

AMC

AMERICAN METALCASTING CONSORTIUM

SPARTAN LIGHT METAL PRODUCTS SUCCEEDING WITH THE GATING EQUATION



The original die casting gating equation was updated to take into account the release of latent heat during the filling time of a die casting. This updated equation allows for maximum flow distance and maximum fill time to be calculated using standard material properties of die casting alloys. The gating equation update was completed by Dr. Al Miller at The Ohio State University, Columbus, Ohio as part of work by the American Metalcasting Consortium (AMC).

SUCCESS STORY

Problem: Spartan Light Metal Products needed to produce a new Grill Opening Reinforcement part, but had not made a structural magnesium part since 2005. Gating for this part needed to be correct the first time because the product launch allowed only one week to produce quality parts with no time for additional samples. Also, the calculated fill time was so short that it would max out the shot end on the largest capable die casting machine in the plant, meaning brute force was not an option. If the fill time and updated gating equations failed, they would face a long hard road through the launch process.



Solution: Spartan Light Metal Products validated the updated gating equation using standard high pressure die casting processes and current alloys they were casting in 2017. After validation, they applied the updated gating equation to the new product launch for the Grill Opening Reinforcement structural magnesium die casting. Tooling was produced and then sampled on October 8, 2018. The gating applied, based on the gating equation, proved to be successful on the first sample resulting in a timely launch of the Grill Opening Reinforcement program.

Benefit: This success enabled a large structural magnesium die casting to be manufactured in a die casting machine without reaching the limit of the machine power to produce quality castings. As a result of shifting this part from aluminum to magnesium, it will weigh 60% less with exactly the same design. This weight savings will translate into lighter vehicles and a significant contribution towards fuel efficiency.

“The target fill time was spot on, we cast the required castings within a week to the satisfaction of all involved. Thank you NADCA for assisting in the development of the updated gating equation.”
Spartan Light Metal Products

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