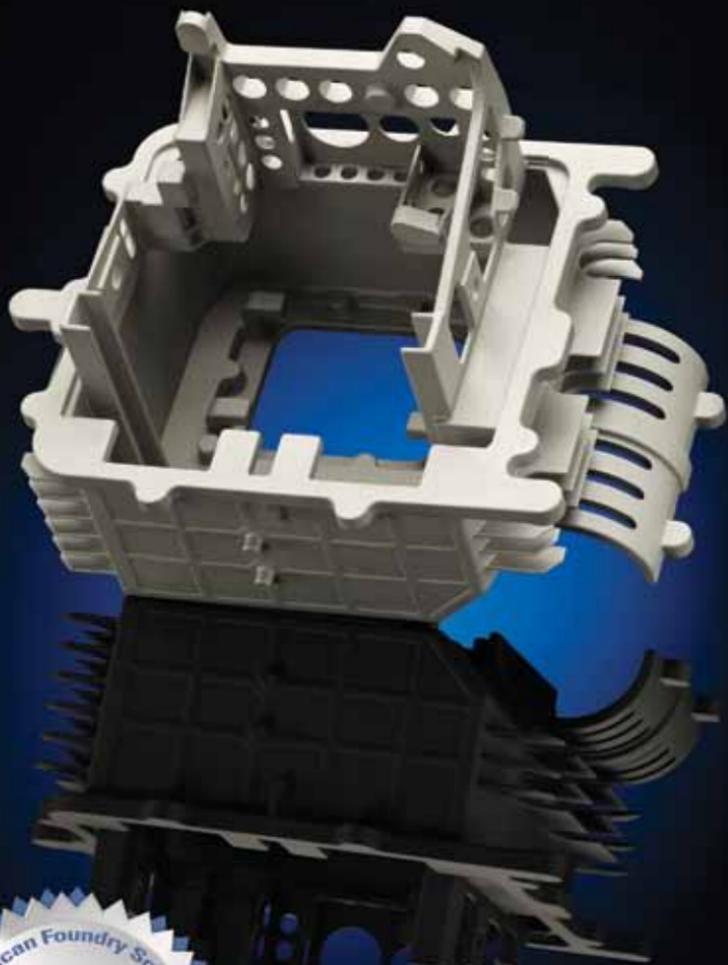


Casting of the Year



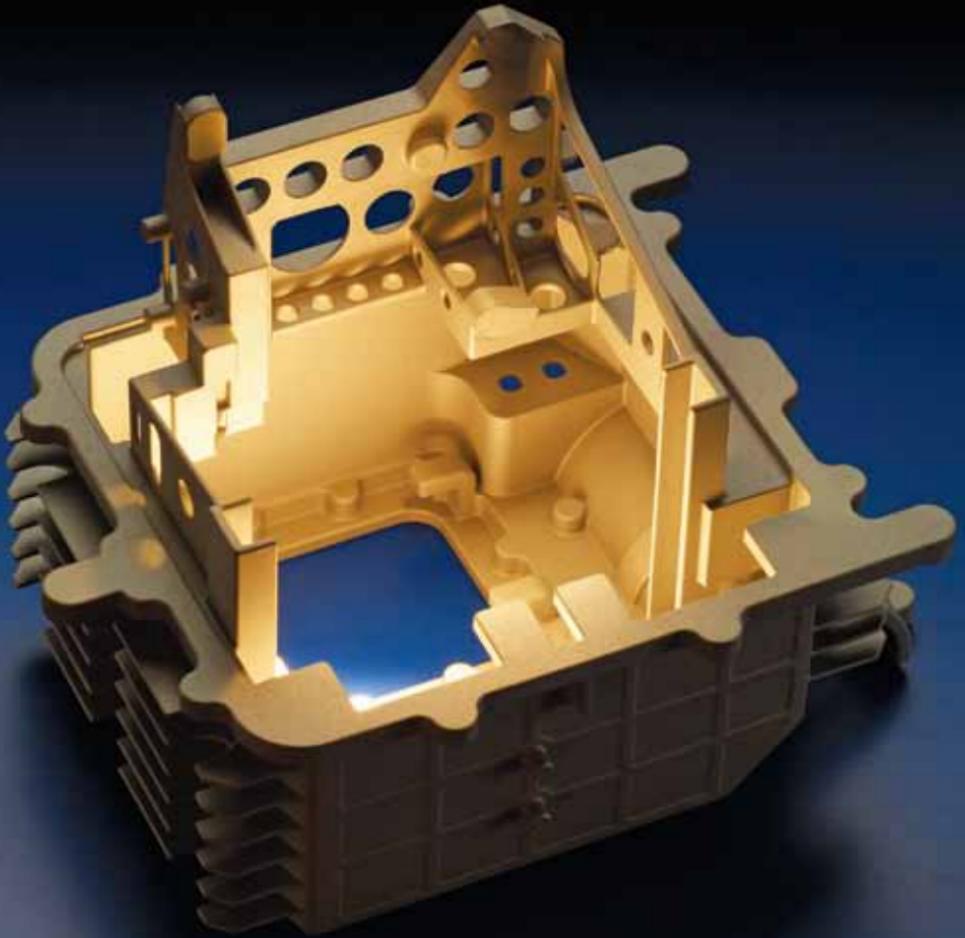
Electronics Housing
By O'Fallon Casting

Casting of the Year

Electronics Housing

O'Fallon Casting

O'Fallon, Missouri





Material: A356-T6.

