Desktop Metal

[30+] Shop System Parts

3D printed part examples and corresponding data from the
Desktop Metal Shop System

This deck is updated regularly. If you have any questions or additions, please contact the Desktop Metal Marketing team. **marketing@desktopmetal.com**

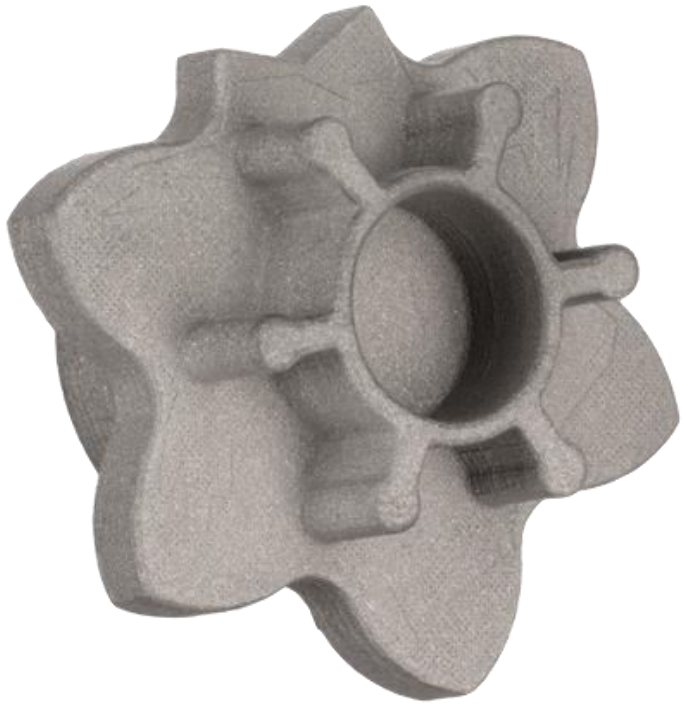
©2023 Desktop Metal, Inc.

Automotive

©2023 Desktop Metal, Inc.

Part Name

VVT Shifter



Brief Description

This VVT shifter is part of a six speed motorcycle transmission.

Why Shop System

This part was previously forged but required an extensive investment in tooling. For different motorcycle transmissions it was beneficial to alter the design of the star shifter slightly to optimize performance.

Material

17-4 PH

Size

35 x 17 x 31 mm

Cost / Part

$11.28

Parts / Build

152

Throughput / Week

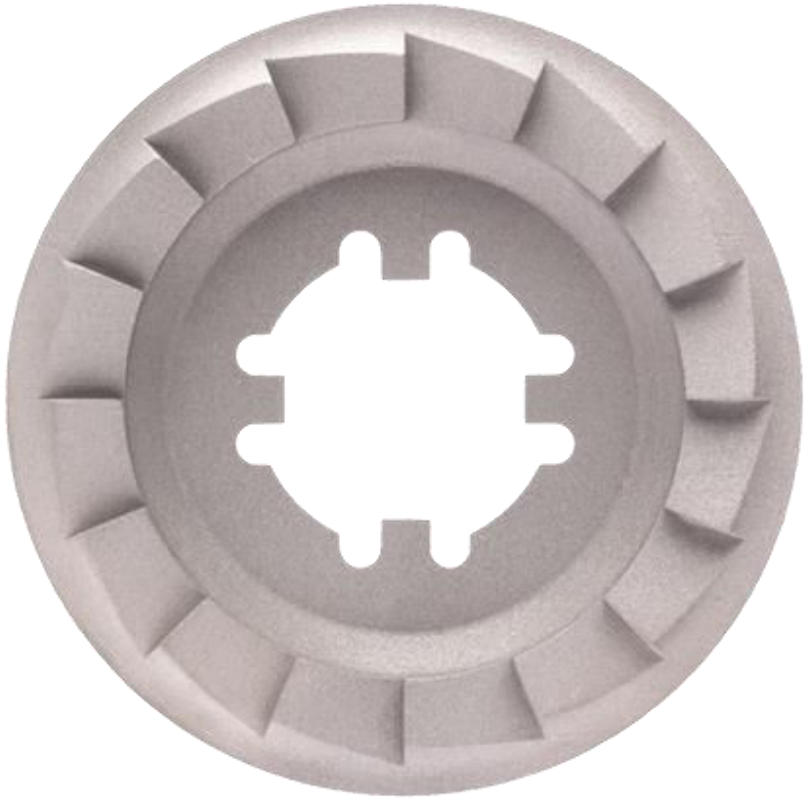
1454

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Clutch Plate



Brief Description

This clutch plate connects an electric motor to the crankshaft to start a motorcycle.

