

eBook

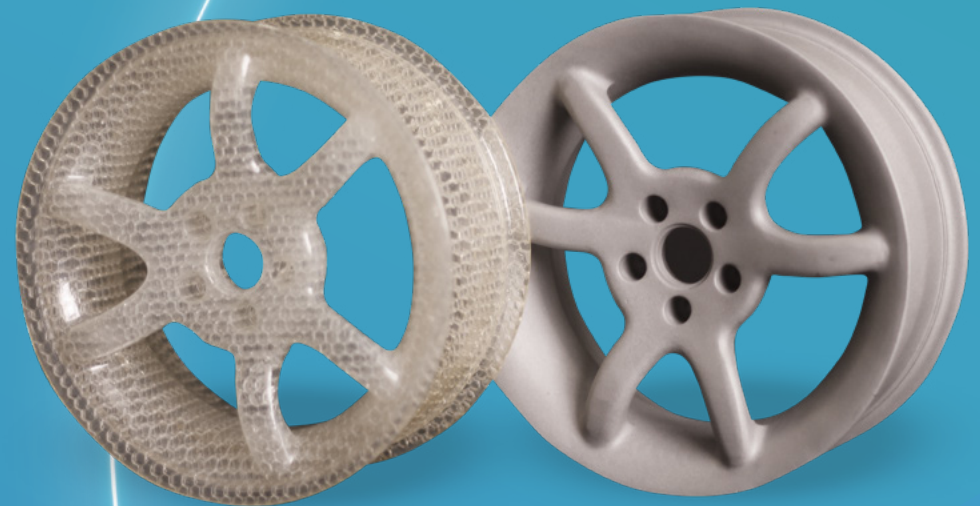
The Foundry Goes Digital

Building productivity and new manufacturing efficiencies
with tool-less 3D printed casting pattern production



Contents

- 03** Investment Casting in the 21st Century
- 04** Benefits of Additive Investment Casting
- 05** How is a Digital Foundry Different?
- 06** When Does it Make Sense to Use Printed Patterns?
- 07** Does Investment Casting Measure Up? - Cost Breakeven
- 08** Does Investment Casting Measure Up? - Time Breakeven
- 09** The Best Fit: Stereolithography or Multijet
- 10** 3D Sprint® Software expertise
- 11** What's Next?



Investment Casting in the 21st Century

Investment casting is a precise manufacturing methodology that delivers value across industries, from mechanical, automotive and aerospace parts to intricate dental work, jewelry and sculpture. For centuries the trade-off for smooth and accurate investment casted parts has been high costs and long casting pattern lead times.

Now the evolution of parts is accelerating dramatically in many industries resulting in shorter product life cycles and lower volumes of casted parts between cycles. Waiting for tooling for obsolete parts for aging aircraft also mean delays for aircraft to be repaired, costing time and money. Demand for faster foundry production is increasing in all industries and foundries need to be ready to respond.

Delivering the Digital Foundry

To meet pressures of shorter product life cycles, foundry labor shortages, and a need for more complex geometries, foundries are adopting additive technologies and investment casting materials that deliver on the demands being faced. These new 'Digital Foundry' solutions deliver massive time and cost savings: Production workflows that now take weeks will be done in hours. Product runs can be smaller, serving more discriminating markets. Customers will place new expectations on foundries to deliver parts faster.



Benefits of Additive Investment Casting

The Digital Foundry will yield competitive advantages for those adopting digital processes, powered by 3D printing. With a digital workflow, there is no tooling required - go straight from CAD to casting pattern, and keep a digital inventory of your patterns.

Whether you need cost-effective low volume production, bridge tooling or one-off design validation before taking next steps, 3D printed investment casting patterns deliver the same high quality casting outcomes, while providing many benefits:



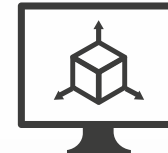
ELIMINATE

tooling storage and maintenance costs



OPTIMIZE

cast part designs and performance



TRUE-TO-CAD

pattern accuracy and smooth surfaces



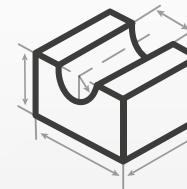
IMPROVE

overall customer response times



DELIVER

premium, accelerated service



HIGHER DESIGN

complexity only possible through additive process

How is a Digital Foundry Different?

The digital foundry will facilitate the transition to digital workflows using advanced 3D printing materials and methodologies, enabling scalable printing of investment casting patterns.

