Dr. Die Cast

When Do You Begin Process Development?

When Do You Start Your Project Timeline?

No matter how you track your time, you're probably not starting soon enough.

Whether we recognize it or not, process development began while the casting was being designed. Decisions were made regarding parting line locations, draft, wall thickness, etc. that will have an impact on the casting process for the life of the program.

We should make every effort to participate in the design development as soon as practical. Many of the designs today are created by people who may have been schooled in plastics but not castings in general or high pressure die castings in particular. We need to help them and ourselves by guiding them toward good design practice. To aid in this step, many die casters provide their customers copies of the NADCA "Product Specifications Standards" #402. The standards are also available as a PDF download from the NADCA Marketplace. This information is invaluable and I believe it is essential on the bookshelf or hard drive of every casting designer.

Some have even gone so far as to begin casting simulations in the design and/or quoting stage. Having the ability to demonstrate problem areas in the casting design with simulations can help persuade the designer to make concessions they might not have considered otherwise.

When you participate in the casting design you can begin to develop a casting process. You know how many cavities are feasible with your inventory of machines and which machines have the process capability to meet your customer's standards.

If not already started, the next step as the tooling is being designed, is a flow simulation using the runner, gating and venting design. Solidification simulations should always be performed but especially where pressure tightness is a primary criterion. Solidification simulations will identify natural shrinkage, and if these are in areas that are machined the risk of leakage is increased. Additional cooling may be necessary in order to minimize shrink porosity in critical areas.

Material specification is essential when requesting tooling quotes. Your suppliers need to understand your standards. If none is stated then you will likely get the cheapest material and design. I have nothing against shops that build plastic molds, but if you are their first high pressure die cast die, then you will need to be very explicit in your requirements. I have witnessed some pretty awful designs that performed very poorly from first time die cast die builders. We now have a wide selection of die cast die materials that are customized to perform for unique processes (such as hot spots, and high wear features.)

Non-standard die materials: There are materials available that are used for very specific areas. A couple are Anviloy® and other Tungsten based materials for localized hot spots such as cores that are too small for conventional bubblers. Using this material helps reduce shrink porosity and soldering as it runs cooler than conventional H-13.

"High Thermal Coefficient" "HTC" die steels: There are die steels that have higher thermal conductivity. With good cooling design, they can help reduce spray usage and reduce cycle time.

Beryllium copper has been used in the shot block area to cool the biscuit and reduce cycle time.

Managing your customer: Sometimes we are too accommodating when it comes to "in-process" design changes. We have all experienced customers 1 to 2 weeks before die delivery with a "life changing" design change but surprised when we can't provide the same delivery schedule. We need to communicate clearly and often the importance of "freezing" the design in order to control costs and delivery schedules.

What differs in the above is that "process development" is an ongoing process that started in the design stage and continued throughout the quote and tooling development. Setting the die in the machine and making those first shots should only confirm what we have demonstrated and expected when we started. If the results fail to match the design and simulations, we will often find that we've missed one or more basic steps.

Who's Dr. Die Cast?
Robert P. McClintic
Die Casting Consultant

Bob McClintic & Associates
523 Lincoln Lawns Dr. NW
Walker, MI 49534

RMcClintic@ameritech.net
www.drdiecast.com
616.292.0454