



Chicago White Metal Casting

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Just the Facts on Die Casting Design

Certain design and production myths regarding die casting may be crippling material and manufacturing decision making. Here's a look at some of the today's realities.

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Condensed and reprinted from a feature article appearing in Product Design & Development
Designing new components should involve an objective look at an entire range of logical processing alternatives, particularly before locking in irreversible decisions.

Die casting is a process that has proven its ability to produce complex, high-strength parts in high volume to net and near-net shapes at low cost. For many engineers, however, misconceptions persist about what can, and cannot, be achieved with die casting. Some important facts can help separate myth from today's reality.

Myth #1: Tooling build takes too long. Today die casting die designers make direct use of customer CAD files, 3-D modeling,

material flow simulation software and thermal analysis programs on advanced computer workstations to speed time to market.

Component "rapid prototypes" and CNC machined prototypes from solids are being generated in-house, prior to final tool design and construction. These form-fit-&-function prototypes

are used as marketing models and provide product validation. They speed pre-production, guide precise die design, help specify quality plans, and provide the model needed for immediate trim die construction, as well as secondary finishing fixtures. The result is significantly shortened production lead times.

Myth #2: Tooling costs are too high. Die cast tooling costs are a reflection of the highest grade of cavity steel required to withstand high pressures and rapid heating & cooling cycles, as well as the skill required to

execute complex die designs. This premium tooling can produce precise as-cast features and cosmetic surfaces in die cast components for substantial savings, by eliminating virtually all secondary machining and finishing.

Combined with part consolidations these cost reductions often amortize tooling costs within six months or less.

Myth #3: Tooling has a relatively short life. For the reasons mentioned above, die casting dies have traditionally been expected to require maintenance, or replacement, in advance of other manufacturing tooling. New developments have altered this scenario.

Introduction of improved grades of tool steel and application of special die surface treatments have significantly lengthened die casting tool life. Adoption of computerized die design techniques and the use of analytical software to modify design features that encourage premature die failure have contributed importantly to the same end.

Myth #4: Economical production volumes are too high. The inherent nature of a quality die and the machine it must run on, usually won't allow low production volumes to be cost-effective. However, when a complex machined component can be redesigned as a part optimized for die casting, lower-cost die cast piece-part production can often be achieved at surprisingly low volumes.

With less complex part shapes, which can be die cast without the use of special core slides, economical unit dies can be used.

Myth #5: Part weight exceeds many requirements. Capitalizing on lighter-weight alloys, no longer should the production of high-strength die castings, with part consolidation capabilities comparable to plastic, be ruled out on weight considerations.

A wide range of lightweight magnesium die cast alloy components are now being manufactured at part weights comparable to plastic, and at comparable part costs. These



A paperless workflow executed the die design for this first-ever die cast magnesium case for a digital camera.

magnesium components can take the kind of abuse only high-cost specialty resins can handle—and reliable EMI/RFI shielding is a built-in feature of such Mg housings. In addition, a Mg housing provides the quality look and feel of metal. Housings of magnesium are currently achieving enthusiastic market reception in a new generation of laptop computers.

Myth #6: Producers are not electronically savvy. Innovative die casters such as Chicago White Metal offer design data at a website and have fully computerized the transfer of customer design files to speed the pre-production process. CWM has a secure FTP site to accept design file transfers over the Internet. Use of CAD/CAM workstations, and 3D simulations, are now routine. CWM's quality management system is ISO 9002 registered, with ISO data on-line, throughout the company.



Fused Deposition Modeling prototypes are used for validation and speeding preproduction operations.

For a free copy of Chicago White Metal's 16-page "Design and Spec Guide" for die cast components, contact your CWM Sales-Engineer Representative or visit the CWM website at: www.cwmfcast.com ■



Flexible clamp was integrally die cast for bicycle hydraulic brake shroud.