Using 3D printing technologies to create patterns that drop seamlessly into pre-existing foundry processes can revolutionize foundry operations.

The productivity benefits result in faster production of patterns to swiftly meet customer needs. Digital foundry solutions eliminate the need for tooling to bring new agility and cost-effectiveness to investment casting pattern production and enable higher performing, more complex parts for casting in production volumes.

Abandoning the traditional labor intensive pattern production process allows printed pattern production to take place 24/7. Once programmed, 3D printers have plug-and-play operation so no technical expertise is required by the operator.

Employing additive manufacturing techniques allows the digital foundry to develop a focus on lower production volumes and to offer faster delivery to the market. In addition, additive casting can reduce component weight by up to 50% without any loss in component strength – critically important for aerospace, defense and automotive industries.



When Does it Make Sense to Use Printed Patterns?

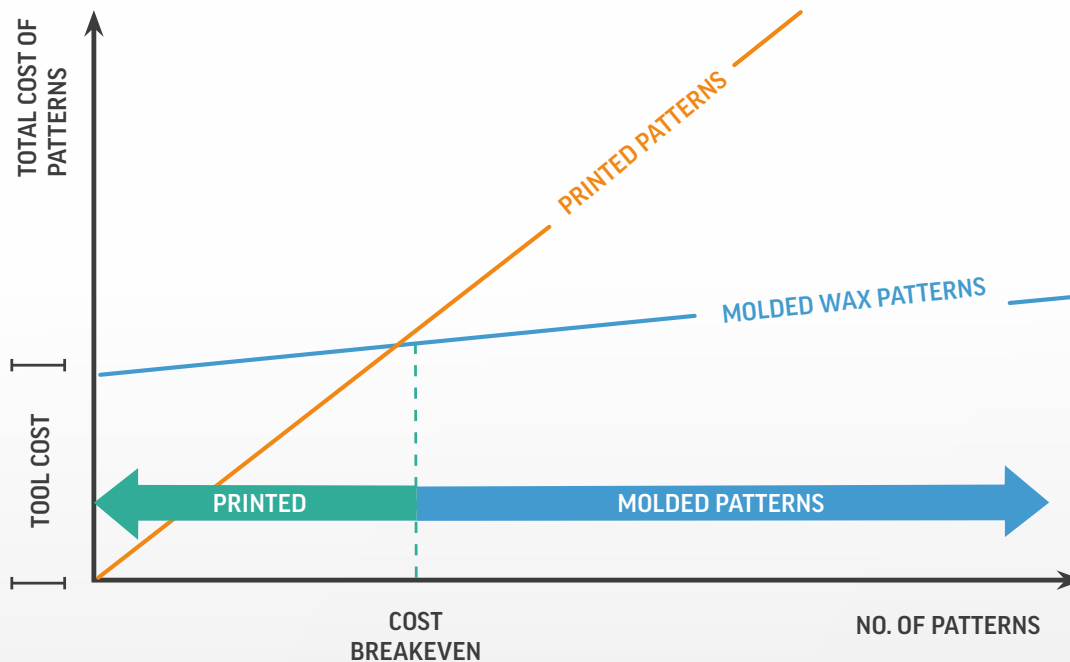
- When printed patterns are less expensive than molded wax patterns
- When printed patterns are faster than molded wax patterns
- When the patterns are too complex to be made using conventional injection molding tooling



Does Additive for Investment Casting Measure Up?

Cost Breakeven

With 3D printed investment casting patterns you can shrink costs by orders of magnitude. Have hundreds of your small to medium size patterns in hand quicker and at less cost compared to the time and expense to build and run traditional tooling.

