

Alloy	#2	#3	#5	#7
Mechanical Properties	Die Cast	Die Cast	Die Cast	Die Cast
Ultimate Tensile Strength: psi x 10 ³ (MPa)	52 -359	41 -283	48 -328	41 -283
Yield Strength – 0.2% Offset: psi x 10 ³ (MPa)	–	32 -221	33 -228	32 -221
Elongation: % in 2"	7	10	7	13
Shear Strength: psi x 10 ³ (MPa)	46 -317	31 -214	38 -262	31 -214
Hardness: Brinell	100	82	91	80
Impact Strength: ft-lb (J)	352 -48	432 -58	482 -65	432 -58
Fatigue Strength Rotary Bend – 5 x 10 cycles psi x 10 ³ (MPa)	8.5 -59	6.9 -48	8.2 -57	6.8 -47
Comprehensive Yield Strength – 0.1% Offset: psi x 10 ³ (MPa)	934 -641	604 -414	874 -600	603 -414
Modulus of Elasticity – psi x 10 ⁶ (MPa x 10 ³)	12.46 -85.5	12.46 -85.5	12.46 -85.5	12.46 -85.5

Physical Properties				
Density: lb/cu in (g/cm ³)	0.24 -6.6	0.24 -6.6	0.24 -6.6	0.24 -6.6
Melting Range: °F (°C)	715-734 (379-390)	718-728 (381-387)	717-727 (380-386)	718-728 (381-387)
Electrical Conductivity: % IACS	25	27	26	27
Thermal Conductivity: BTU/ft/hr/°F (W/m/ft/°C)	60.5 -104.7	65.3 -113	62.9 -108.9	65.3 -113
Coefficient of Thermal Expansion 68-212°F α in °F (100-200°C $\mu\text{m/mm}/^\circ\text{C}$)	15.4 -27.8	15.2 -27.4	15.2 -27.4	15.2 -27.4
Specific Heat: BTU/lb/°F (J/kg/°C)	0.1 -419	0.1 -419	0.1 -419	0.1 -419
Pattern or Die Shrinkage: in/in	0.007	0.007	0.007	0.007

Chemical Specifications								
(per ASTM) (% by weight)	Ingot	Casting	Ingot	Casting	Ingot	Casting	Ingot	Casting
Al	3.9 4.3	3.5 4.3	3.9 4.3	3.5 4.3	3.9 4.3	3.5 4.3	3.9 4.3	3.5 4.3
Mg	0.025 0.05	0.02 0.05	0.025 0.05	0.02 0.05	0.03 0.06	0.03 0.08	0.01 0.02	0.005 0.02
Cu	2.6 2.9	2.5 3	0.1 (max)	0.25 (max ⁹)	0.75 1.25	0.75 1.25	0.1 (max)	0.25 (max)
Fe (max)	0.075	0.1	0.075	0.1	0.075	0.1	0.075	0.075
Pb (max)	0.004	0.005	0.004	0.005	0.004	0.005	0.002	0.003
Cd (max)	0.003	0.004	0.003	0.004	0.003	0.004	0.002	0.002
Sn (max)	0.002	0.003	0.002	0.003	0.002	0.003	0.001	0.001
Ni (other) ¹⁰	–	–	–	–	–	–	0.005 0.02	0.005 0.02
Zn	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Industry Standards	Ingot	Casting	Ingot	Casting	Ingot	Casting	Ingot	Casting
ASTM	B240 AC43	B86 AC43A	B240 AG40A	B86 AG40A	B240 AC41A	B86 AC41A	B240 AG40B	B86 AG40B
SAE	J468B 903	J468B 903	J468B 925	J468B 925			Former 921	Former 921
UNS	Z35540	Z35541	Z33521	Z33520	Z35530	Z35531	Z35531	Z33523

(1) 3 hr at 610 °F and furnace cool. (2) 1/4" square specimen unnotched. (3) 10 mm square specimen unnotched. (4) Comprehensive Strength (5) Previous industry accepted standard. (6) Estimated values to be confirmed by research. (7) Values for permanent mold condition which should be similar for other processes except for ZA-27 Sand Cast Heat Treat (HT). (8) Revision for standard anticipated 1998. (9) Per ASTM B86-88. * For the majority of commercial applications, a copper content in the range of 0.25 to 0.75% will not adversely affect the serviceability of die castings and should not serve as a basis for rejection. (10) Zamak alloy ingot for die casting (with the exception of % Ni in No. 7) may contain Ni, Cr, Mn, Si, in amounts of up to 0.02, 0.02, 0.06 and 0.035% respectively.

ZA Ingot for foundry and pressure die casting may contain Ni, Cr, or Mn in amounts of up to 0.01% each or 0.03% total.