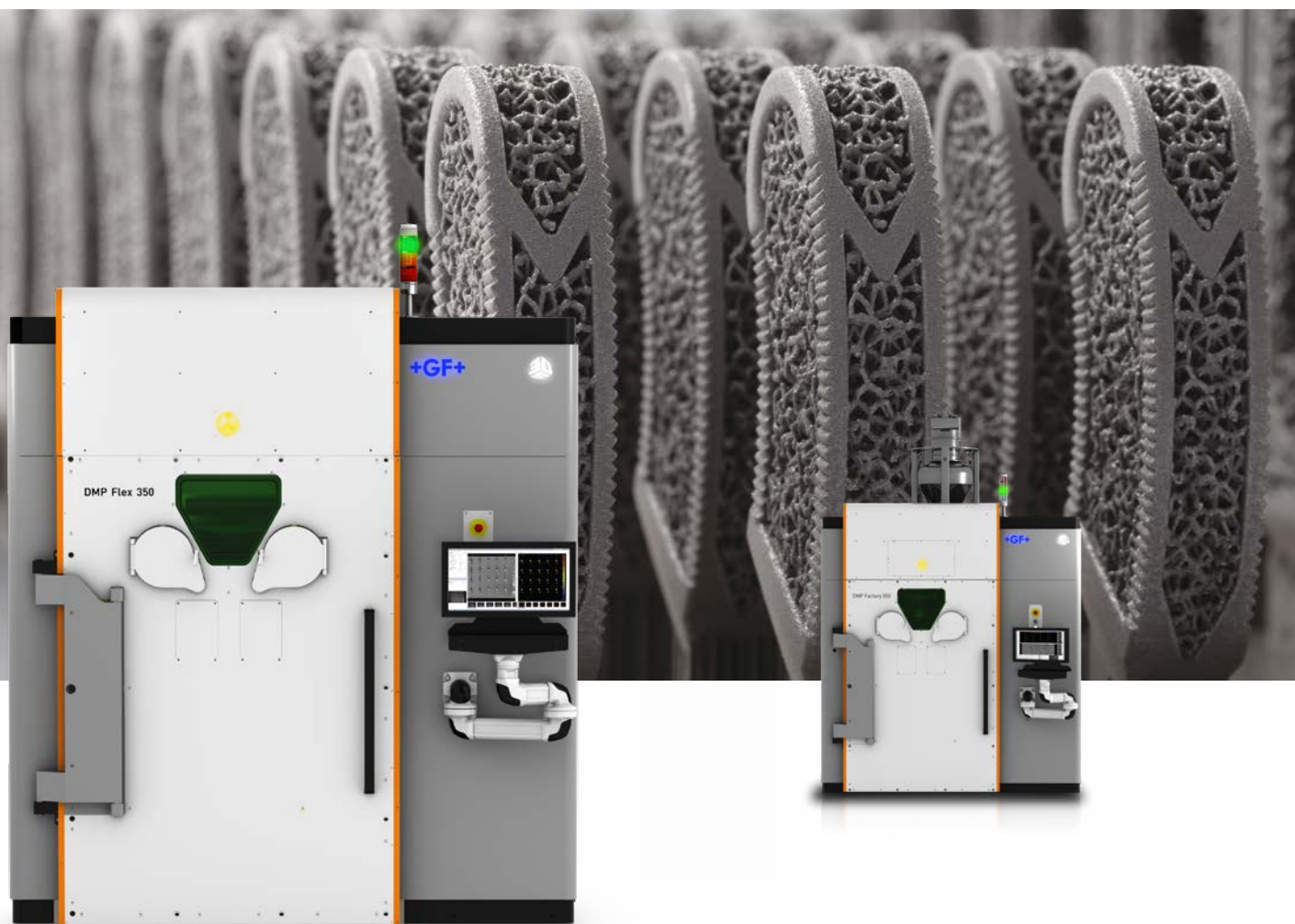


DMP Flex/Factory 350

Robust, flexible metal 3D printer for serial part production.

Achieve even faster production throughput with dual laser or Triple laser configurations.



GF Machining Solutions: Becoming better every day – since 1802

When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From unmatched Electrical Discharge Machining (EDM), Laser texturing, Laser micromachining, Additive Manufacturing and first-class Milling and Spindles to Tooling and Automation, all of our solutions are backed by unrivaled Customer Services and expert GF Machining Solutions training. Our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies help you raise your game—and our digital business solutions for intelligent manufacturing, offering embedded expertise and optimized production processes across all industries, increase your competitive edge.

