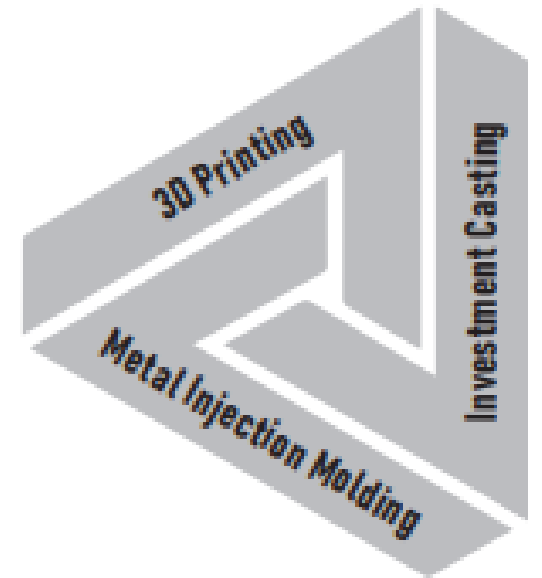




TriTech

TITANIUM PARTS

TriTech Titanium Parts LLC
6401 East Seven Mile Road
Detroit, MI 48234





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Introduction

- TriTech Titanium Parts was formed on April 5, 2022.
- TriTech is a spin-off from AmeriTi Manufacturing Company.
- AmeriTi started in 1984, and grew 10x over 25 years from 1996 to 2021.
- The core business of AmeriTi was sold to Kymera International on April 5, 2022.
- The business sold included powders, alloys, and recycled products for the titanium industry.
- Simultaneously TriTech was formed based on carving out the parts business.



History

- The first development work for Metal Injection Molding (MIM) started in 2015, with subcontracted processes.
- MIM operations and sales started in 2017 with the startup of the first Arburg injection press and the Elnik vacuum sintering furnace.
- Investment Casting (IC) started in 2019 with wax injection, shell building, and vacuum casting.
- All the process technology was developed internally.
- The development of 3D binderjet printing started in 2021, and the Desktop Metal printer will be installed during July of 2022.

Three Technologies

3D BINDERJET PRINTING

METAL INJECTION MOLDING

INVESTMENT CASTING

- The TriTech business strategy.....
to produce titanium parts with the best technology for the part and the customer.
- Each process has strengths and constraints. There is a best solution for each application.
- Decision variables include volume, tooling, complexity, tolerances, surface finish, and mechanical properties.
- All three processes can produce net-shape, or near-net-shape parts.
- Designers can be creative and produce parts that eliminate various steps in the process.
- Reduced manufacturing lead time.

3D Binderjet Printing

Capabilities

- Grade 5 Titanium.
- Tolerances typically +/- .006" (or better).
- Post finishing with blasting, coating, HIP, and more.
- Surface finish is 6 – 8 um Ra.
- Capacity is size dependent from 5-10,000 parts per month per shift with one printer.



3D Binderjet Printing

- TriTech recently partnered with Desktop Metal to install their Binderjet Printing process for beginning of 3D Printing. The Binderjet process is a unique fit with TriTech as it builds upon the sintering technology used in Metal Injection Molding.

- Complex geometries can be produced. TriTech needs a solid model file, and it can build a part or a prototype part very quickly. The setup time is very short and turnaround time can be days rather than months.

- The binderjet process is quick and includes printing the part, thermal debind, and then sintering.



Metal Injection Molding

Capabilities

- Titanium Grade 5 and Grade 2.
- Tolerances typically +/- .003" (or better).
- Post finishing with blasting, coating, HIP and more.
- Surface finish is .5 – 2 um Ra.
- Capacity at 50,000 parts per month per shift.

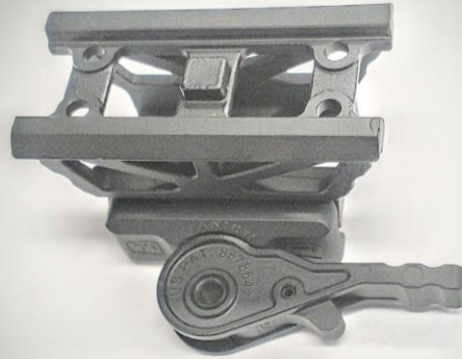


Metal Injection Molding



- MIM is best suited for high volume complex shapes and/or small parts that are difficult to machine using conventional metal cutting methods. Excellent surface quality.
- For the MIM process a titanium metal powder is mixed with an organic binder to make a feedstock to be injected into a mold representing the shape of the final part. The injected part is next processed to remove the binders and sintered in a vacuum furnace to make a fully dense titanium part.
- The MIM process is oriented toward small parts that range from 1 gram to as large as 50 grams. The complete cycle for a MIM part is typically three to five days. Injection, debind, sinter, and final inspection.

Investment Casting



Capabilities

- Grade 5 Titanium.
- Tolerances typically +/- .007" (or better).
- Post finishing with blasting, coating, HIP and more.
- Surface finish is 3 – 5 um Ra.
- Capacity at 2,500 parts per month per shift.



Investment Casting



- TriTech can manage the entire process from initial prototypes for evaluation, designing and building the tool, producing the casting, and finishing which can include polishing, machining, and coating.
- The process starts by injecting a wax into a die that is the final net shape of the part. Each finished casting is a duplicate of the wax pattern.
- The use of a robot for the shell-making process is an important tool for process and quality control. The robot assures every action in the coating process is consistent from part to part.
- The titanium metal is melted in a vacuum arc furnace and then cast into the shell mold.
- TriTech produces small to medium size castings ranging from 50 grams to 40 pounds, and .5 to 20 inches. Typical annual volumes can range from hundreds to thousands of parts with relatively short lead times.

Mission and Values



The MISSION at TriTech is to identify the best product technology for the customer while achieving profitable growth through honest business practices with its customers, vendors, employees, and other business partners.



The VALUES at TriTech are :

Safety

Honesty

Ambition

Respect

Perfection



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Quality Policy

QUALITY POLICY ... important statements that demonstrates TriTech's commitment to perfection for its products.

Variation IS the **ENEMY**.

Continuous Data Analysis.

Exceed Customer Expectations.

NEVER STOP LEARNING.



Supplier of the Year

The target at TriTech is to earn your award for the “Supplier of the Year”.

Everyone at TriTech is focused on several key objectives.

- Safety and quality, which lead to efficient production.
- Consistent production of high-quality products.
- **HAPPY CUSTOMERS.**

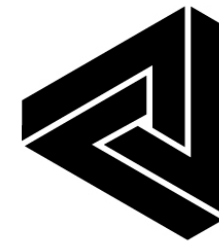
On-time delivery, competitive pricing, and consistent product.

Seeking a partnership with its customers.



THE FUTURE

Always getting BIGGER and BETTER



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