

# X-Series™

## Scalable Binder Jet 3D Printing Used by Over 150 Customers Worldwide

Material flexibility to scale metal, ceramic, or composite additive manufacturing from research and development to serial production



### 3D Printing with Premium Materials

- Silicon Carbide
- Aluminum
- Tungsten
- Copper



# SCALABLE BINDER JET 3D PRINTING WITH MATERIAL FLEXIBILITY

The X-Series family of scalable 3D printers — the InnoventX™, X25Pro™, and X160Pro™ — combines flexible powder capability with machine size options to address the needs of metal injection molding, powder metallurgy, and other manufacturing customers seeking a scalable binder jet solution for producing reliable parts in a production environment.

More binder jet 3D printing research has been done on the InnoventX than any competing platform and the X25Pro allows customers to scale up to a mid-size production platform using the same powder metallurgy standard powders. Designed for throughput, the X160Pro is the largest binder jetting system available to scale applications to full serial production.

Patented Triple Advanced Compaction Technology (ACT) employed on X-Series binder jetting systems combines the dispensing, spreading, and compacting processes critical for consistent, high-quality prints. With each successive pass of the printhead, binder is precisely deposited across the powder as the object is bound layer-by-layer until a near-net shape print is completed. The green part undergoes the standard processes for removing the binder and sintering the remaining metal into a part with a final sintered density that meets or exceeds metal injection molding standards.

## Scalable binder jetting

All X-Series binder jetting systems feature industrial piezoelectric printheads and patented Triple ACT advanced compaction technology that allows these open-materials systems to process metals, ceramics, and more with high density and repeatability for functional, precision parts and tooling in a range of build areas.

## Wide material capability

The X-Series 3D prints a wide variety of materials, including metals, ceramics, and composites. This flexibility is achieved through Triple ACT technology that enables the use of both high- and low-flow materials, as well as small and large particle sizes. The X-Series is used to process stainless and tool steels, nickel alloys, aluminum and titanium alloys, and metal composites, as well as technical ceramics, such as silicon carbide (SiC) and boron carbide (B<sub>4</sub>C).

## Tight tolerances

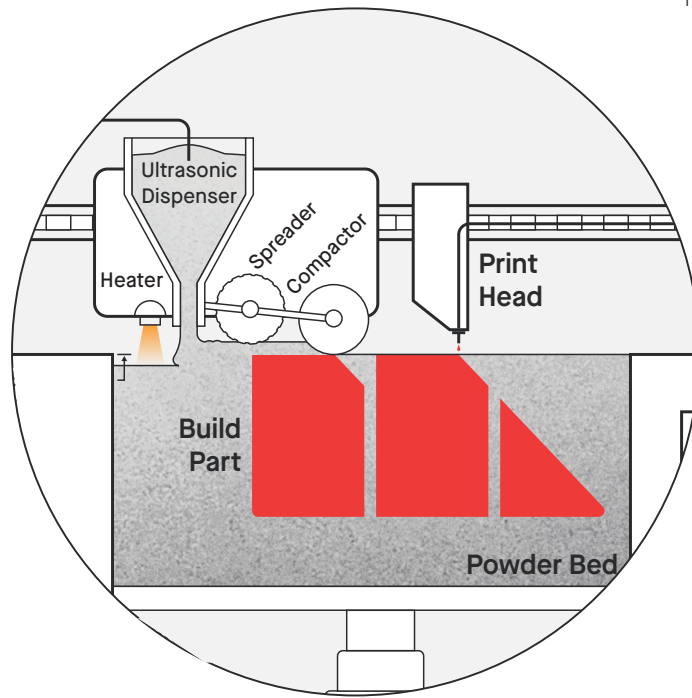
With density variation across the build area, dimensional tolerances can be controlled within 1-2.5% on a first print run. With optimization for production, X-Series systems routinely achieve dimensional tolerances of less than 1%, all while maintaining post-sintered densities from 97% to better than 99% for most metals.

## Excellent surface finish

The X-series achieves world-class surface finish through the combined benefits of the Triple ACT system and precision binder placement. High print bed density and optimized binder distribution all but eliminate binder bleed and overspray, producing excellent edge definition, surface quality, and surface finish as low as 4 µm Ra\*.



