Zinc Die Casting Alloys

Zamak 2

Zamak 2 is the strongest and hardest die casting alloy in the Zamak family due to its higher copper content. It also has the highest compression strength of all the zinc die casting alloys. It is typically specified as a die casting alloy when the other Zamak alloys are not quite strong enough, but less expensive than the high strength alloys like ZA-27 or EZAC.

Summary of Benefits:

- Strongest & Hardest Zamak alloy
- Still considered a low cost alloy with a higher premium due to the copper content.
- Ability to cast complex/net shape components.
- Sometimes called Kirksite in the gravity casting industry.

Properties:

Mechanical Properties:	
Ultimate Tensile Strength: ksi (MPa)	52 (359)
Yield Strength: ksi (MPa)	41 (283)
Elongation: % in 2”	7
Hardness: Brinell	100
Modulus of Elasticity: psi x 10^6	12.4

Physical Properties:	
Density: lb/cu in (g/cc)	0.240 (6.6)
Melting Range: deg F (deg C)	715-734 (379-390)
Electrical Conductivity: %IACS	25
Thermal Conductivity: BTU/ft/hr/deg F	60.5
Coefficient of Thermal Expansion: µin/in/F – 68-212 deg F	15.4
Specific Heat: BTU/lb/deg F	0.10
Pattern or Die Shrinkage: in/in	0.007

Note: The above properties are published “typical” values tested on net shaped die cast test bars. The information found in these tables should be used for initial reference and for comparative purposes only. This data should not be used to establish design limits or as a reason for quality acceptance or rejection.

Chemical Analysis of Zamak 3 (ASTM AG40A):

	Al	Mg	Cu	Fe	Pb	Cd	Sn	Ni	Zn
Ingot (ASTM B240)	3.9-4.3	.025-.05	2.7-3.3	0.035 max	0.0040 max	.0030 max	.0015 max	-	Bal
Die Cast (ASTM B86)	3.7-4.3	.02-.06	2.6-3.3	.05 max	.005 max	.004 max	.002 max	-	Bal