Why Shop System

Machining this clutch plate would require multiple setups and multiple machining operations. By printing the part, only critical dimensions need to be machined, saving machinist labor, CNC machine time and reducing part cost.

Material	Size
17-4 PH	80 x 80 x 15 mm

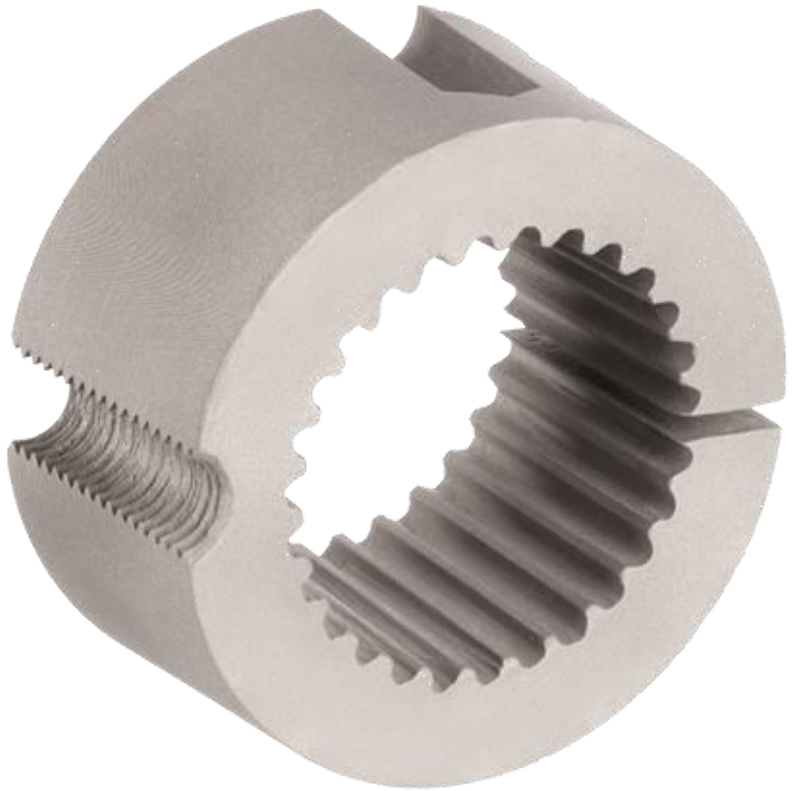
Cost / Part	Parts / Build	Throughput / Week
$58.13	29	221

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Killacycle Taper Lock Coupling



Brief Description

This part is a taper lock coupling designed for a high-end, custom motorcycle.

Why Shop System

The Killacycle is an electrically-powered motorcycle built for drag racing. Using the Shop System, engineers were able to design for function rather than for the manufacturing method, allowing them to use a tapered design that would be difficult to manufacture via traditional methods.

The Shop system allowed for a greatly accelerated manufacturing lead time, allowing the team to rapidly iterate on the part.

Material	Size
17-4 PH	70 x 70 x 32 mm

Cost / Part	Parts / Build	Throughput / Week
$129.85	15	140

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Consumer Products

©2023 Desktop Metal, Inc.

Part Name

Shower Spindle

Brief Description

This spindle is used to connect the hot or cold water handle with a temperature valve.

Why Shop System

To produce this part via traditional manufacturing methods would require the bar stock to first be cut roughly to length, then have the multiple outer diameters turned down on a lathe, broaching of the sprocket teeth, machining of the spline, and finally drilling of the inner diameter.

To produce this part on the Shop system greatly simplifies the manufacturing process, just export your CAD model and a batch of the part is ready for printing in less than an hour. Printing greatly reduces the number of manufacturing steps and has little to no operator burden, simplifying the manufacturing process.

Material	Size
17-4 PH	15 x 15 x 40

Cost / Part	Parts / Build	Throughput / Week
$5.65	397	2,993

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Clipper Blade

Brief Description

This part is a clipper blade used in an electric hair trimmer.

