

# Service Bureaus

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Encompassing everything from companies offering quick-turn prototyping to machine shops to injection molding firms, service bureaus play a key role in the manufacturing ecosystem. They produce a wide range of parts, including one-off functional prototypes and low- to mid-volume production runs.



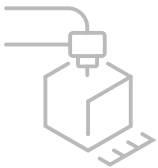


## Challenge

Many customers rely on service bureaus to produce parts they can't make internally because they may not have their equipment, capacity or time. To meet customer's needs often means traditional manufacturing methods which require tooling, complex fixturing or multiple machining setups are often impractical due to long lead times and high cost.

Customers also turn to service bureaus as a way to explore new manufacturing technologies before making large-scale investments. Prior to rolling out new manufacturing methods, companies often look to service bureaus for benchmarking and prototyping, so having access to innovative technology can help them win bids, attract new customers and expand accounts.

In cases where custom tooling is needed, shops must produce those tools as quickly and affordably as possible to meet customers's needs, then store and track those tools if replacement or additional parts might be needed in the future.



## Solution

Additive manufacturing allows service bureaus to extend the benefits of metal 3D printing - such as assembly consolidation, new levels of geometric freedom, and features like overhangs and internal channels - to their customers.

Using binder jetting, service bureaus can eliminate the need for tooling, allowing them to cost-effectively produce low-volume batches of complex parts, simultaneously produce parts with different geometries without the need for multiple setups and produce hundreds of highly-complex, near-net-shape parts every day with dramatically reduced labor costs.

By lowering setup and part costs, metal 3D printing can change the part-cost equation for service bureaus, enabling them to win new business, including small or medium jobs that might previously have been "no bid" due to high mold-tooling or CNC-setup costs. The systems also free up CNC capacity for other, more profitable jobs.

For those jobs where tooling is needed, 3D printing can reduce both the lead time and cost to create it. In addition, materials that are difficult to machine, but offer great benefits for manufacturing tooling, like H13 tool steel and 4140 chromoly steel, can easily be printed and lightly post-processed to reduce machine wear.

And since printing is an additive process, increased tool complexity does not lead to increased cost. The end result is more efficient manufacturing, and reduced warehousing costs as companies store tools as digital files rather than physical objects.

## Service Bureaus Examples

[A]



### [A] Bazigos Cable Gland Inserts

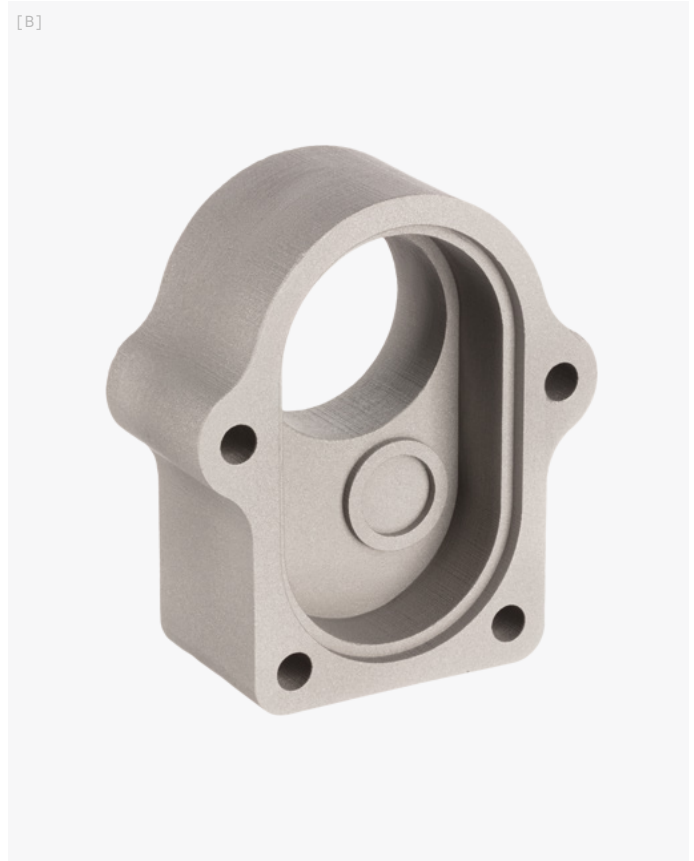
This is an injection mold insert for a cable gland used to secure the end of an electrical cable to a piece of equipment.