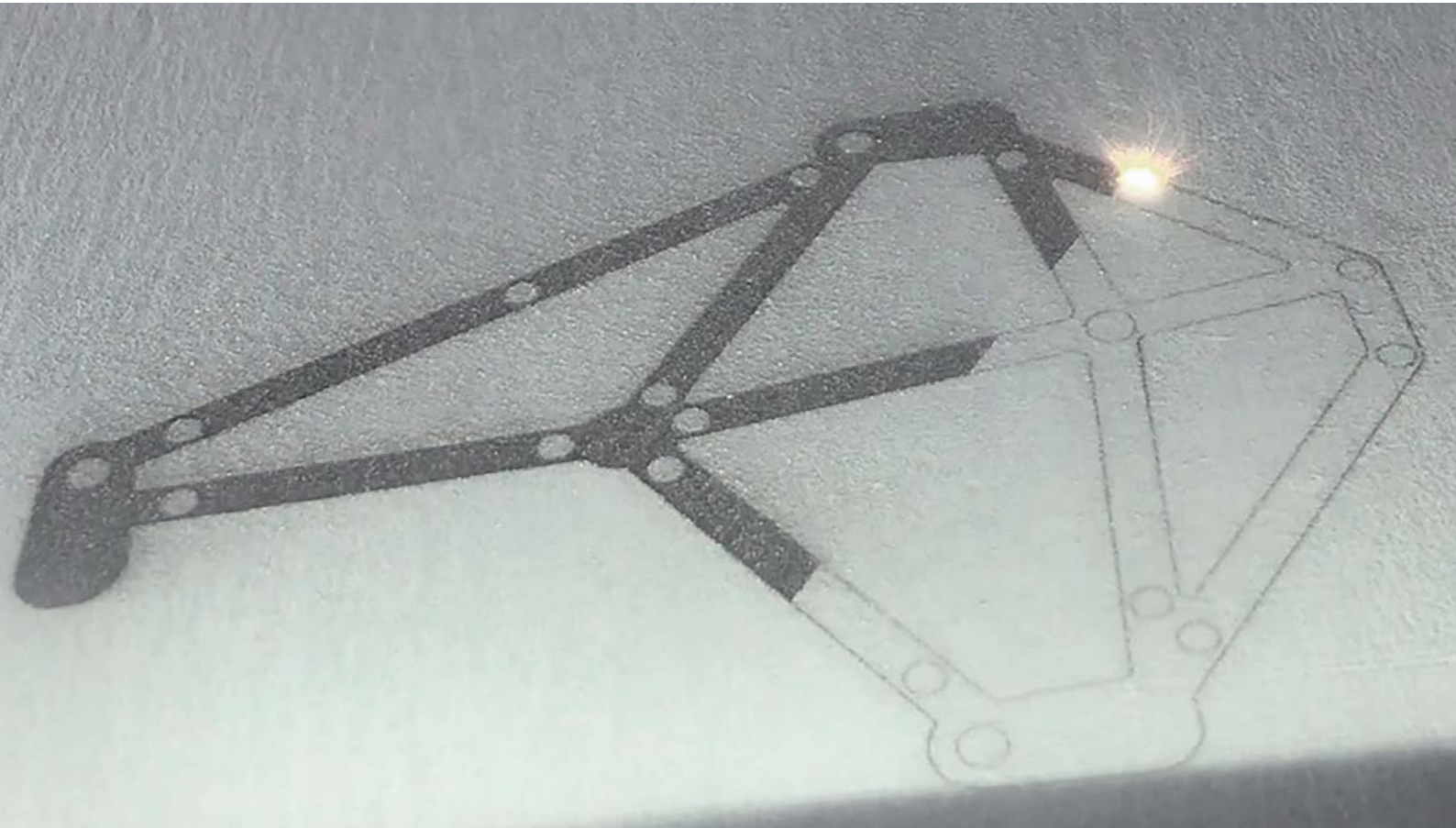


3D Systems: Advancing Industries with Additive

More than 30 years ago, 3D Systems brought the innovation of 3D printing to the manufacturing industry. Today, as the leading additive manufacturing solutions partner, we bring innovation, performance, and reliability to every interaction—empowering our customers to create products and business models never before possible. Thanks to our unique offering of hardware, software, materials, and services, each application-specific solution is powered by the expertise of our application engineers who collaborate with customers to transform how they deliver their products and services. 3D Systems' solutions address a variety of advanced applications in healthcare and industrial markets such as medical and dental, aerospace and defense, automotive, and durable goods. More information on the company is available at www.3dsystems.com.