Process: Investment casting.

Weight: 2.2 lbs.

Dimensions: 7.5 x 7.5 x 10 in.

Application: Defense industry.

O'Fallon Casting, O'Fallon, Mo., earned top honors in the 2013 AFS/*Metal Casting Design & Purchasing* Casting Competition for its electronics housing produced for the defense industry. The component's elegant design and incredible detail exemplifies the capabilities of the investment casting process.

The customer avoided hours of fabrication and assembly by combining multiple parts and features into a single, rigid piece. It is lighter and more precise than a comparable fabrication; secondary machining was minimized.

The customer, who asked to remain confidential, was familiar with the investment casting process and worked with O'Fallon's engineers to pack the part with functional features and elements while keeping it light. Thin walls (0.06 in.) keep the weight low, while a lattice of ribbing provides rigidity. Holes and slots further remove unnecessary material. Functionally, the casting contains a card-guide slot and bosses as mounting features for electronics. Cast fins on the exterior acts as heat sinks for the sealed interior, and a cylindrical clamp-half is cast integrally on the housing's side. Two cast-in holes avoid secondary machining requirements.

"Just look at it and say 'wow,'" said one of this year's casting competition judges. "The fins, the holes, the need for dimensional stability—electronics housings will continue to demand more features as more electronics are jammed into smaller spaces."

Best-In-Class

Radar Casting

Carley Foundry Inc.
Blaine, Minnesota



Material: F357-T6 aluminum.

Process: Nobake.

Weight: 750 lbs.

Dimensions: 61 x 66 x 52 in.

Application: Classified.

- Using computer-based simulation, the company converted the part from machined plates that were welded together, or a truss construction, to a nobake casting in two parts. The two separate castings are welded together in the final product.
- The design resulted in a 67% reduction in part cost. It also enabled the end user to realize a substantial tooling cost savings. Of all the methods studied as possible ways to produce the part, the nobake casting process offered the fastest return on investment.

Best-In-Class Planter Row Unit

Dotson Iron Castings
Mankota, Minnesota



Material: Ductile iron.

Process: Green sand.

Weight: 122 lbs.

Dimensions: 35 x 14 x 32.5 in.

Application: Planting seeds.

- The part replaced 30 stamped steel parts with six assembled ductile iron castings. The casting provider used solidification modeling to validate the soundness, and the tooling was CNC machined from aluminum billet to provide accuracy and repeatability. The castings were cleaned on a trim press.
- The new planter with ductile iron row units is engineered for more stability and dimensional accuracy, as well as more vertical travel. It nearly doubled planting speed, to 8 mph, and improved seed placement accuracy to 99%. The savings in assembly time ranged from 5% to 10%.



Best-In-Class

“Razr” Disc Opener

Monarch Industries Ltd.
Winnipeg, Manitoba, Canada



Material: Ductile iron 65-42-12.

Process: Green sand.

Weight: 95.35 lbs.

Dimensions: 34 x 25 x 10 in.

Application: Assembly opens the ground for seed to be inserted.

- The metalcaster replaced six weldments of 35 steel pieces with six machined ductile iron castings, each of which provides linkages and pivot points for mating parts. Difficult welding procedures were eliminated as well as external, frame-mounted weight kits. Cast-in features simplified assembly and handling.
- The casting design increased the part's torsional rigidity significantly through both material placement and widening the cross sections. Converting this part to ductile iron castings also reduced the customer's fabrication time for welded components.

Best-In-Class

Shaft, Worm Gear

Signicast Investment Castings
Hartford, Wisconsin



Material: 8620 steel.

Process: Investment casting.

Weight: 4.808 lbs.

Dimensions: 8.88 x 4.72 x 4.72 in.

Application: Adjusts drum vanes on a combine.

- The investment casting provider converted a machined from solid part to a single casting requiring no machining. The customer investigated multipiece weldment before selecting investment casting for consistency and quality.
- The conversion resulted in a 40% cost reduction over the machined from solid part. Lead times were cut from four to two weeks, and the customer's machining resources became available for other projects.

Best-In-Class Coolant Collector

Stahl Specialty Company
Warrensburg, Missouri



Material: 356 aluminum.

Process: Semipermanent mold.

Weight: 25.47 lbs.

Dimensions: 41 x 14 x 6 in.

Application: 15L diesel engine coolant collector.

