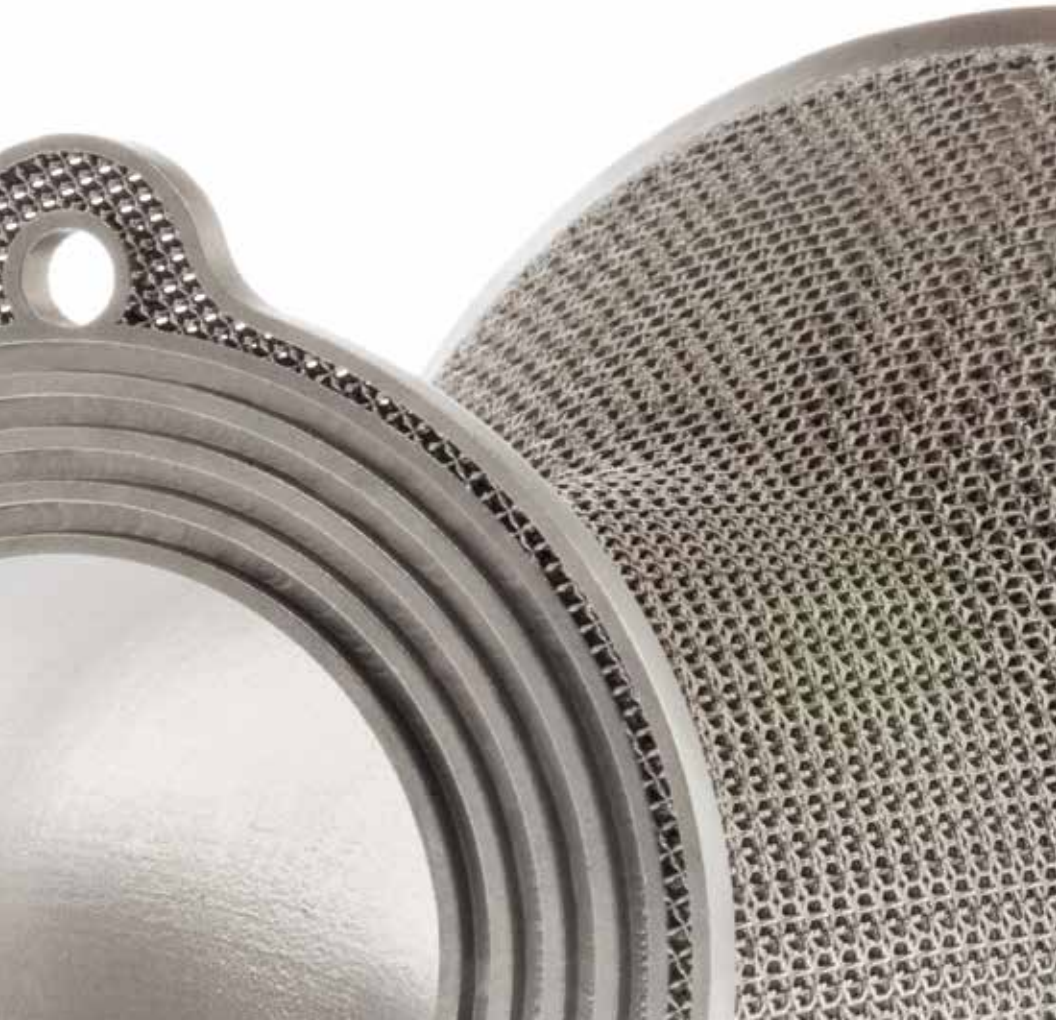




# DIRECT METAL PRINTERS

Metal Additive Manufacturing with the ProX™ DMP Series



# Go Further with Direct Metal Printing

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## UNLOCK YOUR PRODUCT'S POTENTIAL

With complete design freedom, direct metal 3D printed parts can be stronger, lighter, longer lasting and higher performing than machined or cast assemblies. Manufacture superior performing products, faster and at a lower cost than with traditional fabrication methods.

## ACCELERATE TIME-TO-MARKET

Conduct R&D, prototyping and production all in the same system. DMP users around the world are designing faster and compressing production times. Transform complex assemblies that take hundreds or even thousands of hours to machine and assemble into a single high value part printed in hours or days.

