

INVESTMENT CASTING EXCELLENCE



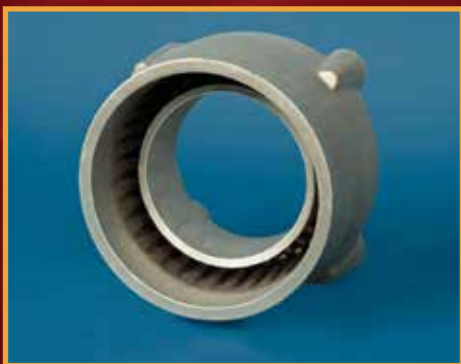
O'Fallon Casting



CASTING CONTEST



Artcast, Inc.



TPM, Inc.



Aristo-Cast, Inc.



Fenico Precision Castings

Investment Casters Take Honors

Top honors in five categories received awards in the Investment Casting Institute's annual casting contest. Awards were presented at the Institute's 65th Technical Conference and Exposition in Kansas City, MO. Awards were given in aerospace, automotive, fine art, energy and industrial hardware categories. Six finalists representing Member companies were also recognized.

Awards were presented to O'Fallon Casting of O'Fallon, MO for aerospace; Artcast, Inc. of Ontario, Canada for

fine art; TPM, Inc. of Sugar Land, TX for energy; Aristo-Cast, Inc. of Almont, MI for automotive and Fenico Precision Castings of Paramount, CA for Industrial Hardware.

Finalists included Aristo-Cast, Inc. of Almont, MI, Carley Foundry of Blaine, MN and Intercast of McAllen, TX.

The casting contest is open to members of the Investment Casting Institute and was designed to recognize foundries which manufacture parts and components that best illustrate and promote the benefits and flexibility

of the investment casting process, or which demonstrate problem solving techniques for the customer. The contest winners and finalists are expected to be recognized in other industry publications.

Submit Your Casting for 2019!

Contact the Investment Casting Institute for more information at info@investmentcasting.org.



65th Annual Technical Conference & Exposition

WINNERS

Steering Wheel Armature Wins Automotive Award

"A long time customer, a large OEM, contacted us to partner up on a recently redesigned steering wheel armature to have the outside ring machined from 304 stainless steel billet, which then would have the armature over molded around the ring in AZ91E magnesium using the investment casting process," Eric Ziemba of Aristo-Cast, Inc. explained. The customer was looking for two armatures to simulate the die casting design, which would be used for testing purposes while the die cast tooling was under construction. To make the best use of the investment casting process, Aristo-Cast engineers worked with the customer to eliminate machine stock and design a net shape armature pattern. Using their in-house Voxeljet VX1000 printer, Aristo-Cast produced sample armature patterns, while the steel rings were concurrently machined from 304 stainless steel billet. The resulting patterns were assembled around the rings and put through the investment casting process. This approach resulted in the first armature being produced in less than 5 days. Overall, four castings were produced to meet the customer's specifications against a very aggressive schedule.



Aristo-Cast, Inc.

**PART: Steering
Wheel Armature**

Size: 13.350 x 12.150 x 5.000"

Alloy: 304 SS and AZ91E Magnesium

Notes: Redesign of steering wheel simulates the die casting, produced in 5 days.

Winner of Energy Casting Award

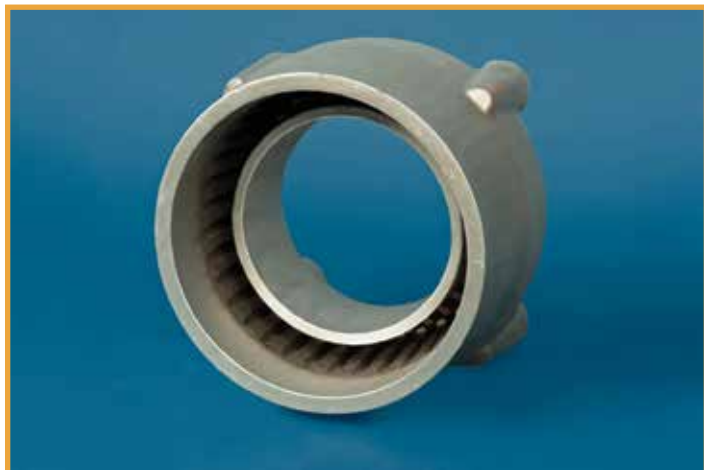
"An existing customer utilizes cooling nozzles in their production process that have a useful life of more than 15 years, making the need for replacement difficult to predict. Lengthy production stoppages are unacceptable, and conventional replacement parts have a lead time of more than 30 weeks. In need of a prompt solution, the customer turned to TPM," explains Anthony Garcia. Working from an existing component, TPM created a 3D model and produced replacement parts via rapid prototyping methods. Due to the high temperatures at which these nozzles operate, HIP, Dye Penetrant and X-Ray were required, and the parts were outsourced to accomplish this. Requiring only seven weeks to produce the components, TPM's approach saved their customer millions of dollars due to downtime avoidance.

