



Eastern Alloys, Inc.

Zinc Die Casting Fact Sheet

Die Casting Process

Die casting is one of the most economical processes when designing **high volume**, complex shaped components. Typically when volumes reach approximately fifteen thousand parts per year, die casting becomes a very competitive manufacturing choice. Due to many inherent alloy properties of zinc, combined with the die casting process, a zinc die casting component offers advantages such as faster cycle times, improved mechanical properties, improved dimensional tolerances, and **longer tool life** (approx. 10X over aluminum die casting), etc.

To learn more, please visit <http://www.eazall.com/Advantages-of-Zinc-Die-Casting>.

Alloys

The most common zinc die casting alloy in North America is **Zamak 3**. It is Eastern Alloy's most economical zinc die casting alloy with an excellent combination of strength and castability, and usually the first choice when choosing a zinc die casting alloy. However, when increased properties are needed, there are several zinc die casting alloys that are also available.

Eastern's **HF Alloy** is the Zinc Industries most fluid alloy. As a die casting, this alloy has successfully been cast with walls as thin as 0.010" thick (3" long). Although zinc alloys are heavier than other competing alloys, the HF alloy can be cast thinner, eliminating this weight penalty.

EZAC is Eastern Alloys newest and strongest hot-chamber zinc die casting alloy. With a yield strength of 57 ksi (396 MPa), and far superior creep properties than other zinc alloys, EZAC is considered an excellent replacement opportunity for competing high cost materials and processes such as Sintered Iron, or Metal Injection Molding, etc.

To learn more, please visit <http://www.eazall.com/ezac>.

Finishing Techniques

Zinc die castings are very **corrosion resistant** in environments with a pH between 4 and 12. However, in corrosive environments outside this range a coating is necessary to help protect the casting. Zinc die castings can be finished in a variety of methods. Some of the more common methods include electroplating, PVD, powder coating, e-coating, electroless nickel, etc.

Zinc die castings are typically the **preferred choice** when electroplating components due to the minimal preparation steps required and resulting cost. Zamak alloys, ZA-8, HF Alloy, and EZAC are all the most easily plated alloys. Due to the higher aluminum content, alloys such as ZA-12 and ZA-12 (and all Aluminum die casting alloys) require additional processing steps to prepare the alloy surface for plating.

To learn more, please visit <http://www.eazall.com/comparison-of-finishes>.

Design

The die casting process gives designers the opportunity to save costs by consolidating components into one **net-shape** die casting, as well as potentially eliminating secondary operations such as machining. Zinc die castings have successfully been designed as bearings (eliminating bronze alloys), rivets, and threads. Due to these advantages, die castings are found in a wide variety of industries including automotive, building hardware, electronics, sporting goods, etc.

To learn more, please visit <http://www.eazall.com/enqchar.aspx>.

Properties

Zinc die castings have excellent tensile properties, hardness, ductility, and electrical and thermal conductivity, etc. **Zamak 3** is approximately **40% stronger** (Room temp yield strength), and has 10 times the impact strength of the standard aluminum alloy **Al380**. EZAC is approximately 150% stronger than Al380 and 60% stronger than Al390 (Room temp yield strength), the aluminum industries highest strength alloy.

To learn more, please visit <http://www.eazall.com/zinc-die-casting-alloys>.

Pricing

Studies have shown that due to the increasing value of the Chinese Yuan and the continuous rising labor rates and inflation in China, prices of die castings in North America are now at parity with those typically found in China. This study is limited to die castings only, and those that do not include other secondary processes such as machining and plating, etc. However, we believe this economic change presents an opportunity for end users to begin reshoring their components, thus eliminating the common challenges associated with buying from off-shore sources.

To learn more, please visit

<http://www.eazall.com/PublicDoc/China%20has%20lost%20its%20cost%20advantage%20in%20die%20casting%20P2.pdf>

Summary

Due to the inherent properties of zinc alloys combined with the die casting process, zinc die casting components are cost competitive when designing high volume, complex shapes. We have found our new high strength EZAC and HF alloys to be very cost competitive compared to other established manufacturing processes including the stamping, machining and powder metal processes such as the MIM process.

Please visit our website www.eazall.com, or contact Ryan Winter via email at rwinter@eazall.com or phone 845-427-2151 to discuss additional advantages of zinc die casting or the die casting process. We offer free consultation services to help you determine if zinc die casting is the right process for you, and help you find the right die casting source.