ZA-12 Graphite Mold Casting a Cost Saver

If you bag it, box it, wrap it or print on it, you've probably got one of Markem's in-plant marking systems. Markem Corporation, Keene, NH is an international firm specializing in identification and coding equipment for printing on virtually any surface—from wrappers and foils, to tablet capsules and hacksaw blades. One of Markem's newest machines is an improved, high speed coder (700 prints/min.). It now incorporates five graphite mold ZA-12 castings.

The graphite mold process provided cast-to-size tolerances and a smooth quality finish. A bronze bushing was eliminated and fast tooling turnaround and modifications allowed them to be in production within a matter of a few weeks. In the end, the process saved Markem, a lot of money!

Markem Corporation manufactures over 100 different label printers, overprinters and coder machines. Production quantities are typically low (5-100/yr.) and most machines are modified to special customer requirements. Because of low quantities most of their metal parts are fabricated from plate or bar. However, when Markem introduced their 904A improved, high speed continuous/intermittent motion coder, higher demand forced Markem to consider more efficient manufacturing methods.

“Our 904A rotary printer hit the European market just the right time” explained Al Simons, Project Engineer. “New package dating and coding laws created an immediate market for the 904A. When sales escalated we investigated several casting and molding methods. The graphite process was selected because it was the most cost effective. All five of our fabricated parts were switched to the process. It gave us quality at low cost and with short term tooling turnaround (a few weeks), we were able to meet our sales delivery schedules.”

A good example was the internal yoke component which was costing $23.00 plus the expense of inserting a bronze oilite bearing. Because ZA-12 exhibits natural lubricity, the oilite bearing was eliminated. Final tooling modifications were made within a couple of days. The yoke now costs around $3.00 that's an 87% savings! The other components also resulted in significant savings (20-50%) because of cast-to-size holes and countersinks and precision tolerances which eliminated secondary machining.

Surface finish was also important because four of the parts were external. “The surface quality of the parts is just outstanding and projects the quality image we strive to maintain,” stated Mr. Simons. “Parts are shipped directly from the foundry (some are painted) and assembled.

All the parts are manufactured by Graphicast, Inc., West Peterborough, NH, specialists in graphite mold casting and pioneers of the process in the U.S.A. What little machining that was necessary, mainly sizing of critical holes and some drilling and tapping, is also done by Graphicast.

Graphite mold casting is new but gaining rapid acceptance. The gravity cast process is actually a marriage between easy-to-machine solid graphite molds and the new high strength ZA casting alloys. Graphite's dimensional stability provides precision, its high thermal conductivity allows high productivity (low costs) and non-wetting characteristics result in superb surface finish and accuracy. The result is a new “precision” gravity casting method offering low tooling cost and low part price. A precision process uniquely suited for intermediate production volumes of 500-20,000/yr. (a few thousand/yr. is typical).

In Markem's case, graphite mold casting actually beat out aluminum sand casting by providing superior finish and eliminating machining. In other instances the process is employed as an alternate to low volume die casting where high die cast tooling cost is difficult to justify. The cost of graphite tools is one-third to one-fifth that of die cast tools and graphite mold tolerances are often close enough to die casting to justify the switch.

Markem Corp. is obviously very pleased with ZA-12 graphite mold casting. In fact, their new generation 904G model already incorporates ZA-12 graphite parts. This story is typical of how ZA castings are winning friends. A superior product at lower cost is hard to beat. If you want to learn more about graphite mold castings or where to buy them, then give us a call. If you want more information about ZA alloys (ZA-12, ZA-27 & ZA-8) do the same. Eastern Alloys pioneered the introduction of ZA alloys and no one knows more about them. Learn how ZA alloys can be sand, permanent mold, and die cast or used for bearings by calling Derek Cocks.

© Markem Corporation is appreciating considerable cost savings because of the close tolerances and good finishes routinely produced by graphite molds using ZA-12 zinc alloys. The 6" x 6" cover and lower plate with cast mounting holes and slots are very flat (.015 TIR) as cast, and the surface finish is excellent for direct painting. Cast mounting holes are commonly located ±.005". For features in the same mold half, a critical tolerance of .005" is often used. This kind of precision allows casting of bosses, posts, and recesses, which would require machining or assembly in other casting methods. When holes are too small to be cored (under #6 or #8) drill spots can be precisely located to facilitate drilling. A surface finish of 63 to 125 rms is typical.

The fork-shaped ink roll bracket is produced using a slide (side pull) in the mold. This is often done but usually limited to one direction which is parallel to the parting plane. The remarkable combination of precision and finish with low cost tooling and low piece prices results in the nickname, "Low Volume Die Casting," for the new graphite mold process.