PART: Praxair Gas Nozzle

Size: 49 lbs, 11" in diameter

Alloy: WC9

Notes: Investment casting saves time and offers significant savings.



TPM, Inc.



WINNERS

Pump Housing Takes Aerospace Casting Award

"This pump housing is an excellent example of how the investment casting process offers the versatility to consolidate a fabrication made from multiple components, made from a variety of processes, into a single piece casting," explains Jake Robben of O'Fallon Casting. Aero engine pump housings are laden with complex internal passages, and are typically fabricated through the consolidation of a number of components manufactured by several processes. Through the use of the investment casting process, it was possible to reduce component weight while simultaneously eliminating future failure points at the assembly location. This casting contains multiple interconnected core passages with varying diameters and depths. Considering this with the combination of thin walls, large masses of metal and grade B metallurgical requirements, the component lends itself to the investment casting process. Through the application of this process and design optimizations, O'Fallon Casting was able to help the customer reduce the number of weld openings from ten to five, which saved the customer cost and provided a more robust product.



O'Fallon Casting

PART: Pump Housing Casting

Size: 12 x 10 x 8"

Alloy: C355

Notes: Fabrication conversion saves valuable time and cost.

Safety Tool Takes Industrial Hardware Award

"The Halligan firefighter tool is a multi-purpose fire and travel light tool that was being fabricated as a weldment from many machined components. Fenico Precision Castings developed an investment casting conversion which saves the customer \$42.00 to \$65.00 per unit, depending on assembly head configuration," explains Sonny Tran. The resulting precision casting has forms and edges that are crisp, smooth, uniform and exceptionally easy to maintain. Fenico's combo-tool design provides the customer with a cost savings over producing a separate tool for each component configuration. Distinguished by sharp edges and a curved round pike, the Halligan firefighter tool is a critical component to any firefighter's arsenal.

PART: Halligan 42" Fire Fighter Tool

Size: 5 x 6 x 42"

Alloy: 17-4PH H925

Notes: Investment casting conversion provides significant cost savings.



Fenico Precision Castings



65th Annual Technical Conference & Exposition

WINNERS

Fan Art takes Fine Art Award

"This piece is a unique fan-sculpt of Logan and has been done digitally the same way that many digital models from video games or movies are made. The process can be utilized for collectibles, fine-art, and industrial applications," explains Erich Knoespel of Artcast Inc. This approach affords the customer many of the same benefits realized by the use of additive manufacturing to build the casting pattern as is seen in other markets. The ease of which a model can be scaled for monumental, desktop and jewelry sizes is one of the most notable characteristics that additive affords foundries serving the art community. Artcast uses their Make-Hollow process, a method for producing light-weighting sculptures. Make-Hollow essentially puts the piece through the shell room and dewax twice. Once to melt out the solid wax and then once to melt a hollow wax. One of the most striking features of this piece is the patina, which is the result of a chemical process to prematurely age the metal as a decorative finish. To achieve the range of colors making this piece distinctive, Artcast employs over 6 different chemicals as part of its Patina Process. The figure is sealed with a clear wax and is considered to be of "Museum Quality".

PART: Old Man Logan

Size: 24" tall

Alloy: C87300

Notes: Art foundry's unique use of additive manufacturing creates investment casting art.



Artcast, Inc.



HELP WANTED

Looking for young professional talent?