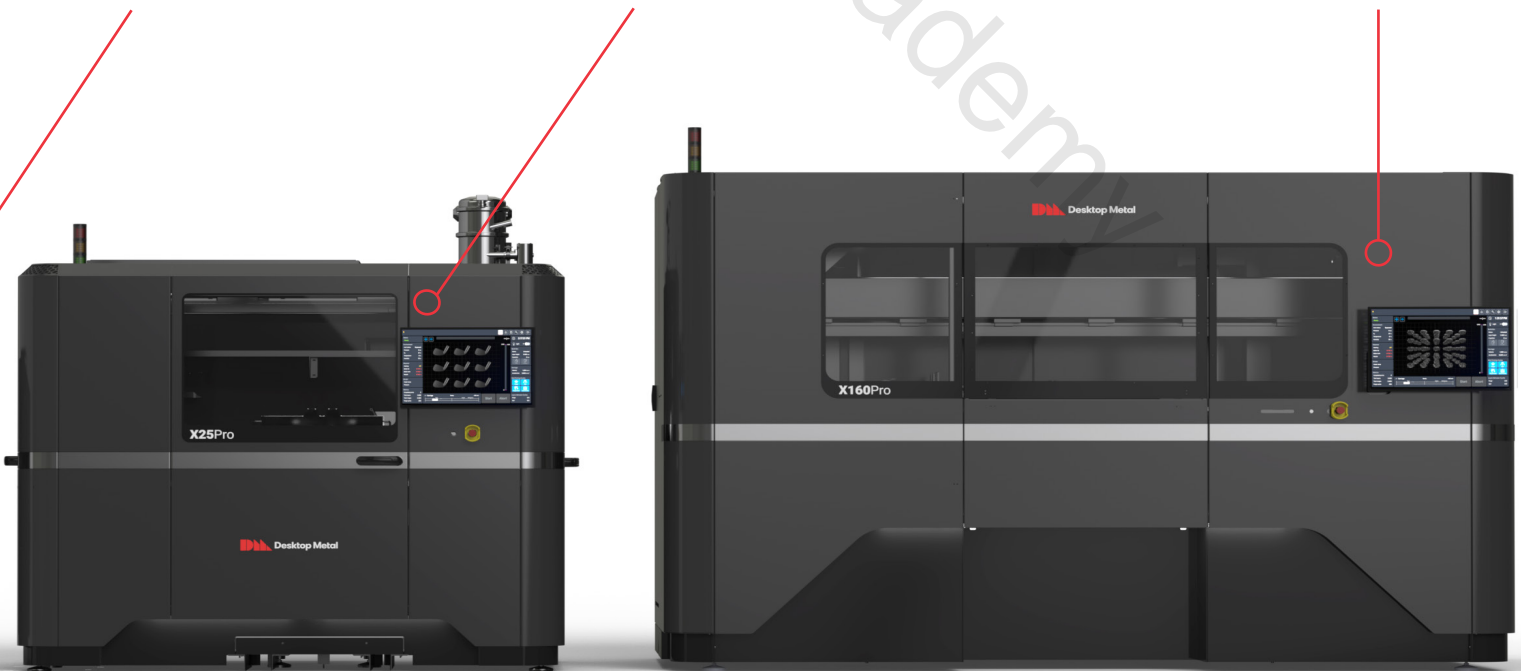
Triple ACT features an ultrasonic dispensing system for consistent flow of fine powders with a spreading roller system and counter-rolling compactor for high green strength



InnoventX is the most compact binder jet 3D printer in the X-Series. It's small build box is suitable for education, research, prototyping, or rapid product development with quick changeover and without a large investment in powder.

X25Pro is our mid-volume advanced binder jet system already used around the world. Suitable for prototyping and rapid product development with the space to make multiple iterations as well as short-run production

X160Pro is the world's largest binder jet 3D printer. Designed to leverage its large size for serial production, yet supports short-run production, rapid product development, and even research and prototyping, especially for large-format parts



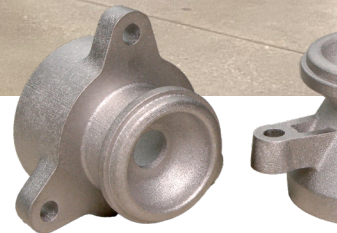




The X25Pro, left, is used for application development at DSB Technologies before scaling to serial production on the X160Pro, right

# MATERIAL VERSATILITY

Binder jetting with the X-Series platform offers manufacturers the ultimate flexibility in material and size offerings. Features like piezoelectric printheads enable a variety of binders to be processed and the Triple ACT workflow allows you to work with powders of various particle sizes and compositions. Developed with an open powder architecture in mind, the powerful X-Series platform has the ability to process materials from metals to technical ceramics while scaling applications from development to serial production. What's more, the Desktop Metal AM2.Production partnership process ensures customers have the collaboration to ensure binder jetting can deliver a solution to your production challenge.