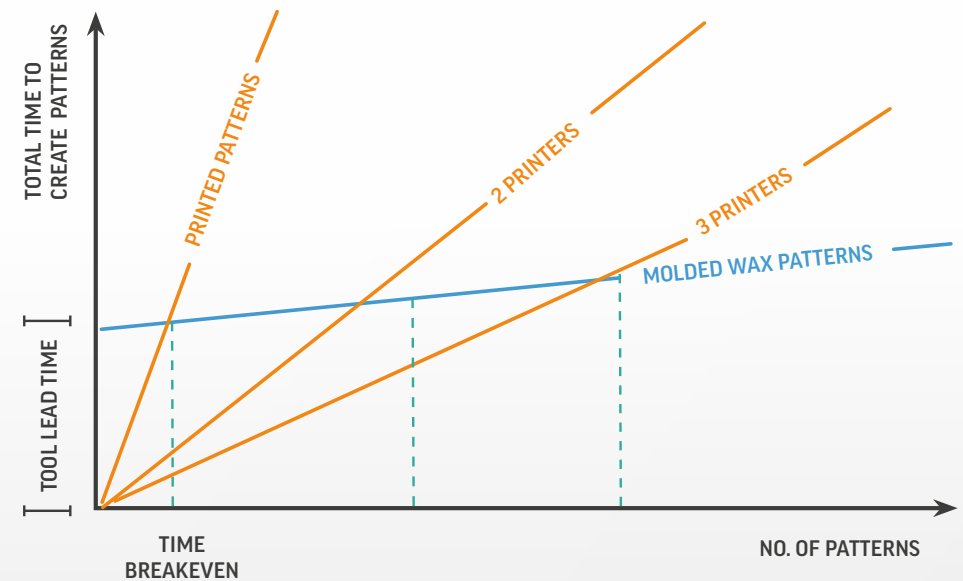
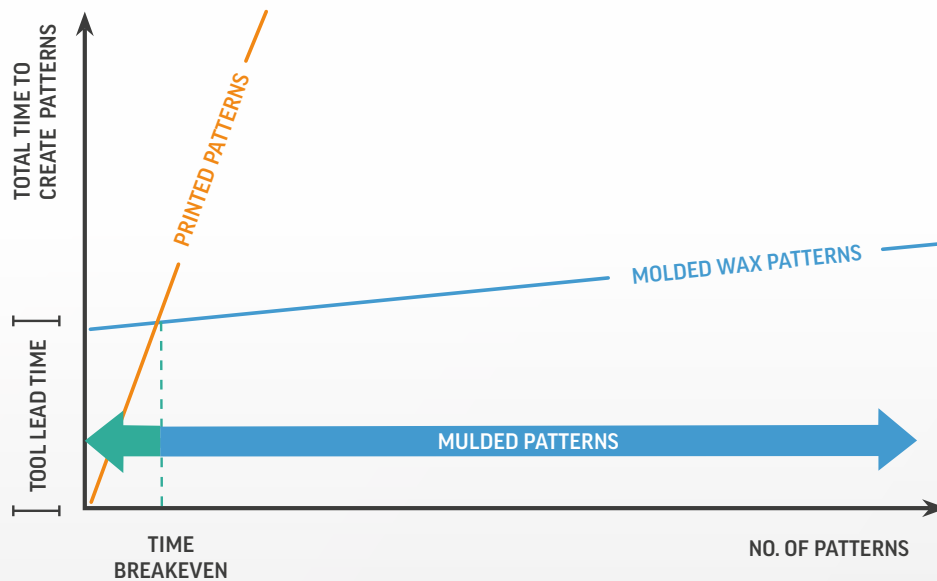


Results based on customer benchmarking of the ProJet® MJP 2500 IC 3D printer, with Visijet® M2 ICast RealWax™ materials, August 2018.

Does Additive for Investment Casting Measure Up?

Time Breakeven

Experience unmatched turnaround time with 3D printed investment casting patterns. Save weeks on wax pattern production with 3D printing and accelerate time-to-market. Increase your productivity and enable faster time-to-parts for premium service delivery to customers.



Results based on customer benchmarking of the ProJet® MJP 2500 IC 3D printer, Visijet® M2 ICast RealWax™ materials, August 2018.

The Best Fit: Stereolithography or Multijet

Printed patterns can be created with Stereolithography (SLA) or Multijet (MJP) technology.

STEREOLITHOGRAPHY (SLA)

SLA printers can be used to produce lightweight, highly detailed patterns in sizes ranging from just a couple of millimeters, up to 1.5 meters long. These patterns can be created in one piece, greatly reducing the amount of assembly required while maintaining the same exceptional standard of resolution and accuracy without warping or shrinkage.

SLA provides high precision, accurate printing and efficient use of materials with unattended operation until the end of the print run, offering lower pattern costs than similar 3D printing options. SLA QuickCast® patterns are constructed with a unique honeycomb structure so that the pattern collapses internally as the temperature causes it to expand. The patterns are produced from castable resins with a high surface quality to reduce post-processing expenses.