## STREAMLINE SUPPLY CHAINS

With DMP, you have complete control over your production, without relying on specialty components from suppliers. Print entire assemblies on-demand, with fewer components, as needed.

## INCREASE MANUFACTURING AGILITY

Additive manufacturing requires no tooling, reducing overhead and increasing economies of scale. You are able to update designs and change your production mix to meet changing market demands.

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## DMP APPLICATIONS INCLUDE:



### CONFORMAL COOLING

Direct integration of conformal cooling channels into this blow mold for 30% efficiency increase.



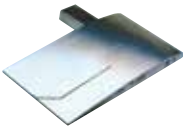
### SIMPLIFIED ASSEMBLIES

Replacing a complex assembly, this single burner component contains nine under-cuttings and six internal cavities.



### LIGHT WEIGHTING

Complex and thin-walled structures allow significant weight reduction for these jet engine fuel nozzles.



### ENHANCED FLUID FLOW

For this turbine inlet guide vane, computed fluid dynamics simulation predicts a 70% reduction in shock intensity.



### TOPOLOGY OPTIMIZATION

Topology optimized aerospace bracket reduces weight by 35%.



### MASS CUSTOMIZATION

Designed to perfectly fit the obstructed zone, the reconstruction corrects the patient's facial asymmetry.

# ProX™ DMP 100, 200 & 300

## Automated production, exceptional quality

The ProX DMP 100, 200, and 300 share a common architecture to print exceptionally detailed, high quality parts in an automated and repeatable process that is ideal for R&D and serial part manufacturing at the tightest tolerances in direct metal printing.



Dental frames



Tire mold sipes



Aerospace airfoils

### INDUSTRY'S BEST SURFACE FINISH

Reduced machining or polishing to get final parts.

### EXCEPTIONAL MECHANICAL PROPERTIES

Roller compaction yields higher density and uniform mechanicals.

### UNMATCHED PRECISION

Print the finest features with exceptional accuracy.

### CLEAN & SAFE FOR MORE ENVIRONMENTS

Sealed powder loading and recycling prevents material contamination and increases operator safety.

### COMPACT, COMPLETE SYSTEM

Requires less floor space and ancillary equipment.

### PRINT IN MORE ALLOYS

Use standard alloys or run your own with the industry's most customizable parameters.



ProX™ DMP 300

ProX™ DMP 200

### TECHNOLOGY LEADERSHIP

3D Systems' patented roller system spreads the powder and compacts each layer, enabling better heat transfer in the metal powder, steeper unsupported angles, more uniform and thinner layers (as thin as 5 microns).

# ProX™ DMP 320

## High precision, high throughput

The ProX DMP 320, developed from the outcome of nearly half-a-million prints, offers fast build turnaround times in demanding 24/7 production environments.

### PRODUCTION READY

Designed for productivity with quick-swap build modules and fast powder recycling.

### STRONGER MECHANICAL PROPERTIES

The lowest O<sub>2</sub> during builds (25 ppm) for exceptionally strong parts of high chemical purity.

### LOW OPERATING COSTS

Efficient consumables management and shared ancillary equipment lower the total cost of ownership.

### EXTENSIVELY TESTED MATERIALS

Thousands of hours of parameter optimization ensure predictable and repeatable print quality.

### APPLICATIONS VERSATILITY

The ProX DMP 320's robust, streamlined print process means you can print virtually any geometry and avoid trial-and-error steps.

Increased functionality spinal implant

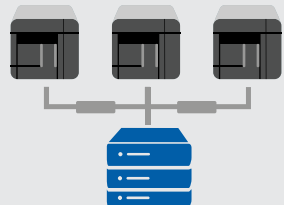


Monolithic complex extrusion with mixing channels



## YOUR SCALABLE DMP FACTORY NETWORK

The ProX DMP 320 is easily scalable for high volume part production. A central server manages print jobs, materials, settings and maintenance for 24/7 productivity. Shared resources, including cooling and powder recycling systems, increases efficiency.



Centralized Process Management

# Metal Alloys for the ProX DMP Series

Achieve the best part quality and mechanical properties with 3D Systems' ready-to-run materials\* with extensively developed print parameters.

