. H. Jones, Butterworth-Heinemann, 1998.