

Zinc Alloys

Property	Zamak #3	Zamak #5	Zamak #7	ZA-8	ZA-12	ZA-27
Mechanical Properties						
Ultimate Tensile Strength (psi x10 ³ (MPa))	41 (282.7)	48 (328.0)	41 (282.7)	54 (374)	58 (404)	61 (425)
Yield Strength – 0.2% Offset (psi x10 ³ (MPa))	—	—	—	42 (290)	46 (320)	53 (371)
Elongation (% in 2")	10	7	13	6–10	4–7	1–3
Shear Strength (psi x10 ³ (MPa))	31 (213.7)	38 (262.0)	31 (213.7)	40 (275)	43 (296)	47 (325)
Hardness (Brinell)	82	91	80	95–110	95–115	105–125
Impact Strength (ft-lb (J))	43 (58.3)	48 (65.1)	43 (58.3)	31 (42)	21 (29)	9 (5)
Fatigue Strength – Rotary Bend, 5×10 ⁶ cycles (psi x10 ³ (MPa))	6.9 (47.6)	8.2 (56.5)	6.8 (46.9)	15 (103)	17 (117)	—
Compressive Yield Strength – 0.1% Offset (psi x10 ³ (MPa))	60 (413.7)	87 (599.8)	60 (413.7)	37 (252)	39 (269)	52 (385)
Modulus of Elasticity (psi x10 ⁹ (MPa))	12.4 (85.5)	12.4 (85.5)	12.4 (85.5)	12.4 (85.5)	12.4 (85.5)	11.3 (77.9)
Physical Properties						
Density (lb/cu in (g/cc))	0.24 (6.6)	0.24 (6.6)	0.24 (6.6)	0.227 (6.3)	0.218 (6.0)	0.181 (5.0)
Melting Range (°F)	719–728	717–727	718–728	707–759	710–810	708–903
Melting Range (°C)	381–387	380–386	381–387	375–404	377–432	376–484
Electrical Conductivity (% IACS)	27	26	27	27.7	28.3	29.7
Thermal Conductivity (BTU/ft/hr/°F (W/m/hr/°C))	65.3 (113.0)	62.9 (108.9)	65.3 (113.0)	66.3 (114.7)	67.1 (116.1)	72.5 (125.5)
Coefficient of Thermal Expansion	15.2 (27.4)	15.2 (27.4)	15.2 (27.4)	12.9 (23.3)	13.4 (24.2)	14.4 (26.0)
Specific Heat (BTU/lb/°F)	0.1 (418.7)	0.1 (418.7)	0.1 (418.7)	0.104 (435)	0.107 (435.4)	0.125 (534.4)
Pattern Shrinkage (in/in)	0.006	0.006	0.006	0.007	0.0075	0.008
Chemical Specifications						
Al	3.5–4.3	3.5–4.3	3.5–4.3	8.0–8.8	10.5–11.5	25.0–28.0
Zn	Balance	Balance	Balance	Balance	Balance	Balance
Mg	0.02–0.05	0.03–0.08	0.005–0.020	0.015–0.030	0.015–0.030	0.010–0.020
Cu	0.25 max	0.75–1.25	0.25 max	0.8–1.3	0.5–1.25	2.0–2.5
Fe (max)	0.1	0.1	0.075	0.075	0.075	0.075
Pb (max)	0.005	0.005	0.003	0.006	0.006	0.006
Cd (max)	0.004	0.004	0.002	0.006	0.006	0.006
Sn (max)	0.003	0.003	0.001	0.003	0.003	0.003
Ni	—	—	0.005–0.020	—	—	—
Si	—	—	—	—	—	—
Industry Standard						
ASTN	AG 40A	AC 41A	AG 40B	—	—	—
SAE	903	925	—	—	—	—
UNS	Z33520	Z35531	Z33523	Z35636	Z35631	Z35841
						Caldwell Casting Company