For resumes of students seeking jobs or internships

FOR MEMBERS ONLY

A member service from...
the Investment Casting Institute



Visit our website for more details
www.investmentcasting.org

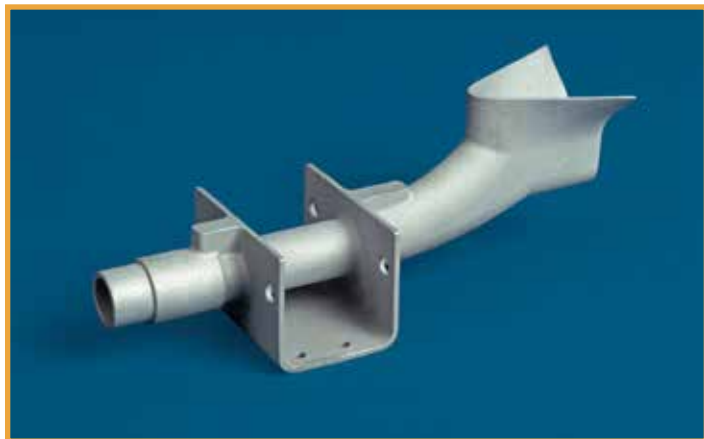


65th Annual Technical Conference & Exposition

FINALISTS

Weldment Conversion Illustrates Strength of Investment Casting

"During a foundry tour, we showed a new customer several different castings, discussing the varied reasons that other customers come to Aristo-Cast for help. As part of these discussions, it was mentioned that we could take a weldment and create a casting from it with better properties. This stayed with them, and when one of their longtime customers came back to them to reorder additional parts, it was decided that this was the perfect opportunity to convert the weldment to an investment casting," explained Paul Leonard. Aristo-Cast's engineers worked with the customer to enhance the design, resulting with a more easily producible component. The customer was extremely happy with how much better the casting operates and how much better it looks than the weldment that they had been using. Since that time, the customer has continued to work with Aristo-Cast, converting all of their other weldments to investment castings.



Aristo-Cast, Inc.

PART: Induction Wear Tube

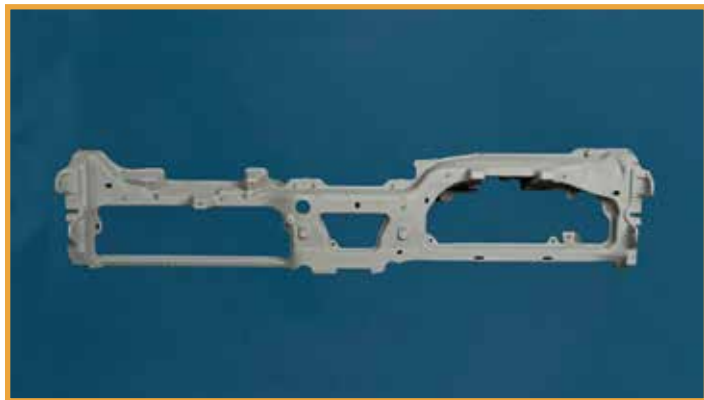
Size: 2.90 x 3.21 x 8.38"

Alloy: 17-4pH

Notes: Investment casting created from weldment conversion enhances design and functionality of part.

Aluminum Instrument Panel Simulates Die Cast Design

"An automotive company, who has been pushing to pursue additive manufacturing more aggressively, contacted us to partner up on a recently designed instrument panel that they were in dire need of as the original sand casting process didn't work," Eric Ziemba of Aristo-Cast, Inc. explained. The customer was looking for one panel that would simulate the die cast design which could be used for testing purposes while the die casting tool was under construction. Utilizing an in-house printer to produce sample patterns, they then took the patterns, assembled them to a down sprue and put them through the process in order to get a cast sample to their customer as soon as possible. Aristo-Cast printed a set of patterns, processed them and cast the instrument panel in nine days.



Aristo-Cast, Inc.

PART: Instrument Panel

Size: 11.800 x 10.700 x 53.500"

Alloy: A356 T6

Notes: Investment casting of instrument panel serves as prototype for die casting proof of concept.



65th Annual Technical Conference & Exposition

FINALISTS

Bronze Mask Combines Fine Art with 3D Innovation

InterCast was approached by a customer in need of bronze mask castings. This was the company's first foray into the world of fine art. "The process started with the development of a 3D model from an existing casting. Rapid prototype patterns were produced from the model, eliminating the cost and lead-time associated with building aluminum tooling," Claudia Lopez of InterCast explained. To meet or exceed the customer's requirements, the company designed a unique gating system to improve pour performance and minimize foundry related defects. Additionally, a special aging process was required. InterCast's engineering team developed a low cost, fast aging treatment that satisfied the customer's need. Through the use of rapid prototyping techniques and engineering innovation, InterCast was able to produce and ship parts in less than 10 days.

PART: Art Bronze Mask

Size: 11.5 x 9 x 4.5"

Alloy: SiBronze

Notes: Rapid prototyping of fine art mask eliminates cost and lead time.



