

Invest Cast: Wax 3D Printing Is Next Gen for Investment Casting

Wax 3D printing solution for the digital foundry helps Invest Cast, Inc. dramatically cut time and cost for cast parts and grow business.



Visijet® M2 ICast 100% wax material shares the melt and burnout characteristics of standard casting waxes.

Founded in 1981, Invest Cast, Inc. has steadily grown its casting, machining and fabrication business with an emphasis on innovation. Using the latest technologies, training and techniques, Invest Cast now has three U.S. locations where it produces superior quality investment castings and delivers unmatched industry and technical experience.

In the company's ongoing mission to deliver exceptional projects with unmatched customer service, Invest Cast recently purchased two ProJet® MJP 2500 IC 3D printers, 3D Systems' new digital foundry solution that uses 100% RealWax™ investment casting wax to deliver fast and cost-effective, tool-less wax pattern production. By eliminating tooling, this new 3D printing solution reduces the time and expense of transitioning from a design to a cast part, and 3D Systems' wax material integrates seamlessly into standard investment casting workflows.

Invest Cast reports exceptional surface finish, dimensional stability and castability with the ProJet MJP 2500 IC and is now able to serve more customers with greater efficiency. Invest Cast is now positioned to introduce low-volume tool-less production for high quality cast parts in a fraction of the typical time.

Unprecedented speed and flexibility in casting

The ability to make final cast parts without tooling a mold has given Invest Cast's customers the freedom to test multiple iterations quickly and cost-effectively, ultimately enabling them to arrive at better final parts.

CHALLENGE:

Introduce greater agility, flexibility, and cost-effectiveness to the investment casting process without changing the standard foundry workflow.

SOLUTION:

3D printing wax investment casting patterns with 3D Systems ProJet® MJP 2500 IC solution for the digital foundry.

RESULTS:

- Reduce lead time for cast parts from 6–12 weeks to 2–5 days
- Enable multiple, cost-effective iterations of same part for better final product
- Grow customer base through ability to deliver parts faster and more affordably
- New opportunities for low-volume production casting



Making final cast parts without tooling saves Invest Cast time and money.

According to Al Hinchey, prototype specialist at Invest Cast, the ProJet MJP 2500 IC has cut significant time from the investment casting process. "Many times, we can go from model to metal in 2-5 days," he says, which is down from the average lead time of approximately 6-12 weeks with investment casting molds. The ability to quickly deliver high quality casted parts sets Invest Cast apart from traditional foundries and offers Invest Cast customers a premium experience marked by exceptional service.

Hinchey has been 3D printing patterns for the foundry for 13 years and is impressed with all aspects of 3D Systems' new digital foundry solution. In addition to the unparalleled production speed and low pattern costs, Hinchey credits the high quality of these patterns for their popularity with customers. "The surface finish of the wax patterns coming out of 2500 IC have been nothing short of phenomenal," he says. "Our customers now specifically request patterns from these particular machines."

The part accuracy and dimensional stability of patterns printed with the ProJet MJP 2500 IC have enabled Invest Cast to produce more complex parts with much finer, castable details than ever possible previously. Built using 3D Systems Multijet Printing (MJP) technology, the ProJet MJP 2500 IC delivers patterns with tight tolerances that are ideal for complex precision metal components and uses VisiJet® M2 ICast material, a 100% wax material that shares the melt and burn-out characteristics of standard casting waxes.

The high fidelity, sharp edges, and smooth surfaces achievable with the 2500 IC save Invest Cast significant time on post-processing as well: "Our customers are constantly asking us for ways to get a better tolerance," says Tyler Albert, Engineering Manager at Invest Cast, "which typically includes a lot of machining operations after casting, and finishing operations to improve surface finish. Our 2500 IC's make it possible to eliminate a lot of those processes."

Building business with high casting quality, low pattern cost

According to Albert, the accelerated pattern production speed of 3D Systems' digital foundry solution has helped Invest Cast expand its business by enabling it to answer parts needs quickly and consult on more projects. "Adding 3D printing to our capability has allowed us to expand our customer base and reach people that we typically wouldn't be talking to," says Albert. "A lot of customers come to us and know what they want, but they don't know how to get there. With our expertise and the ProJet MJP 2500 IC, we are an avenue to get them to where they need to be."

The ability to produce complex wax casting patterns without tooling also enables a dramatic reduction in per part costs. With 3D printing, complex geometries can be delivered at a fraction of the typical price and spare Invest Cast and its customers the added expense of tooling storage and maintenance. "With the 2500 IC, we can do more than what's



The ProJet MJP 2500 IC helps Invest Cast go from model to metal in 2-5 days.

possible with injection molding,” says Hinchey. “The ability to 3D print wax patterns with this quality, speed and cost is not only good news for prototyping, but it opens up new opportunities in low-volume production casting as well. It helps Invest Cast stand out and do more for our customers.”

3D printed wax patterns, standard casting protocol

Hinchey reports a quick and easy installation process, with a crate-to-first-build time of just five hours. The ProJet MJP 2500 IC ships with 3D Sprint®, an additive manufacturing software unique to 3D Systems for preparing, optimizing, and sending files to print in a user-friendly workflow. “You no longer have to be an expert in the more complex CAD drawing programs,” says Hinchey.

The ProJet MJP 2500 IC incorporates seamlessly into Invest Cast’s standard investment casting protocol. After Invest Cast receives a digital file from a customer, the file is sent to print and the printed patterns are assembled onto a tree. The patterns are then dipped in slurry and emptied of wax in the foundry’s dewaxing ovens. Invest Cast uses a permeable investment casting shell, which allows investment casting wax to run through it. “The benefit of the 2500 IC is that it is plug-and-play for our operation,” says Albert. “At 1600 degrees, we can melt all of the 3D printed wax out of the shell.”

After the shells are dewaxed, they are loaded into preparation ovens for preheating just prior to pouring. Once the metal has been poured and the patterns have cooled, the ceramic shells are removed, disconnected from the tree assembly and ground free of the gate material before final heat treatment or shipping.

Next generation casting solution

It is not only Invest Cast customers who prefer the 3D printed wax patterns to injection molded ones. Due to their high quality surface finish, dimensional accuracy, and easy integration in the investment casting workflow, the foundry staff prefers them as well. “3D printed wax patterns are a fantastic fit for us,” says Hinchey. “Almost on a daily basis I hear from the foundry workers and general management staff that if the part can be printed on the 2500 IC, they would prefer it that way.”

Given the quality, cost and business advantages the ProJet MJP 2500 IC has already introduced, Invest Cast is convinced digital foundry solutions are the way of the future. “This technology is going to be the next step in the next generation of investment casting,” says Albert.

Get in touch for more information on the ProJet MJP 2500 IC and transform your casting workflow with our digital foundry solutions: www.3dsystems.com/contact



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