Why Shop System

Manufacturing this clipper blade would traditionally require expensive tooling for production via stamping or metal injection molding. Mass producing on the Shop System eliminates tooling costs and drastically reduces manufacturing lead time.

Furthermore, additive manufacturing enables mass customization - allowing real-time adjustments to the part.

Material	Size
17-4 PH	36 x 35 x 3.5 mm

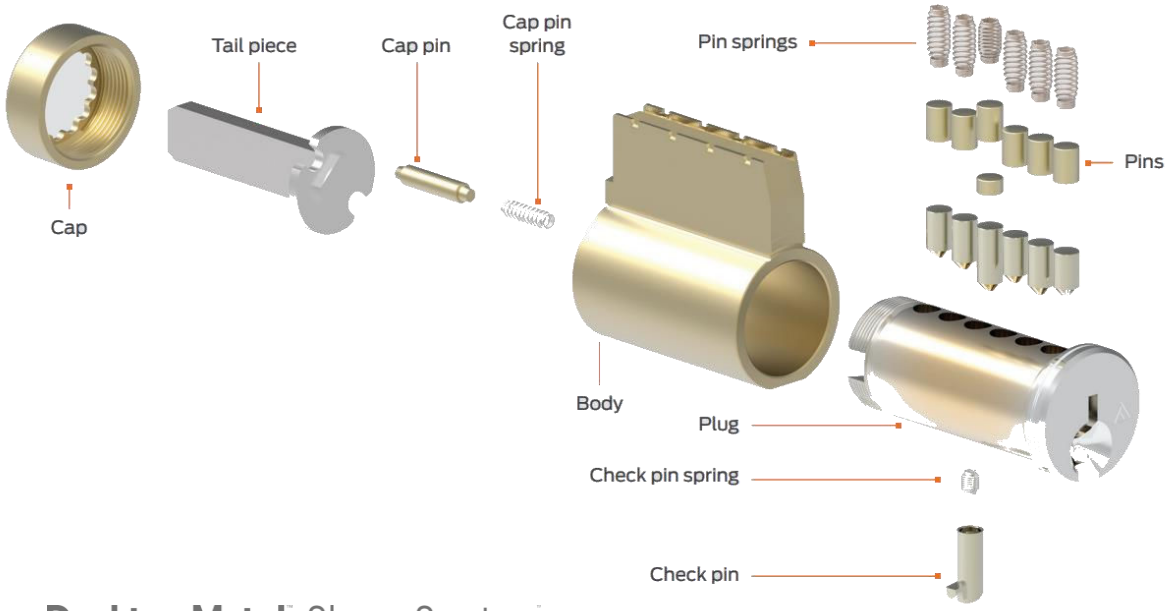
Cost / Part	Parts / Build	Throughput / Week
$4.17	684	5,376

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Lock Plug



Brief Description

This is the lock plug for an industrial door lock.

Why Shop System

This part would be traditional manufactured on a swiss live tool lathe. This complex and expensive machine requires a very experienced highly trained operator to run.

By printing the lock plug on the shop system the entire build of over 500 parts was able to be set up in less than an hour and printed overnight. This greatly simplified the manufacturing process and reduced cost, especially when producing lock plugs in low volume.

Material	Size
17-4 PH	15 x 29 x 15 mm

Cost / Part	Parts / Build	Throughput / Week
$4.71	513	3,954

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Shank

Brief Description

This is a shank for hunting applications.

Why Shop System

This part has many different possible geometry options, all will affect the performance of the end use part.

By printing this part on the Shop System the geometry can be constantly iterated on, rather than having to commit to a design when hard tooling is created for a manufacturing process such as metal injection molding. This helps to minimize risk and leads to a better part design.

Similarly, by using the Shop System the secondary sharpening step on each of the shanks is greatly simplified, leading to a lower part cost and reduced manufacturing lead time.

Material

17-4 PH

Size

28 x 28 x 43 mm

Cost / Part

$12.12

Parts / Build

57

Throughput / Week

747

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Pen Base

Brief Description

This is the bottom tip of a high end writing pen.

Why Shop System

Since this pen was being produced in low volume it was not possible to justifying hard tooling for metal injection molding or die casting.

By printing on the Shop system no tooling was required so the designer could print a few hundred of the pen for this custom/exclusive production run at an affordable price.

