

# Shop System™

## Unparalleled productivity

The Shop System™ is designed to effortlessly amplify your shop's output. Dramatically increase your capacity without additional headcount or labor hours.

## Superior print quality

Produce fully dense, customer-ready parts with superior surface finish and resolution than laser-based systems.

## Easy to use & operate

Designed with the modern machine shop in mind. Achieve superior parts than laser-based systems at a fraction of the cost.



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## Shop System™

Shop System™ introduces high quality binder jetting to an entirely new market of machine shops. Shops can now cost effectively print small end-use metal parts with unparalleled speed and productivity.

### Print

During each layer, the printer spreads metal powder across the build bed, and precisely jets a binding agent to bond loose powder and define part geometry. Layer by layer, metal powder and binder is deposited until the entire build volume is packed with bound parts and surrounding loose powder.

### Depowder

Once an entire build is complete, the build box is removed and placed in a powder station for bulk and fine depowdering—with the help of a hand-held air pick. All loose powders are removed from the parts and recovered via a built-in powder recycling system with powder sieving.

### Sinter

Depowdered parts are placed onto trays in a shop-safe, high-throughput furnace for batch sintering. With an external gas hookup, temperatures reaching 1400 °C, and the ability to process high-strength binders, the Shop System™ furnace is able to deliver quality and reliable sintering in a shop-friendly format.

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## Materials Approach

The system is compatible with powders from traditional powder metallurgy processes including stainless steels, tool steels, and super alloys. Get started quickly with a turnkey, end-to-end solution. Shop System features Desktop Metal® engineered powders and processing parameters, optimized to deliver exceptional part quality, and ensure part-to-part repeatability.

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## About Desktop Metal®

Desktop Metal® is accelerating the transformation of manufacturing with end-to-end 3D printing solutions. Founded in 2015 by leaders in advanced manufacturing, metallurgy, and robotics, the company is addressing the unmet challenges of speed, cost, and quality to make 3D printing an essential tool for engineers, designers, and manufacturers around the world.

### \_Highlights

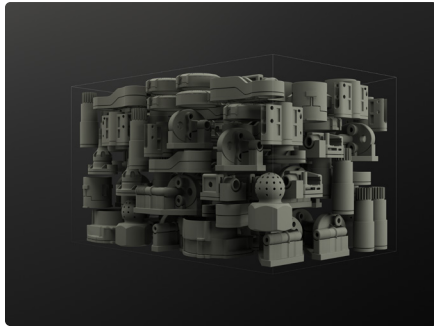
- Over \$438M in funding
- 200+ engineers, 25 Ph.D.s
- 4 MIT professors (co-founders)
- 100+ patents in process covering 200+ inventions
- Adopted by industrial companies
- 90+ resellers in 65 countries

### \_Customers

- Google
- Ford
- MIT
- BMW
- Renault
- Nissan
- Bosch
- Toyota
- EATON
- Goodyear
- Protolabs
- INDO-MIM
- Applied Materials
- Continental
- TerraPower
- Owens Corning
- Medtronic
- Univ. of Texas at Austin
- Texas A&M Univ.
- Wentworth
- Politecnico Di Milano
- The Univ. of Sheffield
- Wilson Tool
- Milwaukee Tool
- Alpha Precision Group
- L3
- TECT Aerospace
- MITRE
- 3M
- Stanley Black & Decker
- Adidas
- Jade Group
- Christian Tse
- WEIR Group
- John Zink Hamworthy
- US Army
- US Navy
- US DoD
- Oak Ridge National Laboratory
- Knight Global
- The Hebrew Univ. of Jerusalem
- Lockheed Martin
- etc.

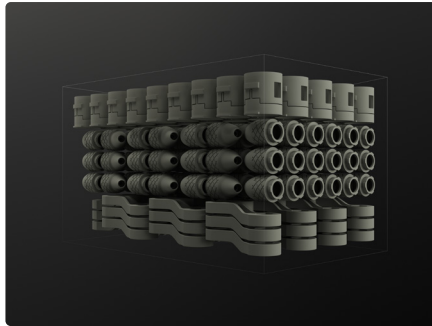
## Use Cases

Dramatically increase your shop's throughput with the flexibility and speed of the Shop System™. Print hundreds of parts per shift and modify your designs at the press of a button. Utilize the entire build box for a single geometry, or nest various part designs, all within a single print setup.



