Powder Coating for Medical Applications

Watry Industries LLC, a large permanent mold aluminum foundry located in Sheboygan, Wisconsin, takes pride in working closely with its customers to co-develop and optimize casting design. In addition to offering casting design assistance and permanent mold casting production in its 172,000 square foot facility, Watry also performs heat treating, precision machining, powder coating and assembly operations in-house.
Some of Watry's largest customers design and build various medical devices, typically structural components of patient care equipment such as anesthesia machines, ventilators, EKG carts and other applications. The casting shown in the picture is the base of an anesthesia machine which houses the caster wheels and supports the weight of the unit, including large gas cylinders for certain applications, and, as such, must support substantial mechanical loads, while also meeting tough cosmetic requirements required of top-end medical equipment. Watry worked closely with its customer to assist in the design process for this part, as well as two other castings used on the same program, from concept through tooling and into production. Several other production processes were considered for making this part, including injection molded plastic, structural foam, plastic cowling over steel fabrication and several casting processes including sand cast, permanent mold and high pressure die cast. After investigation, mechanical strength concerns eliminated some of the plastic construction methods and a thorough cost analysis eliminated the fabrication options as being too expensive. Aluminum castings had a proven track record in similar applications, and a cost analysis was done to compare the various cast processes. Based on the combination of part cost and tooling cost (total cost of ownership) the result of all these studies was that permanent mold was selected as the best process for the application.

Subsequently, Watry's engineers participated in technical reviews of the part with their customers' engineering group, and used Magmasoft® solidification modeling

software to analyze part and gating design as well as determine optimum process parameters. Magmasoft® analysis led to some design changes, which were incorporated into the part before mold build. The result of this joint engineering efforts was that Watry produced suitable castings, which were heat treated, machined and powder coated in-house. Watry is currently tooling a similar but larger part, using the lessons learned on this program to ensure cost-effective production of the follow-up program.

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