Material	Size
17-4 PH	11 x 11 x 37 mm

Cost / Part	Parts / Build	Throughput / Week
$3.28	713	5757

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Heavy Industry

©2023 Desktop Metal, Inc.

Part Name

Connector

Brief Description

This is a fluid connector used in many chemical processing plants.

Why Shop System

This part features complex geometry, including internal channels that would make it impossible to manufacture from one component via traditional manufacturing methods, and would instead require a multi-part assembly.

Printing, however, made it easy to produce this component as a single part, and also resulted in higher performance than the traditionally-manufactured alternative, while simultaneously reducing part cost and manufacturing lead time.

Material	Size
17-4 PH	70 x 53 x 31

Cost / Part	Parts / Build	Throughput / Week
$35.97	26	358

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Rotating Manifold

Brief Description

This manifold is used for generating pressure and rerouting fluids in a hydraulic system.

Why Shop System

By printing this manifold on the Shop system the original assembly of multiple parts was able to be simplified into 1 component that does both the fluid rerouting and the pressure generation.

Since no tooling was required to create this part the designer has the ability to change the vanes to optimize the pressure for different pumping scenarios. Similarly the outlets can be changed and reprinted easily for different hydraulic systems. If this part was fabricated with traditional manufacturing different fixturing and tooling would be required for each different iteration, leading to much higher part cost and manufacturing lead time.

Material	Size
17-4 PH	50 x 50 x 27 mm

Cost / Part	Parts / Build	Throughput / Week
$51.79	29	303

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Fuel Swirler

Brief Description

This swirler is used to push the fuel mix into the burner.

Why Shop System

Swirlers are an essential component of burners; small changes to the geometry can have drastic effects on burner performance, fuel efficiency, power output, etc.

Printing on the Shop System allowed for the part to be produced with no tooling, allowing for the printed geometry to be changed easily to adapt for different burners and fuel mixes. Printing also significantly shortened the manufacturing lead time and lowered the part cost.

Material	Size
17-4 PH	30 x 30 x 10 mm

Cost / Part	Parts / Build	Throughput / Week
$4.82	359	2,896

Costing and throughput for 8L Shop System

Desktop Metal Shop System

©2023 Desktop Metal, Inc.

Part Name

Oil Pump Sprocket

Brief Description

This is a sprocket that is used in a pump specific to pumping viscous oil and gas fluids.

Why Shop System

This part features very complex geometry that would be very difficult to machine or would require a large tooling investment in both time and capital to be produced via metal injection molding (MIM).

The Shop system allows this sprocket to be produced on demand without any investment in tooling, this significantly reduced part cost and manufacturing lead time. Since printing requires no tooling, the sprocket design can be easily changed to accommodate other fluids.

Material	Size
17-4 PH	28 x 10 x 28

Cost / Part	Parts / Build	Throughput / Week
$4.74	323	3,357

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Bulb Nozzle

Brief Description

This part is a custom nozzle for use in chemical processing.

Why Shop System

Traditional manufacturing of this part would require casting followed by extensive secondary machining on a 5 axis CNC. Because only a few hundred of this nozzle needed to be manufactured, it was a great fit for the Shop System.

By printing, the entire order of nozzles could be produced on the Shop System in less than a week with only one secondary thread-tapping operation required.

Material	Size
17-4 PH	33 x 38 x 45 mm

Cost / Part	Parts / Build	Throughput / Week
$33.84	30	376

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Down Hole Tool Slip

Brief Description

This part provides a frictional hold between a packer and a pre-existing pipe during oil extraction.

Why Shop System

This part is a consumable and is lost after pumping is complete, so keeping the price and lead time low are essential. The Shop System allows this part to be manufactured with an accelerated lead time and at lower cost than traditional manufacturing. The Shop system also allows the part design to be changed extremity easily for different pumping scenarios. Just modify the CAD file and send it to print.

Material	Size
17-4 PH	57 x 23 x 82 mm

Cost / Part	Parts / Build	Throughput / Week
$87.75	26	218

Costing and throughput for 8L Shop System

©2023 Desktop Metal, Inc.

Part Name

Cetim Impeller

Brief Description

This is an impeller used in a water pump

Why Shop System

To be made via traditional manufacturing methods the part would have to be made out of multiple components and welded together, or with a very complex metal injection molding mold that features 6 radial sliders, this would be extremely expensive.