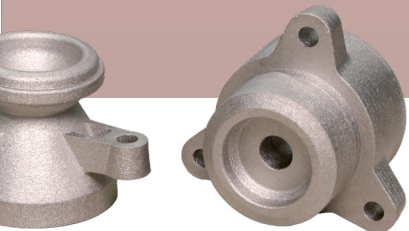
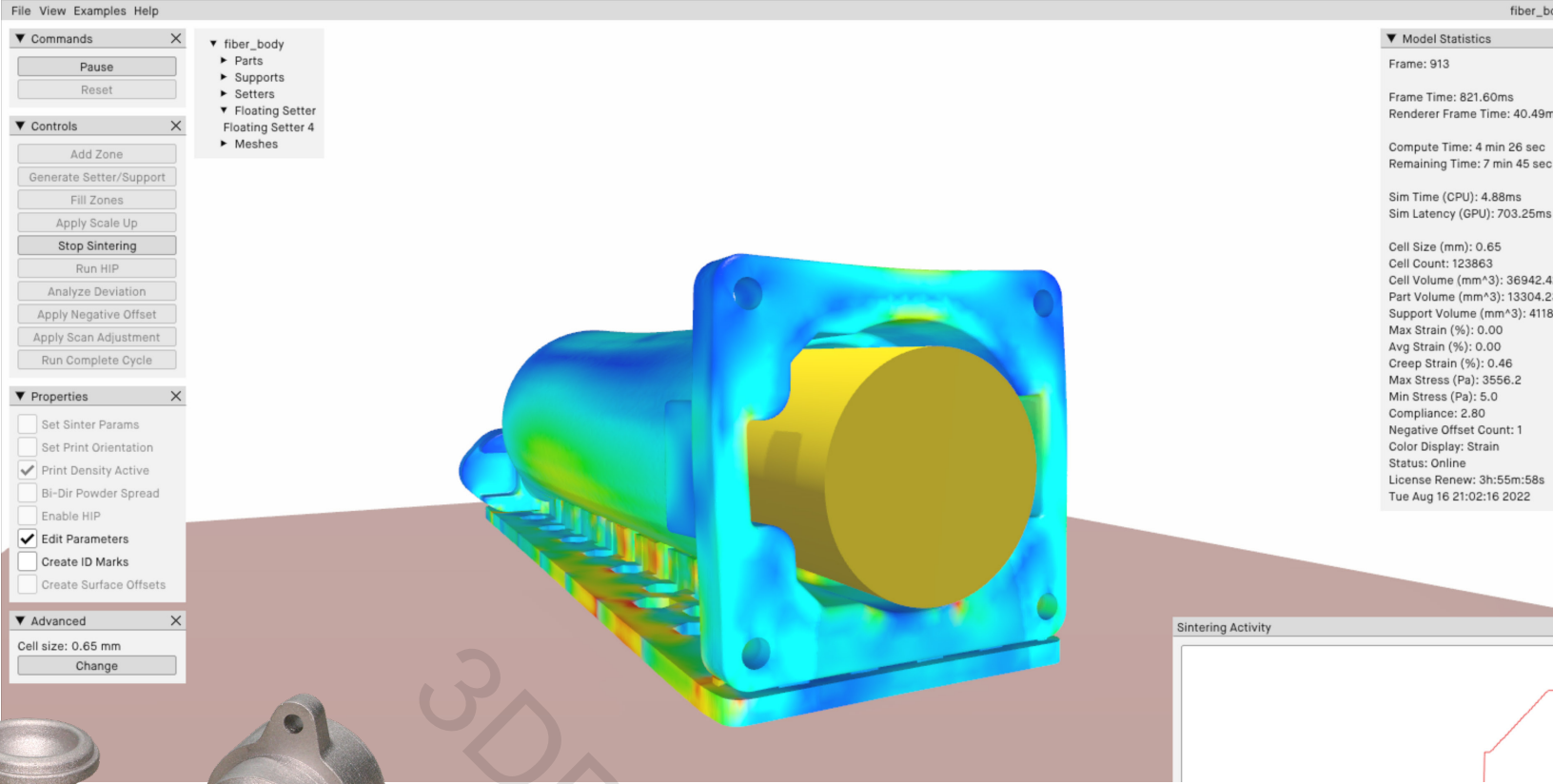
Learn more about our AM2.Production low-risk adoption partnership process