- The complexity of this coolant collector casting is unique to the customer and presented a design challenge of maintaining core position and wall thickness given the long span between core prints. Leak testing was required at 36 psi with a maximum allowable flow rate of 4 cc/minute. In addition, the casting provider overcame a high incident of outgassing of “core gas” during the casting process.
- Three separate chambers in the compact part distribute coolant from the radiator to separate areas of the engine. The aluminum casting provides a significant weight savings from its predecessor.

Honorable Mention

Duct

Barron Industries, Oxford, Michigan

Material: A356-T6 aluminum.

Process: Investment casting.

Weight: 1.275 lbs.

Dimensions: 13.4 x 8.3 x 4.3 in.

Converted From: Fabrication.

- For use on the General Dynamics Abrams tanks, this investment cast component is part of the heating ventilating air conditioning system used to cool the electronics on the vehicle.
- The investment casting process offered a cost-effective means of production compared to aluminum fabrication, allowing for tight space configuration and multiple attachment points.



Boom Foot

Joy Global Surface Mining

Milwaukee, Wisconsin

Material: AISI 4320 (modified).

Process: Nobake.

Weight: 3,212 lbs.

Dimensions: 50 x 36 x 17 in.

Converted From: Fabrication.

- Converting to a casting resulted in a total weight reduction of 638 lbs. and a 57% reduction in cost, in addition to a lead time reduction of three weeks.
- Lightening the internal pocket area gave way to a weight reduction that allows for more mining material weight in the dipper, a strong sales point.



Honorable Mention

Valve Housing

Brillion Iron Works, Brillion, Wisconsin



Material: Ductile iron.

Process: Sand.

Weight: 90.12 lbs.

Dimensions: 7.5 x 9 x 11 in.

Converted From: Two separate cast components.

- Combining two separate castings to one led to an estimated \$1 million in savings and eliminated assembly costs, fasteners, seals and an assembly test for leakage, for this valve used in mobile hydraulics.
- A tighter core tolerance was achieved for the five-piece core assembly by assembling the core in a bucket, which also allows for less breakage in transport and storage.

Sym-Ply T20 Clamp

Victaulic Co., Easton, Pennsylvania



Honorable Mention

Main Housing & Bulkheads

Denison Industries, Denison, Texas



Material: A356.

Process: Dry sand.

Weight: 165/59/144 lbs.

Dimensions: 28 x 23 x 35 in.

Diameter: 23 x 6 in./32 x 6 in.

Converted From: Assembly of machined and fabricated components.

- A significant cost savings, more than 50%, was realized in the main housing by taking 23 welded, fabricated components and converting them to a one-piece casting.
 - The conversion also removed the necessity of a separate component for both the front and rear bulkheads, both of which were previously machined from billet and mated to the separate component during assembly.
 - The three components are used for industrial-sized variable transmissions.
-

Material: Ductile iron and austempered ductile iron.

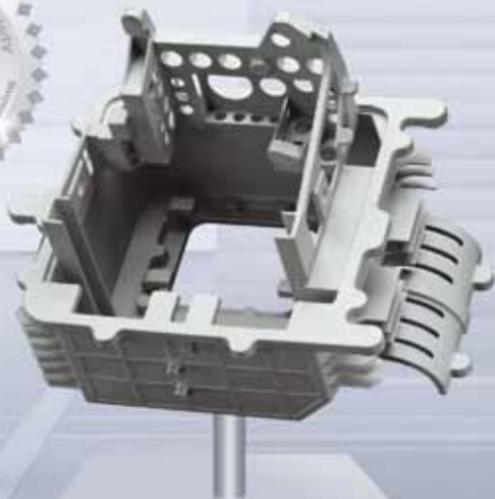
Process: Sand.

Weight: 3.5 lbs.

Dimensions: 6.5 x 5 x 1.5 in.

- In this three-component clamp, each piece is designed individually to ensure all three work in unison to function properly.
- Choosing austempered ductile iron provided increased strength and durability to the three-piece component.
- The clamp is part of the Symons by Dayton Superior Sym-Ply Wall Forming System gang wall forming system that assists contractors in doing their jobs faster, easier and more safely and cost-effective.

CONGRATULATIONS!



FIRST PLACE

"MAGMA congratulates O'Fallon Casting on winning the 2013 Casting Of The Year title, along with a year of MAGMASOFT®. We would also like to give special recognition to the **Best In Class, as well as the **Honorable Mention** winners. We are proud to see an increasing number of **MAGMA** customers successfully competing in this annual event.**

Keep leading the foundry industry!"

- **Christof Heisser**, President
MAGMA Foundry Technologies, Inc.

For more information on
MAGMASOFT®
Call us at **847-969-1001**

Use your smartphone to
scan the QR code and
see what our customers
have been saying or visit
<http://bit.ly/14Rk9x>



MAGMA Foundry Technologies, Inc.
10 N. Martingale Road, Suite 425
Schaumburg, IL 60173
Phone: 847-969-1001
info@magmasoft.com
www.magmasoft.com

MAGMA
BUSINESS AMPLIFIED