SIZE AND WEIGHT MATTER–

Miniature Castings from Aristo-Cast Include Impressive Intricate Detail

More and more in the industrial world, size and weight not only matter, they are critical. Twenty years ago, a telephone weighed a few pounds; today's cell phones are only ounces. And phones don't fit on tables any more, they fit in pockets. Miniature computers run on microchips and surgeons perform micro surgery in the previously inaccessible reaches of the human body.

And this requirement for smaller and lighter is increasingly common among investment casters. Thin walls, hollow cores, exotic alloys all contribute to reducing weight in investment castings.

Aristo-Cast of Almont, MI recently produced a series of miniature investment castings which may set a record for small castings with very intricate detail. While smaller investment castings have been made for years, the complexity of this series puts them in a class by themselves.

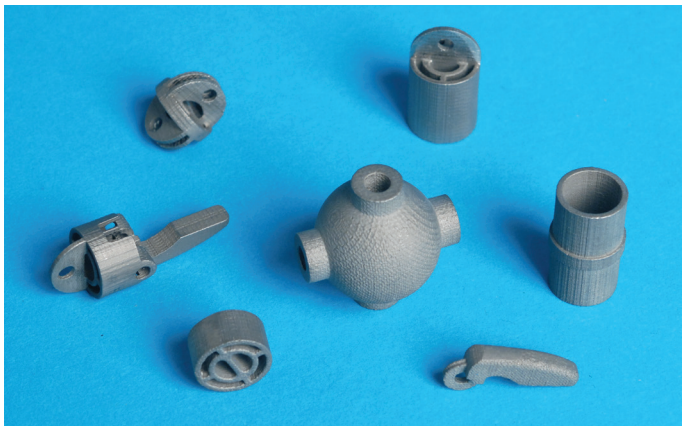
A finalist in the Investment Casting Institute's recent casting contest, Aristo-Cast was able to achieve much of the detail in these castings by way of rapid prototyping techniques and meticulous processing.

Vice President Paul Leonard noted the project started with a call from a mechanical engineer studying at the University of Oklahoma who was working on his senior design practicum developing a hand-held articulating laparoscopic forceps to aid in surgery.

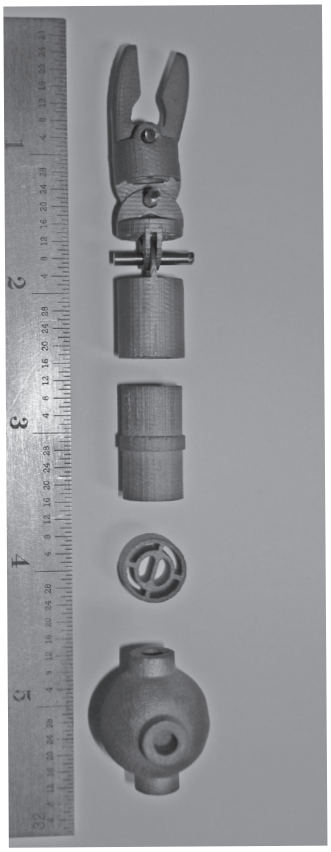
"The major problem he encountered was finding a company that could cast several small and intricate pieces. During his research, he looked at several other manufacturing techniques but soon discovered that casting these details would result in better tolerances and quality," Leonard said.

"Since these were miniature castings, it was important that they be handled with utmost care throughout the process," he continued. "The Pro-Jet patterns were very fragile and quite a challenge to be cleaned. When it came time to apply Aristo-Cast's proprietary ceramic materiel, it was very important to make sure these patterns were dipped with extreme care to ensure the coating coverage was complete with each step of the process. After reviewing the data for the seven different crucial details, we decided we would be up for the challenge."

The parts are extremely small, with thin walls and slots of 0.040;" the stationary jaw has a 0.040" diameter hidden blind hole through two interior walls that could not be machined. The only way to produce this part was to cast these holes to size and location.



This series of miniature investment castings also features intricate detail and thin walls (0.0460" x 0.825" long at 0.040" wall thickness). The castings are assembled to make hand-held articulating laparoscopic forceps to aid in surgery.



The resulting prototype assembly forms a hand-held light-weight set of forceps made of 316L stainless steel which meets all requirements for durability and surgical instrumentation.

Aristo-Cast, which began operations in 1995, produces short and long runs from one to a million castings in ferrous and nonferrous air melt alloys including zinc and magnesium. The Aristo-Cast campus includes a 23,000 square foot casting faciltity and a 12,000 sq. ft. technology center.

A consistent winner in casting contests, Aristo-Cast is always up for a challenge. CEO Jack Ziemba indicated he believes entering contests. "We believe this sends the signal throughout the organization that we want all of our efforts to result in a product that is 'best in class.' So we enter, and strive to win every casting contest we can."

"Competing publicly can be intimidating for a foundry. However, we have institutionalized this practice. It has become part of the way we do business," he continued. "The beauty of this approach is that after you do it consistently for a number of years, you really do get a reputation as a problem solver."

"The most important outcome, which we believe underpins the entire company, is the tremendous confidence we have when confronted with difficult designs and technical challenges," he concluded. 'We don't shy away from them; we have come to welcome them. Our company attitude is: Don't assume we can't do something. We can."