## Metal and Ceramic Compatibility\*

- 17-4 PH Stainless Steel
- 304L Stainless Steel
- 316L Stainless Steel
- 4130 Low-Alloy Steel
- 4140 Low-Alloy Steel
- 4340 Low-Alloy Steel
- 8620 Alloy Steel
- Alumina
- Aluminum Nitride
- Aluminum 6061
- Boron Carbide
- Bronze
- Carbon
- Cobalt-Chrome
- Copper
- CM247
- Glass
- Gold
- H13 Tool Steel
- Hastelloy
- Haynes 282
- Iron-Chrome-Aluminum
- M2 Tool Steel
- Nickel Alloy IN625
- Nickel Alloy IN718
- Nickel-Free Austenitic Stainless Steel
- Silicon Carbide
- Silicon Nitride
- Sterling Silver
- Titanium (Ti64)
- Tungsten
- Tungsten Carbide Cobalt
- Tungsten Heavy Alloy
- TZM Molybdenum

## Binders

- CleanFuse: For low-carbon metals like 316L
- AquaFuse: For compliance with stringent EH&S requirements
- FluidFuse: Excellent general purpose properties for a variety of materials, including reactive powders
- PhenolFuse: For high-temperature non-metallic carbides



# SINTERING SUCCESS

Desktop Metal's software connects you with the lifeblood of your digital manufacturing systems - data - in new ways that simplify and deliver value. Sintering remains one of the main challenges of metal binder jetting technology and our advanced simulation software team has worked to eliminate the trial and error required to achieve high-accuracy parts via powder metallurgy-based additive manufacturing processes.

Live Sinter simulates part behavior during the sintering processing, including shrinkage and distortion. top. The software generates a negative offset geometry that prints and sinters to compensate for these effects, bottom.



## Live Sinter™

Live Sinter software is a powerful, multi-physics sintering simulation application that delivers final parts with tight tolerances.

Rather than printing a part straight to have it warp out of spec, Live Sinter prints a negative offset that will sinter to meet dimensional tolerances. It enables unique distortion compensation to help manufacturers not only reduce costs, but enable sintering to be successfully applied to a wider range of applications.

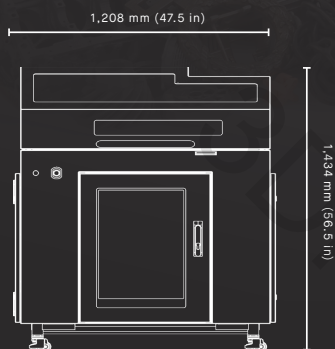
After scan-based adjustments, Live Sinter enables correcting for complex distortion effects, yielding parts that consistently fall within 1% of target dimension with as low as +/- 0.3% deviation, avoiding distortion, warping, and other common sintering challenges.





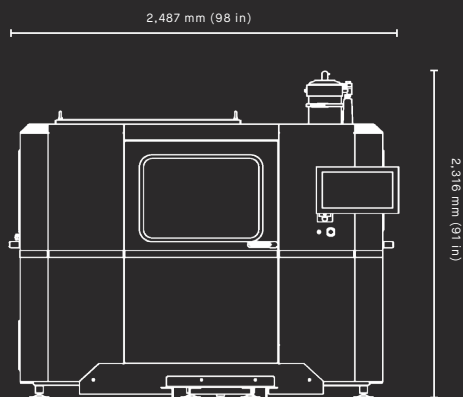
# TECHNICAL SPECIFICATIONS

## InnoventX™



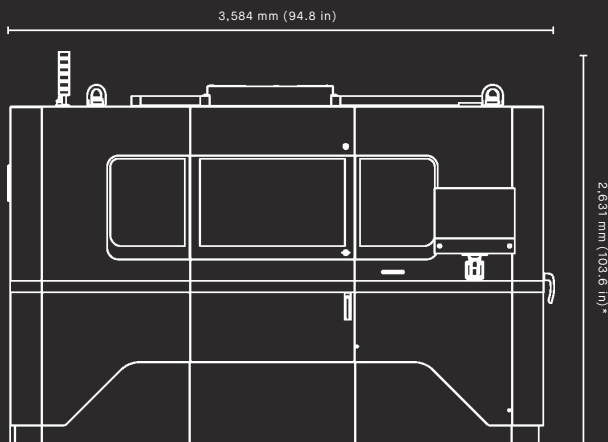
Build envelope (L x W x H)	160 x 65 x 65 mm (6.3 x 2.5 x 2.5 in)
Maximum throughput	54 cc/hr (3.3 in³) at 65 µm layer thickness
Layer thickness	30 - 200 µm
Print resolution	
80pL printhead	400 dpi
30pL printhead	600 dpi
10pL printhead	800 dpi
Binder jetting module	1 piezo-electric printhead (256 nozzles)
External dimensions (L x W x H)	120.8 x 93.5 x 143.4 cm (47.5 x 36.8 x 56.5 in)
Weight	500 kg (1,100 lbs)
Electrical requirements	120 VAC, 60 Hz, 1-phase 230 VAC, 50 Hz, 1-phase

