



DESKTOP METAL PRODUCTION SYSTEM

Technology Fact Sheet

Metal 3D printing for mass production

Created by the inventors of binder jetting and single-pass inkjet technologies, the Production System™ delivers the speed, quality and cost-per-part needed to compete with traditional manufacturing methods. It's the fastest way to print metal parts at scale.

100x faster	20x lower cost-per-part
Breakthrough Single Pass Jetting™ technology delivers speeds up to 12,000 cm ³ /hr—more than 100x faster than quad-laser metal printers and over 4x faster than the closest binder jetting alternative. With zero tooling required, it's the fastest way to manufacture complex metal parts.	Low-cost MIM powder, high throughput, and simple post-processing deliver per-part costs that are competitive with traditional manufacturing processes—and up to 20x lower than today's metal 3D printing systems.

The process

1. Print	2. Depowder	3. Sinter
Two state-of-the-art single-pass print bars containing 32,768 nozzles work in conjunction with powder spreaders to disperse metal powder and print in a single pass across the build area, jetting up to 3 billion drops per second.	Parts are removed from the build box and cleared of any loose powder that remains in channels and crevices in preparation for sintering.	Heated to temperatures near melting, remaining binder is removed causing the metal particles to fuse together and the parts to densify.

Print Speed and Build Volume

Speed	Build volume	Resolution
Up to 12,000 cm ³ /hr	750 x 330 x 250 mm	<50 µm voxels

The fastest way to print complex metal parts



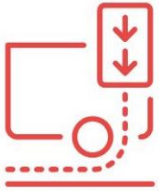

Powered by Single Pass Jetting™ (SPJ™), the Production System features bi-directional printing where all steps of the print process—powder deposition, spreading, compacting, ballistic suppression, and binder jet printing—are applied with each pass over the build area. Whenever there is movement, there is printing—making it the fastest way to print complex metal parts.




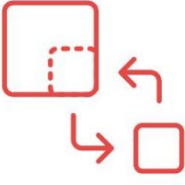

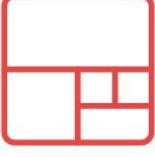
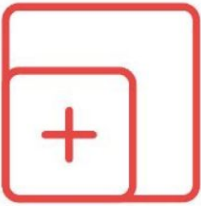

Industrial piezo system prints a broad range of metals

The MEMS-based piezo print head features 32,768 jets printing at a record 3 billion drops per second, at 1200 dpi resolution. Desktop Metal's print head exhibits a 1000X longer life than the thermal print heads used by competitors - a key requirement for demanding industrial environments.

And, unlike thermal print head systems, the Desktop Metal Industrial Piezo system can jet the broad range of binders required for printing tool steels, low alloy steels, titanium, aluminum and other advanced materials.

Key System Features & Benefits

	Bi-directional printing With each pass over the build area, the printer spreads metal powder, binder, and anti-sintering agents to create a new layer while avoiding any wasted motion.		High-density 3D nesting Production System parts are not welded to a build plate. Instead, they're self-supported by loose powder—enabling full use of the build volume and higher productivity per build. The software automatically arranges each part, nesting them to maximize throughput.
	Constant wave spreading The non-contact system maintains a uniform powder wave in front of the compaction roller. This creates a powder bed with consistent density throughout the build regardless of the build box length, traveling at speeds as high as 1 meter per second.		Low-cost, low-flow powder Constant wave spreading enables the use of low-cost, low-flow MIM powders with irregularly-shaped particles.

	<p>Cold printing Binding agents are printed at room temperature without the need for heat activation, allowing for the immediate transfer of the build box to downstream processes.</p>		<p>Ballistics suppression & software based redundancy The ballistics suppression mechanism prevents clogging of jets—drastically reducing variability in the print process and increasing the longevity of the printhead. An optical inspection system combined with software based redundancy eliminates the need for printhead redundancy and dramatically reduces maintenance requirements.</p>
	<p>Inert processing An inert processing atmosphere ensures maximum safety and quality by controlling oxygen content within the process —making it possible to printing with reactive metals like aluminum, titanium, and other high-performance alloys.</p>		<p>Hot-swappable modules Designed for the most demanding production environments, the Production System uses hot-swappable modules that can be replaced in under an hour. This allows for rapid material changes and reduced downtime.</p>
	<p>Automated printhead maintenance & diagnostics Integrated maintenance and automated diagnostic modules work with the ballistics suppression mechanism to deliver the most robust and reliable printhead performance of any metal binder jet system.</p>		<p>Modular build box The build box is a low-cost, removable component designed for efficient and easy transfer to downstream processes.</p>
	<p>Open materials & process platform Manufacturers can procure metal powders directly from suppliers and manually adjust key processing parameters for greater quality control, as well as control in their supply chain.</p>		<p>Separable Supports™ Anti-sintering agents can be printed between the part and its supports, making it easy to remove supports post-sintering</p>

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