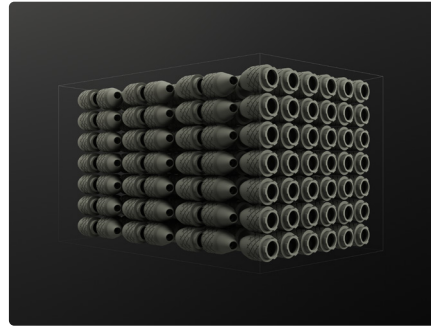
### 01 Mixed-volume production of single units

Produce various part geometries simultaneously without the need for multiple machining setups.



### 02 Batch production of 10s of units/day

Cost effectively produce low volume batches of complex parts due to elimination of tooling and individual machining setups.



### 03 Mid-volume production of 100s of parts/day

Produce hundreds of near-net shape parts every day with dramatically reduced labor costs and expanded geometric flexibility.

## Configurations

The Shop System™ printer comes in four models to enable you to tailor the solution for your needs.

# 4L

[Build Envelope Size]  
350 x 222 x 50 mm  
(13.8 x 8.7 x 2.0 in)

# 8L

[Build Envelope Size]  
350 x 222 x 100 mm  
(13.8 x 8.7 x 3.9 in)

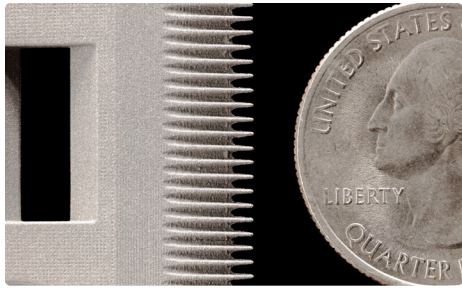
# 12L

[Build Envelope Size]  
350 x 222 x 150 mm  
(13.8 x 8.7 x 5.9 in)

# 16L

[Build Envelope Size]  
350 x 222 x 200 mm  
(13.8 x 8.7 x 7.9 in)

## Features



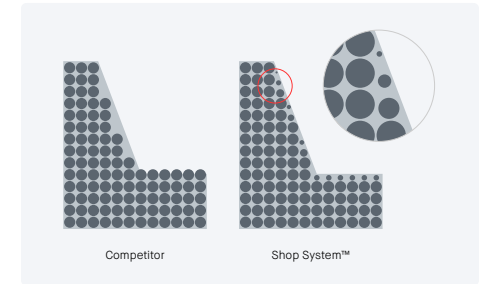
### 01 High resolution printhead

The Shop System™ features the highest resolution single pass printhead in the market. With 1600x1600 dpi native (33% higher than the nearest competitor), and over 670M drops per second, the Shop System™ delivers high-speed, high-resolution printing.



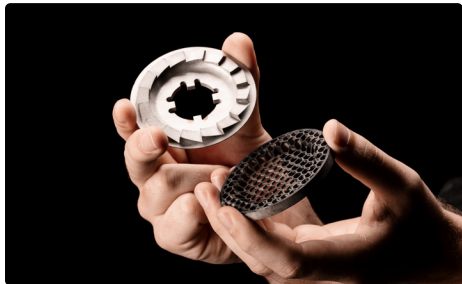
### 02 Unparalleled productivity

With a high-speed, single-pass print engine, Shop System™ produces high-quality metal parts 10x faster than laser powder bed fusion. Boasting speeds up to 700 cc/hr, the system is capable of producing up to 70 kg of metal parts per day—allowing you to print tens to hundreds of near-net shape parts each day.



### 04 Adaptive print engine

Users don't have to sacrifice feature detail or resolution for speed. Employing the smallest droplet size on the market (1.2 pL) and automated drop multiplexing up to 6 pL, the Shop System™ achieves superior surface finish, bleed control and rich feature detail at high speed.