## X25Pro™



Build envelope (L x W x H)	400 x 250 x 250 mm (15.7 x 9.8 x 9.8 in)
Maximum throughput	1,200 cc/hr (73 in³) at 65 µm layer thickness
Layer thickness	30 - 200 µm
Print resolution	
80pL printhead	400 dpi
30pL printhead	400 dpi
10pL printhead	800 dpi
Binder jetting module	2 piezo-electric printhead (2,048 nozzles)
External dimensions (L x W x H)	248.7 x 181.5 x 231.6 cm (98 x 71.5 x 91 in)
Weight	2,000 kg (4,409 lbs)
Electrical requirements	208 - 240 VAC, 50/60 Hz, 3-phase

## X160Pro™



Build envelope (L x W x H)	800 x 500 x 400 mm (31.5 x 19.7 x 15.8 in)
Maximum throughput	3,120 cc/hr (190 in³) at 65 µm layer thickness
Layer thickness	30 - 200 µm
Print resolution	
80pL printhead	400 dpi
30pL printhead	400 dpi
10pL printhead	800 dpi
Binder jetting module	4 piezo-electric printhead (4,906 nozzles)
External dimensions (L x W x H*)	358.4 x 240.8 x 263.1 cm (141 x 95 x 103.6 in)
Weight	3,700 kg (8,157 lbs)
Electrical requirements	400 VAC, 50/60 Hz, 3-phase

# ADDITIONAL RESOURCES

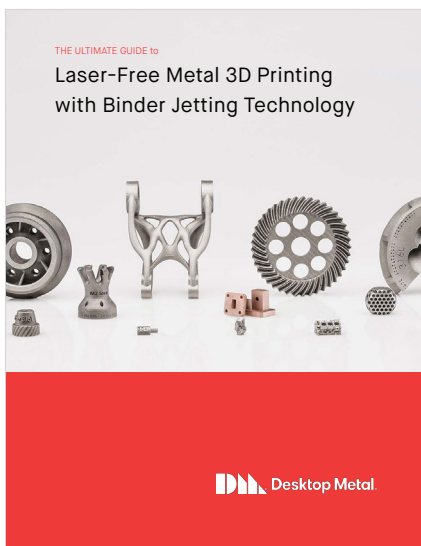


## CUSTOMER SUCCESS STORY

### Scaling Binder Jet Applications

Processing over eight million pounds of metal powder each year – including over 7 million pounds of stainless steel materials, DSB Technologies is a market leader in the mass production of powder metal components. The company invested in transformative technologies like binder jet 3D printing to provide a wider range of metal solutions. DSB features each X-Series platform to scale applications from material development to design optimization to serial production in-house.

[TeamDM.com/BinderJetGuide](https://TeamDM.com/BinderJetGuide)



## LEARN MORE ABOUT THE PROCESS

### Ultimate Guide to Binder Jetting

This introduction explores the most promising ASTM-recognized 3D printing technology for the mass production of metal parts and products. The guide contains a comprehensive overview of high-speed 3D printing of metals without a laser. Explore why binder jetting holds the keys to enabling the next era of Additive Manufacturing 2.0, which can unlock the innovation, agility, and sustainability benefits of 3D printing in meaningful high volumes.

[TeamDM.com/BinderJetGuide](https://TeamDM.com/BinderJetGuide)

Learn more about the X-Series and find customer success stories at

[TeamDM.com/XSeries](https://TeamDM.com/XSeries)

# Additive Manufacturing 2.0

Metal | Polymer | Ceramic | Composite | Wood

Printer platforms



Desktop Health™



Materials



Applications and more



Desktop Labs

[DESKTOPMETAL.COM](https://www.desktopmetal.com)

Desktop Metal (NYSE:DM) is driving Additive Manufacturing 2.0, a new era of on-demand, digital mass production of industrial, medical, and consumer products. Our innovative 3D printers, materials, and software deliver the speed, cost, and part quality required for this transformation. We're the original inventors and world leaders of the 3D printing methods we believe will empower this shift, binder jetting and digital light processing. Today, our systems print metal, polymer, sand and other ceramics, as well as foam and recycled wood. Manufacturers use our technology worldwide to save time and money, reduce waste, increase flexibility, and produce designs that solve the world's toughest problems and enable once-impossible innovations. Learn more about Desktop Metal and our #TeamDM brands at DesktopMetal.com