ProX DMP 100, 200 and 300 printers feature the most flexible build parameter control settings in the industry. These open systems offer you the option to develop parameters and run any material in addition to 3D Systems' ready-to-run alloys.

The ProX DMP 320 offers exchangeable manufacturing modules that support rapid material change or replenishment, in line with the printer configuration selected.



Lightweight aerospace component in Aluminum Alloy (AlSi12)



Gas burner with integrated cooling channels in LaserForm™ Ni718



High corrosion resistant impeller in LaserForm™ Stainless 316L



Optimized racing car oil pump pulley in Stainless Steel 17-4PH



Partials, copings and bridges production in Cobalt Chrome (CoCr)



Blow mold with conforming holes in Maraging Steel

Hip implant in LaserForm™ Ti Gr. 23



\* Availability varies by printer model (see details on the last page).

3D Systems' Direct Metal Printing process builds up fully dense, chemically pure complex metal parts from 3D CAD data by melting fine powder with a laser beam, layer by layer, providing industry leading part quality, fine details, precision and repeatability.

ProX Direct Metal production 3D printers are the proven industry standard. You benefit from the experience of our truly global product support team, offering dedicated service and application engineers, to meet your rigorous quality requirements at facilities around the world.

**ProX DMP 100      ProX DMP 200      ProX DMP 300      ProX DMP 320**

<b>Build Envelope Capacity</b> (W x D x H)	3.94 x 3.94 x 3.94 in (100 x 100 x 100 mm) <sup>1</sup>	5.51 x 5.51 x 4.92 in (140 x 140 x 125 mm) <sup>1</sup>	9.84 x 9.84 x 12.99 in (250 x 250 x 330 mm) <sup>1</sup>	10.82 x 10.82 x 16.53 in (275 x 275 x 420 mm) <sup>1</sup>
<b>Metal alloys choice with developed print parameters:</b>	Cobalt-Chrome CoCr Stainless Steel 17-4PH	Cobalt-Chrome CoCr Stainless Steel 17-4PH Maraging Steel Aluminum Alloy AlSi12	Cobalt-Chrome CoCr Stainless Steel 17-4PH Maraging Steel Aluminum Alloy AlSi12	LaserForm™ Ti Gr. 1 <sup>2</sup> LaserForm™ Ti Gr. 5 <sup>2</sup> LaserForm™ Ti Gr. 23 <sup>2</sup> LaserForm™ Ni718 <sup>3</sup> LaserForm™ Stainless 316L <sup>3</sup>
<b>Layer thickness</b>	Adjustable, min 5 µm - max 100 µm Preset: 30, 40 and 50 µm			Adjustable Preset: 30 and 60 µm
<b>Repeatability</b>	x=20 µm, y=20 µm, z=20 µm			
<b>Min. feature size</b>	x=100 µm, y=100 µm, z=20 µm			100 µm
<b>Min. wall thickness</b>	150 µm	150 µm	150 µm	150 µm
<b>Typical accuracy</b>	± 0.1-0.2% with ± 50 µm minimum	± 0.1-0.2% with ± 50 µm minimum	± 0.1-0.2% with ± 50 µm minimum	± 0.1-0.2% with ± 50 µm minimum
<b>Material loading</b>	Manual	Semiautomatic	Automatic	Manual
<b>Recycling system</b>	Optional external system	Optional external system	Automatic	Optional external system
<b>Interchangeable build modules</b>	No	No	No	Yes

<sup>1</sup>Including build plate

<sup>2</sup>Set up A

<sup>3</sup>Set up B

Complete specifications available at [www.3dsystems.com](http://www.3dsystems.com)



**DMP for in-space communication satellite engines – European Space Agency**

Injector: simplified assembly from 5 to 1 part, optimized propellant flow

Combustion chamber: significant weight saving with a 12% volumetric density mesh

Expansion nozzle: reduced stress, minimizing the overhung mass

Warranty/Disclaimer: The performance characteristics of these products may vary according to product application, operating conditions, material combined with, or with end use. 3D Systems makes no warranties of any type, express or implied, including, but not limited to, the warranties of merchantability or fitness for a particular use.

**MANUFACTURING THE FUTURE™**



**3D Systems Corporation**  
333 Three D Systems Circle  
Rock Hill, SC 29730  
[www.3dsystems.com](http://www.3dsystems.com)

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