### 05 Simplified post-processing

Parts on the Shop System™ print fully supported in their powder bed, and feature hand-removable sintering setters. Avoid hours of labor machining off support structures typical to laser-based systems and instead achieve customer-ready parts right out of the furnace.



### 06 End-to-end solution

The Shop System™ contains all pieces of equipment your machine shop needs to begin binder jetting—from print through sintering. With upgradable variable build volume configurations (4L, 8L, 12L, and 16L), the Shop System™ is designed to scale to your shop's throughput.



\_Impact to Your Business

## Increase Revenue

### 01 Make small/medium jobs economical

By reducing the need for high mold tooling and CNC setup costs, the Shop System™ makes it possible to bring in new business that would previously have been “no bid.”

### 02 Free up CNC capacity for new jobs

The ability to print customer-ready, near-net shape parts with the Shop System™ frees CNC capacity to take on more profitable jobs.

### 03 Produce previously unattainable geometries

With the highest resolution and smallest droplet size on the market, the Shop System™ can achieve assembly consolidation and design optimization beyond what’s possible with CNC.

### 04 Win new business

Lower setup and part costs with the Shop System™ translates to improvements in the part-cost equation, enabling you to win more bids.

### 05 Print hard to machine metals

The Shop System™ makes it possible to print with many materials that are incompatible with Laser Powder Bed Fusion (LPBF), including refractory metals like Inconel and tool steels such as H13.



\_Impact to Your Business

## Reduce Costs

### 01 Eliminate tooling costs

A tooling-free manufacturing process, the Shop System™ prints parts without the need for molds or workholding fixtures. Change jobs at the press of a button, and process multiple complex jobs without the need for custom setups.

### 02 Reduce tool wear

Print and sinter parts to near-net shape with the Shop System™, avoiding the need for additional machining and reducing tool wear.

### 03 Reduce job setup costs

The Shop System™ can dramatically reduce your setup time. Regardless of complexity, entire builds can be set up in 1-2 hours, compared to hours/geometry for CNC.

### 04 Reduce manufacturing steps/part

Hand-removable sintering setters and the ability to print to near-net shape in a single step enable the Shop System™ to dramatically reduce the number of manufacturing steps per part.

### 05 Reduce labor cost/part

Produce tens to hundreds of customer-ready parts right out of the Shop System™’s furnace, allowing machinist hours to be reserved for refining critical features.

## Shop System™ Specification

### [Printer]

Print technology	Binder Jetting
Print direction	Uni-directional
Maximum throughput	800 cc/hr
Layer thickness	50 – 100 µm
Native printhead resolution	1600 dpi (1 pL drop size)
Printhead configuration	Single, easy to replace, page-wide printhead
Dimensional tolerance of parts	± 3.0%
<b>External dimensions</b>	
Printer	1630 x 1990 x 760 mm (64.2 x 78.3 x 29.9 in)
Powder station	1600 x 1200 x 700 mm (63.0 x 47.2 x 27.6 in)
Drying oven	1100 x 910 x 740 mm (43.3 x 35.8 x 29.1 in)
Powder blender	800 x 800 x 400 mm (31.0 x 31.0 x 16.0 in)
Powder kegs	Height : 280 mm Diameter : 250 mm Maximum Volume : 10 L Typical Volume: 5 L
Furnace	1618 x 1380 x 754 mm (63.7 x 54.3 x 29.7 in)
<b>Build envelope options</b>	
4L	350 x 222 x 50 mm (13.8 x 8.7 x 2.0 in)
8L	350 x 222 x 100 mm (13.8 x 8.7 x 3.9 in)
12L	350 x 222 x 150 mm (13.8 x 8.7 x 5.9 in)
16L	350 x 222 x 200 mm (13.8 x 8.7 x 7.9 in)
Binder jetting module	70,000 Nozzles (5x Redundancy)
Power requirements: Printer	100-120V, 12.5A. 220-240V, 5.6A. 50/60 Hz, 1.03 kW
Power requirements: Drying Oven	230 VAC, 50/60 Hz, 17.5 A, 2.97 kW
Power requirements: Furnace	208 VAC, 60 Hz, 30 A, 3-phase dedicated circuit