



Dr. Die Cast



(Will you have) Chocolate, Strawberry or Vanilla??

One of the frequent inquiries we get as part of an “RFQ” (Request for Quote) as a die caster is to produce the casting in a less common alloy. The request is usually the result of the casting designer scanning the entire list of aluminum alloys produced and cherry picking the alloy that appears to overcome some or all of the design deficiencies related to their product. While it is true that the alloy may be listed in the Aluminum Association or NADCA standards that does not insure that it is the best choice.

I refer to 380 aluminum as the “plain vanilla” of aluminum alloys. It is readily available and the most economical of the aluminum alloys. In addition it is generally the most trouble free when it comes to operational characteristics.

Then there are the Strawberry alloys. Certainly there are performance reasons for specifying other alloys. What if I am producing a gasoline engine without a cast iron sleeve? The 390 alloy is often used where the aluminum casting must be subjected to severe heat and wear conditions. The extra

silicon produces a harder surface than 380. However the extra wear characteristics are not free. They come at a price that may not be immediately evident to the customer. For example, 390 alloy needs to operate at a significantly higher temperature than 380. This is due to higher Si content. (17% compared to 8.5% for 380). This additional silicon content (think molten beach sand) accelerates die wear and reduces machine tool life. The silicon likes to separate and settle to the bottom, requiring a stirring method. Die cavity life is significantly reduced, requiring more frequent service and replacement. In short, it is similar to the sign in a craft store, “Yes, I know you can, but will you?” which is to say, most alloys are possible but is it worth the extra cost in both operations and tool life. If the application is properly justified then it will be worth the extra time to review the options.

How about Chocolate with yours? What of some of the new generation of aluminum alloys? Due to the efficiency of the die

casting operation it is feasible to produce large quantities of die castings using very specialized processes and alloys. Some of the heat treatable alloys allow heat treatment that will improve their performance and makes it possible to achieve high levels of ductility previously impossible for the more common alloys. Examples include alloys such as Silafont 36 and Mag-simal-25. The consideration is not simply dedicating a furnace to melt and hold the specialized alloy but the installation of a heat treat line can require significant floor space and capital investment.

NADCA currently offers a one day course titled “Metallurgy of Die Casting Alloys”. If you are a designer considering alternative alloys or a die caster who is considering producing castings with some of these alloys, then it could be well worth your time.

So how about it? Will you have Chocolate, Strawberry or Vanilla with your die casting?



Who's Dr. Die Cast?

Robert P. McClintic
Die Casting Consultant

Bob McClintic & Associates
2544 Almar St
Jenison, MI 49428-9108

rmclintic@ameritech.net
www.drdiecast.com
(616) 669-2932