InterCast

Brass Pour Becomes Happy Accident

"This is an example of a shell that was not strong enough to support the weight of the metal material poured into it. This is one of the first patterns that we put thru the system, using only our standard shelling process. Once the shell was full of the metal, it blew out and 90% of the base metal leaked out, creating a 'piece of art'," describes Paul Leonard. From this experience, the engineers learned that they needed to enhance the strength of the shell. Leonard continued, "This is a great example that all failures are not necessarily scrap."

PART: Dive Gone Bad

Size: 11.00 x 12.00 x 13.00

Alloy: Brass

Notes: Lesson in shell failure creates artistic showpiece.



Aristo-Cast, Inc.



65th Annual Technical Conference & Exposition

FINALISTS

Additive Manufacturing Answers Customer Need for Near Term Production

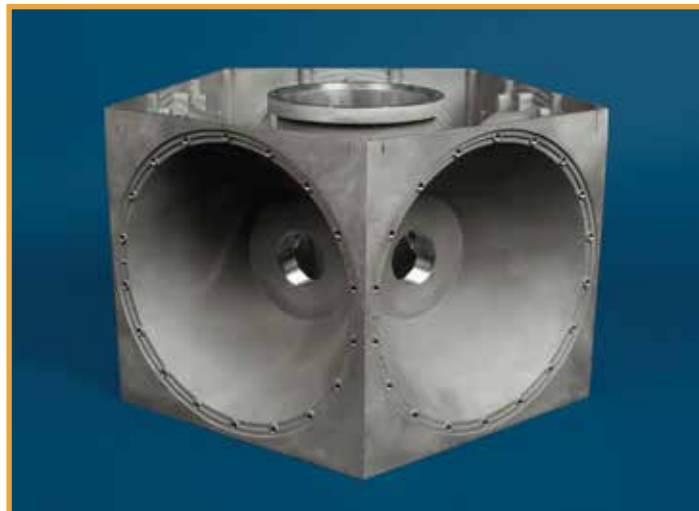
"Our customer approached us looking for a source for a 5 sided emitter housing. The challenge they faced was not in manufacturing the medium sized casting, largely comprised of 0.185" walls, but was in addressing tooling costs against the annual need of five to ten parts per year," explained Marlo Swedzinski of Carley Foundry Inc. The foundry suggested printed Voxjet patterns until a future date where part volume would justify tooling costs. Carley continues to receive orders for the finished part, which undergoes machining and clear coat post casting processes, the volume of which still supports the use of additive manufacturing.

PART: Emitter Housing

Size: 14.83 x 14.0 x 9.25

Alloy: A356-T6

Notes: Investment casting saves tooling costs with additive manufacturing.

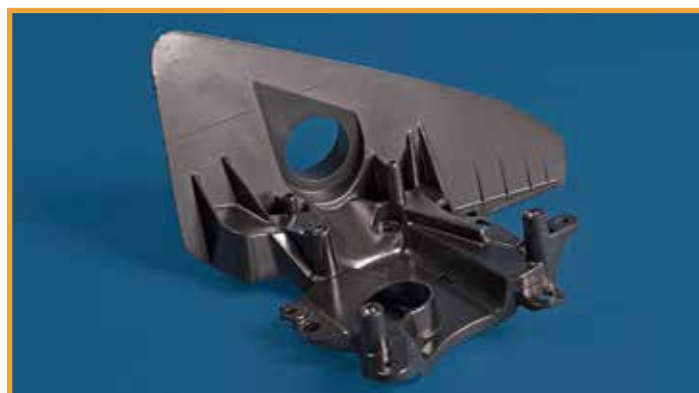


Carley Foundry, Inc.

Autonomous Electric Vehicle Finds its "Eyes" in Investment Casting

"When one of our customer who specializes in automotive mirror brackets came across this unique application, they knew that we could help them maintain their tight delivery schedule with high quality product," Paul Leonard explained. During review of the customer's design, Aristo-Cast engineers suggested changes to enhance the casting's performance. They utilized their 3D printing resources to produce prototype components for testing during tool build. After heat treatment, machining and coating, the first components were evaluated, where it was discovered that several minor modifications would enhance part functionality while simultaneously reducing assembly time. The changes were incorporated into the solid model file, and new prototypes were produced, tested and verified. The resulting modifications were incorporated into the tool build without impact to schedule.

With electric autonomous vehicles being produced at lower than traditional automotive volumes and with the resulting design maximizing effectiveness while minimizing weight, this component lends itself nicely to the investment casting process.



Aristo-Cast, Inc.

PART: Autonomous Electric Vehicle Radar Bracket

Size: 9.482 x 8.765 x 6.015"

Alloy: Aluminum

Notes: Investment cast prototype enhances part functionality and reduces assembly time.