By printing on the Shop System manufacturing was greatly simplified and the part cost was reduced. Since no tooling was needed to print the part the impeller can be changed for different printing scenarios and another 500 parts can be printed overnight.

Material

17-4 PH

Size

25 x 25 x 10 mm

Cost / Part

$3.40

Parts / Build

512

Throughput / Week

4,129

Costing and throughput for 8L Shop System

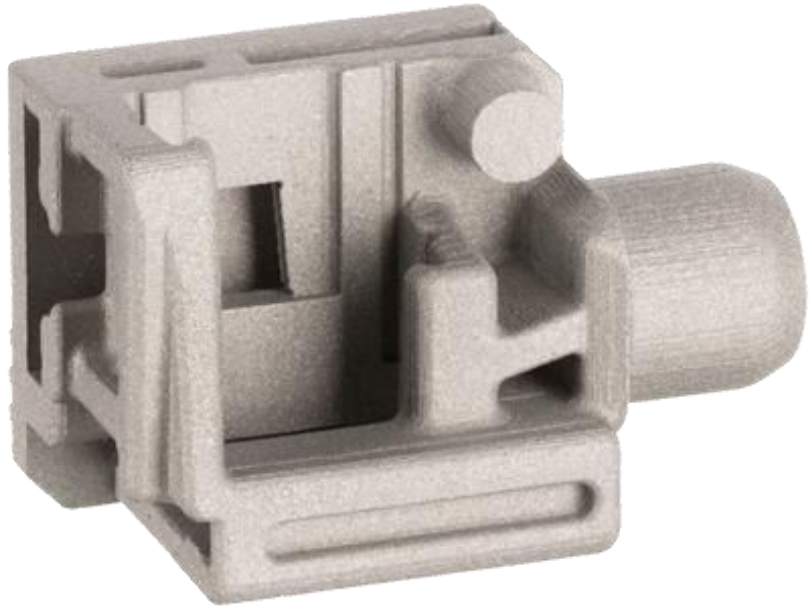
©2023 Desktop Metal, Inc.

Machine Design

©2023 Desktop Metal, Inc.

Part Name

Sensor Holder



Brief Description

This part is used to hold multiple sensors while measurements are taken in a running machine.

Why Shop System

The intricate geometry of this sensor holder make the part an ideal candidate for the Shop system. The part was printed with an extreme reduction in both manufacturing lead time and part cost.

Printing on the Shop System also allows for manufacturing flexibility - when the design needs to be modified to incorporate different sensors, engineers can simply send a revised file to the printer.

Material	Size
17-4 PH	37 x 23 x 18 mm

Cost / Part	Parts / Build	Throughput / Week
$11.59	186	1,511

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Bearing Housing

Brief Description

This housing is used to hold pressed-fit bearings in place in a machine.

Why Shop System

This part needed to be produced quickly out of steel. Using the Shop System, the required parts were printed in just 4 days and were ready for assembly in less than a week, requiring almost no operator labor.

Printing on the Shop System also dramatically reduced manufacturing lead time compared to traditional manufacturing methods.

Material	Size
17-4 PH	73 x 65 x 30 mm

Cost / Part	Parts / Build	Throughput / Week
$88.96	23	209

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Hot Air Nozzle

Brief Description

This nozzle is used to direct a steady flow of hot air in a manufacturing environment.

Why Shop System

This part features complex internal geometry to correctly direct the flow of the hot air. The part also features small mounting features that would be costly and difficult to machine. The Shop System is easily able to print these features.

It is beneficial for different variations of nozzle to be used depending on the air flow specification for each product being manufactured. Since the Shop System requires no tooling the manufacturer is able to print hundreds of different iterations that are perfect for each part being manufactured without affecting the per part cost