MULTIJET PRINTING (MJP)

The ProJet MJP 2500 IC with VisiJet M2 ICast material delivers 100% wax and is cast-ready with no surface finishing required so it drops seamlessly into existing foundry processes.

MJP offers tool-less production of 100% wax casting patterns in hours rather than days with accuracy, repeatability and design complexity. MJP is perfect for casting of customized metal components, low volume production and bridge manufacturing.

The VisiJet RealWax™ material can be dropped seamlessly into existing investment casting processes and produce hundreds of patterns more rapidly and for less cost than traditional pattern production. Use one or more printers to create, iterate, produce, and refine as needed using a just-in-time production model.

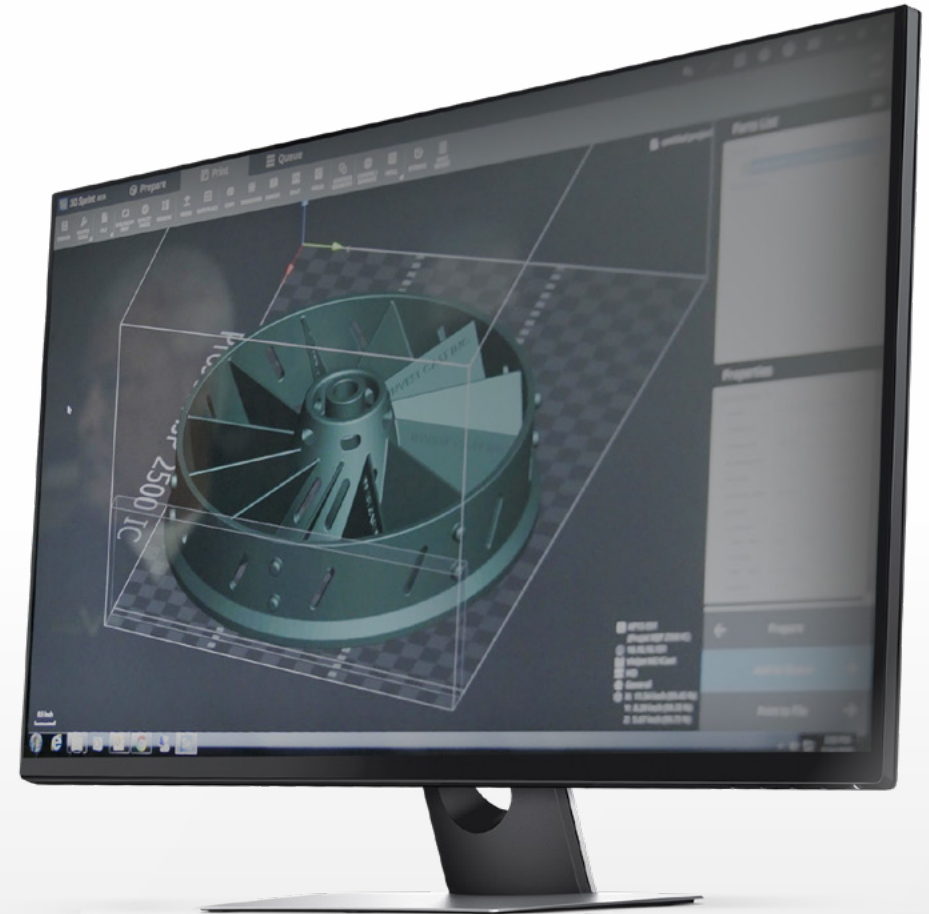
3D Sprint® Software Expertise

INCREASED PRODUCTIVITY. LOWER COSTS. BETTER PARTS.

3D Systems has been at the forefront of additive manufacturing for more than thirty years and has consistently demonstrated the leadership and expertise needed to guide manufacturers as they adopt digital workflows to realize the full benefits of additive manufacturing.

3D Sprint® software allows you to 3D print better parts and patterns without needing additional high-priced software to achieve it. 3D Sprint® delivers 3D Systems' expertise to prepare and optimize CAD data and manage the additive manufacturing process, providing one intuitive interface for design, model prep and printing.

Advanced tools include the ability to introduce offsetting, cutting and keying, and part splitting. Users can quickly monitor print queues, job progress and materials.



What's Next?

Interested in learning more about cutting weeks off your investment casting production using 3D printed patterns?

Get in touch today - we will be right with you.

Get in Touch



Watch Webinar