For each size of cable, different cable glands - and different mold inserts, each with a slightly different design - are required, meaning a variety of different fixturing is required to manufacture the inserts. By printing the inserts using the Studio System™, fixturing is not required, greatly reducing the part cost and lead time.

This insert was printed in H13 tool steel, which is extremely difficult to machine, leading to slow feed rates and high tool wear. By printing the mold inserts, only critical dimensions need to be machined after sintering. This greatly accelerates manufacturing lead time - machining time was less than one hour per part - and frees up multiple CNC machines in the tool shop.

Using 3D metal printing allowed Bazigos to begin molding these cable glands much faster than they could if they had machined the inserts, getting parts to their customers faster.

[B]



### [B] Bearing Housing

This housing is used to hold pressed-fit bearings in place in a machine. This part needed to be produced quickly out of steel. Using the Shop System™, the required 100 housings were printed in just four days and were ready for assembly in less than a week, requiring almost no operator labor.

Printing this housing on the Shop System™ dramatically reduced manufacturing lead time compared to traditional manufacturing methods, allowing the service bureau customer to meet their deadline.

## Service Bureaus Examples

[C]



### [C] Thread Checker

This fixture pushes a thread checker into a part on a manufacturing line to ensure the threads were molded correctly.

This fixture was originally produced in plastic but had issues with wear because the part is being used constantly. To extend its lifetime, it needed to be reproduced in steel.

Printing the part with the Studio System eliminated any CNC lead time - the design was simply uploaded to the printer, and a finished part was ready for installation in a few days. This reduced the manufacturing lead time for the part while also freeing up the machine shop to work on jobs for paying customers, rather than internal fixturing and tooling needs.

[D]



### [D] Bearing Inner Race

This is the inner race of a custom bearing. The part designer chose to use a service bureau to take advantage of a technology they don't have in house - Binder Jetting, which can create parts with more complex features at no additional cost.

The internal square fixturing features in this part cannot be machined and would require a collapsible core to be metal injection molded, adding significant cost to the tooling. Similarly, the divots in the bearing race would require surfacing with a ball mill, an expensive and time-consuming machining process.

This part is easily printable on the Shop System™, allowing for the production of an optimized design without increasing the part cost. And since no tooling is involved, the design can easily be updated for different sized bearings and printing can start in a few hours, as opposed to waiting days for new tooling.

## Service Bureaus Examples

[C]



### [C] Custom Bolt

This custom-designed bolt was needed when no off-the-shelf fastener solution would work for a very specific application.

Due to the high cost of hard tooling, most bolts are manufactured in quantities of millions. In this case, however, only a few tens of thousands were needed. By printing on the Shop System™, this bolt can be produced with no tooling, and at dramatically reduced per-part cost. In addition, because no tooling is used, the designer can change the length, thread profile, pitch, and other characteristics of this bolt on demand, by simply altering parameters in the CAD file and starting a new print.

[D]



### [D] Connecting Bar

A common machine design component, this connector is used to attach two rotating components. This bar is designed to allow one end to be permanently attached, while the other can be quickly connected and disconnected.

This part was produced on the Shop System™ in low quantities of just a few hundred parts for custom machines. By printing this part, the number of secondary processing steps could be reduced, because the part was fully functional right out of the furnace. This led to cost and lead time savings for this part. This part also incorporates a light weighting feature that improves part performance, but couldn't be justified with traditional manufacturing methods.