Material	Size
17-4 PH	16 x 12 x 22 mm

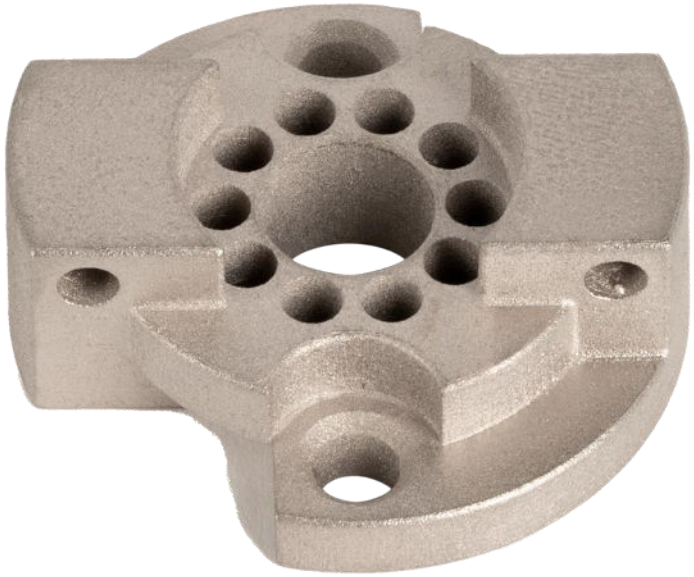
Cost / Part	Parts / Build	Throughput / Week
$2.06	718	6,449

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Adapter



Brief Description

This adapter is used to hold a gyro sensor in place in a rotating machine component.

Why Shop System

To manufacture this part via traditional machining would require extensive machining as well as multiple different fixturing set up and orientations to machine the features across the multiple planes.

The designer only needed to produce these adapters in low quantity (≈1000 pieces) making the Shop System a perfect fit, all of the parts could be produced in about a week. The low volume that this part is produced in makes it infeasible to justify the capital for permanent machining fixtures or molds for metal injection molding.

Material

17-4 PH

Size

40 x 40 x 15 mm

Cost / Part

$14.66

Parts / Build

133

Throughput / Week

1,031

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Differential Bearing Housing

Brief Description

This is the inner race for a small differential bearing

Why Shop System

Due to the many fine features across multiple planes, this part would require a number of different fixturing setups to be machined properly, taking up CNC time and capacity.

To produce this part on the Shop system required no tooling, allowing it to be printed on demand the same day that the design was completed. This greatly reduces the manufacturing lead time and part cost.

Material	Size
17-4 PH	25 x 25 x 8

Cost / Part	Parts / Build	Throughput / Week
$2.54	685	5,293

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Custom Bolt

Brief Description

This custom-designed bolt is used in specific applications.

Why Shop System

Due to the high cost of hard tooling, most bolts are manufactured in quantities of millions. For this bolt, however, only a few tens of thousands were needed. By printing on the Shop System this bolt can be produced with no tooling at an dramatically reduced cost per part.

Material	Size
17-4 PH	60 x 14 x 10 mm

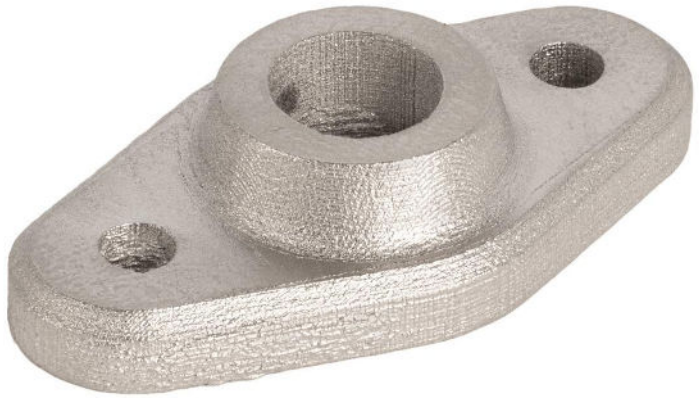
Cost / Part	Parts / Build	Throughput / Week
$5.76	319	2,499

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Small Flange



Brief Description

This is a small mounting flange.

Why Shop System

This part needed to be produced quickly and out of steel. The Shop system allowed for hundreds of these parts to be printed in just 1 day, allowing for the entire order to be filled. This drastically cut down on the cost and lead time to produce these small flanges.

Material	Size
17-4 PH	37 x 20 x 8 mm

Cost / Part	Parts / Build	Throughput / Week
$4.12	479	3698

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Stop Ring

Brief Description

This is a precision stop for a manufacturing machine running on a continuous manufacturing line.

Why Shop System

This part features many complex features across a variety of different planes as well as hard to reach features inside of the part. These features make the part very difficult to machine, but conducive to additive manufacturing.

By printing this part on the Shop system the manufacturing process was greatly simplified leading to a more optimized geometry while still reducing part cost and lead time.

Material	Size
17-4 PH	40 x 36 x 36 mm

Cost / Part	Parts / Build	Throughput / Week
$30.18	53	444

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Live Parts Tri Bracket

Brief Description

This bracket is used for holding a sensor in place and leverages generative design to reduce the part weight and material usage.

Why Shop System

This bracket needed to be produced in low volume, only 100 needed, so the Shop System was an excellent manufacturing fit since no tooling was required and printing could start as soon as the design was complete. Greatly reducing manufacturing lead time and part cost. Since the part was going to be able to be printed, generative design was able to be utilized. For this part the software Live Parts.

While generative design produces optimized geometries for the parts specific loading scenarios it generally produces a part that is very difficult if not impossible to manufacture. Luckily these organic complex features are easy to print, making it possible to produce generative design parts in high volume on the Shop System.

Material	Size
17-4 PH	68 x 43 x 33 mm

Cost / Part	Parts / Build	Throughput / Week
$36.51	30	271

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Spindle Catch

Brief Description

This spindle catch is used in an industrial external lock.

Why Shop System

This part needed to be made out of metal to ensure that it had adequate strength for the locking components. Prior to investing in tooling for this part to be Metal Injection Molded, many prototype locks were fabricated and rigorously tested.

By printing this part on the Shop System the prototype locks could be created quickly and affordably all without tooling. This greatly offsets the risk involved with making the part, because the design can be easily (and affordably) changed if need since no tooling is used.

Material

17-4 PH

Size

49 x 17 x 31 mm

Cost / Part

$16.10

Parts / Build

114

Throughput / Week

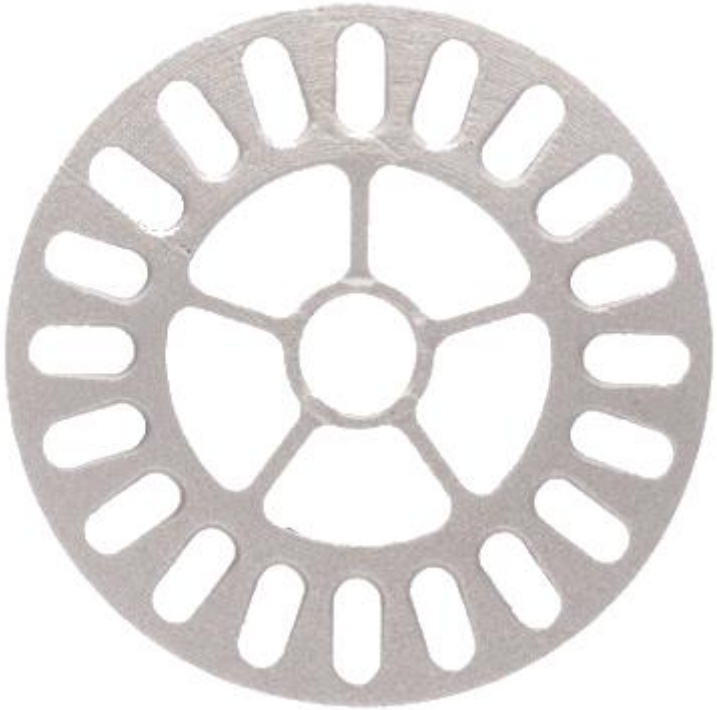
1,093

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Support Plate



Brief Description

This support plate is used to create lightweight yet strong spacing in a running machine.

Why Shop System

When the designer realized they were not going to be able to use an off the shelf spacing option they looked to utilize the Shop system for its speed and low part cost. Since weight is a factor in the design, by printing the support plate most of the weight can be removed from the part while leveraging the strength of steel.

With the Shop System adding lightweighting features, like the cutouts features in this part, actually lead to lower cost parts since parts are built additively and end up saving material (cost).

Material	Size
17-4 PH	35 x 35 x 4 mm

Cost / Part	Parts / Build	Throughput / Week
$3.31	570	4,493

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Bearing Inner Race

Brief Description

This is the inner race of a bearing

Why Shop System

This is the inner race of a custom bearing. The internal square fixturing features are not possible to machine and would require a collapsible core to be metal injection molded, adding significant cost to the tooling. 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 an optimized design to be produced, that is more complex and has additional features that don't add to the part cost.
Since no tooling is involved, whenever a different size bearing is needed the design can be easily changed, and printing can start within a few hours, rather than having to wait days for new tooling.

Material	Size
17-4 PH	55 x 55 x 30 mm

Cost / Part	Parts / Build	Throughput / Week
$38.59	29	448

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Swivel Base

Brief Description

This is a rotating machine component.

Why Shop System

This part features many natural curves that would require extensive machining time as well as advanced CNC programming knowledge. It also features many features that are locating in difficult to reach locations, where a machine tool would not be able to access.

Since the Shop system builds up parts layer by layer these natural curves and internal features are easy to manufacture, as they are just printed right into the part.

Material	Size
17-4 PH	25 x 25 x 19 mm

Cost / Part	Parts / Build	Throughput / Week
$6.19	293	2,226

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Lever Drive

Brief Description

This lever drive is used to linearly adjust the location of components in a machine.

Why Shop System

This lever drive needed to be produced in low volume (≈ 1,000) for a low volume machine run. This part features many precise grooves that are important for locating the correct position of components.

Since the volume was low, justifying hard tooling for metal injection molding, or casting was not economically feasible. By printing the entire run of parts was able to be printed in less than a week with no post processing needed.

Material	Size
17-4 PH	117 x 8 x 8 mm

Cost / Part	Parts / Build	Throughput / Week
$5.67	342	2,642

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Connecting Bar

Brief Description

A common machine design component, this connector is used to attach 2 rotating components with one end being permanently attached and the other able to be quickly connected and disconnected.

Why Shop System

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

Material	Size
17-4 PH	79 x 16 x 29 mm

Cost / Part	Parts / Build	Throughput / Week
$22.41	57	581

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Full Wobbler

Brief Description

This is an essential component of the rise ventilator use to turn the rotation of an electric motor into up and down actuator to squeeze the ventilator bag. This is the first iteration.

Why Shop System

When the Covid - 19 pandemic began the world was faced with a large problem, a shortage of ventilators. A team of engineers quickly began to develop an open source low cost ventilator to help solve this problem.

The team needed parts quickly, while keeping the ability to iterate on those parts rapidly. The shop system allowed the team to print hundreds of multiple iterations in just a few weeks during the design process. The team completed their ventilator design and have since open sourced it for anyone around the world to manufacture.

Material

17-4 PH

Size

44 x 46 x 55 mm

Cost / Part

$72.45

Parts / Build

17

Throughput / Week

182

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Top Wobbler

Brief Description

This is an essential component of the rise ventilator use to turn the rotation of an electric motor into up and down actuator to squeeze the ventilator bag. This is the final iteration.

Why Shop System

When the Covid - 19 pandemic began the world was faced with a large problem, a shortage of ventilators. A team of engineers quickly began to develop an open source low cost ventilator to help solve this problem.

The team needed parts quickly, while keeping the ability to iterate on those parts rapidly. The shop system allowed the team to print hundreds of multiple iterations in just a few weeks during the design process. The team completed their ventilator design and have since open sourced it for anyone around the world to manufacture.

Material	Size
17-4 PH	48 x 46 x 41 mm

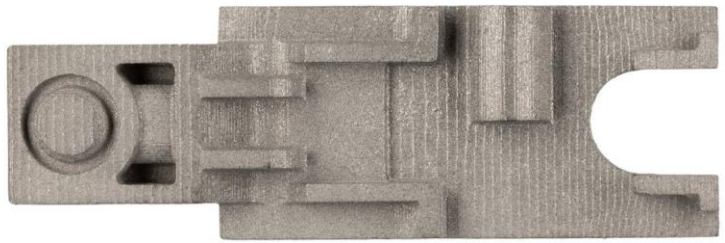
Cost / Part	Parts / Build	Throughput / Week
$47.50	17	235

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.

Part Name

Medical Device Closure/Latch



Brief Description

This assembly is used to latch and hold other components in place in a medical device assembly

Why Shop System

These parts require geometry that is very small and precise, this would require extensive machining an or these fine thin features that would be challenging. To produce these parts via metal injection molding would require a large investment in tooling, since the parts do not need to be produced in very large volume, only about 10,000 needed the, the tooling couldn't be justified.

The Shop System allowed the parts to be produced quickly and affordably, without any tooling costs.

Material	Size
17-4 PH	59 x 26 x 10 mm 37 x 12 x 9 mm

Cost / Part	Parts / Build	Throughput / Week
$6.33 $1.99	160 745	1,287 5,809

Costing and throughput for 8L Shop System

©2020 Desktop Metal, Inc.