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24/7 productivity

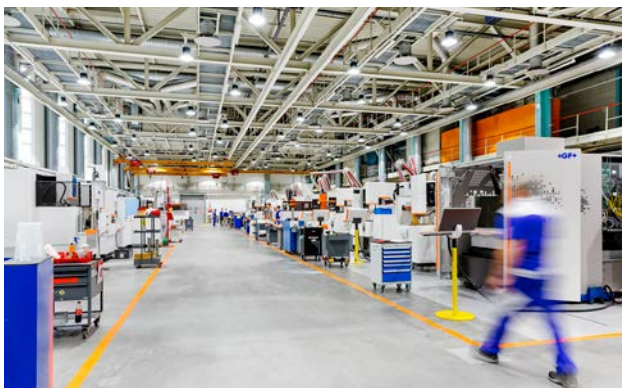
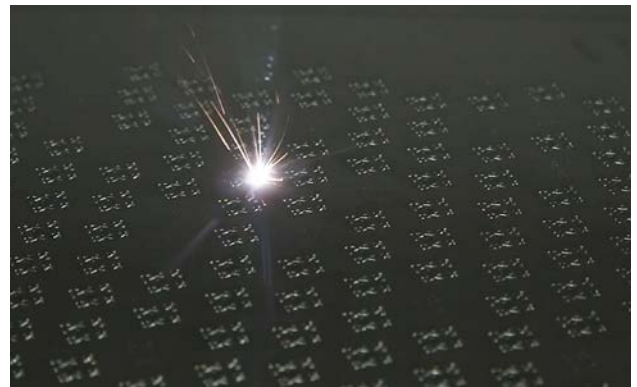
Our mid-frame direct metal printing platform is designed for flexible application use for R&D projects, application development or serial production. Yet it is easily scalable for volume part production. Quick-swap build modules and fast powder recycling speed up production. A central server manages print

jobs, materials, settings and maintenance for 24/7 productivity. Metal additive manufacturing software 3DXpert® is the industry's most powerful tool to prepare and optimize part data quickly, enabling rapid design for metal additive manufacturing to shorten production time and increase part precision.

Two partners, one vision for transforming manufacturing

Robust and proven solutions

3D Systems has been pioneering additive manufacturing for over three decades. Nurturing a passionate team of designers, process and application development specialists, 3D Systems is dedicated to continuously advancing additive manufacturing technology. The DMP Flex 350 and DMP Factory 350 are not only a labor of love but also the result of years of experience in additive manufacturing serial production with more than 2,000,000 challenging production parts delivered by 3D Systems services year over year.

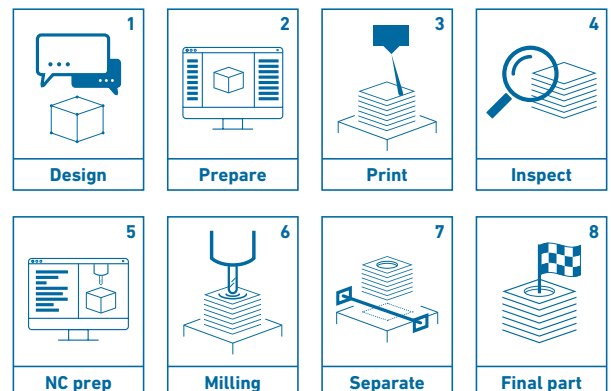


State-of-the art manufacturing process

GF Machining Solutions is a world leading provider of complete solutions for manufacturers of precision components. The company has decades of experience in manufacturing machines following strict procedures and quality control. This knowledge applied to the DMP Flex 350 guarantees the robustness and the quality of the printing process.

Simplify AM technology integration

GF Machining Solutions and 3D Systems offer a full, comprehensive range of AM solutions. With a thorough understanding of every part of the additive workflow, we are experts in seamlessly integrating metal AM technology into existing conventional manufacturing facilities. Our solutions cover the entire part-production cycle to deliver greater productivity and ease of use.



Production-oriented metal 3D printers

Maintain highly repeatable quality

The DMP Flex 350 delivers the purest atmosphere during printing: a consistently low oxygen environment (fewer than 25 parts per million). This solution ensures excellent microstructures and very high density and stable mechanical properties.

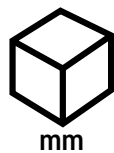
Low TCO for affordable per part costs

An efficient factory is streamlined from end to end. With extensive experience in the production environment, our engineers have packaged their production workflow expertise into functional modules that enable maximum uptime and efficiency.

High throughput metal 3D printing

High throughput 3D metal printing is ensured by the solution's fast, bidirectional material deposition. At the same time, users' productivity is accelerated by high printer utilization and short changeover time.

24



275x275x420
mm (XYZ)
or
350x350x350
mm (XYZ)

≤ 25 ppm

1

Available Materials

Ready-to-run metal alloys with thoroughly tested build parameters (Inconel, Titanium, Cobalt Chrome, Aluminium, Steel).

Build envelope size

Print large and high metal parts with our middle-size printer (*height inclusive of build plate).

O₂ level in the build chamber

Guarantees consistent powder quality for high quality parts.

All-in-one parametric software

3DXpert® streamlines your process to quickly and efficiently transition from a 3D model to a successfully printed part.

DMP Flex 350: High Precision, High Throughput Platform

Unique vacuum chamber

Reduce your cost to part by avoiding non-quality scrap issues and get access to higher-margin regulated markets like aerospace and medical, where constant quality is a requirement for certified parts. Discover these benefits, thanks to our consistently low O₂ environment in the printer to guarantee consistent powder quality for high-quality parts.

Removable print module

Improve your flexibility and productivity with a Removable Print Module (RPM) that can be replaced with another RPM just after a job is finished. This reduces downtime when switching from one material to another material by having one dedicated RPM per material.

Bi-directional recoater

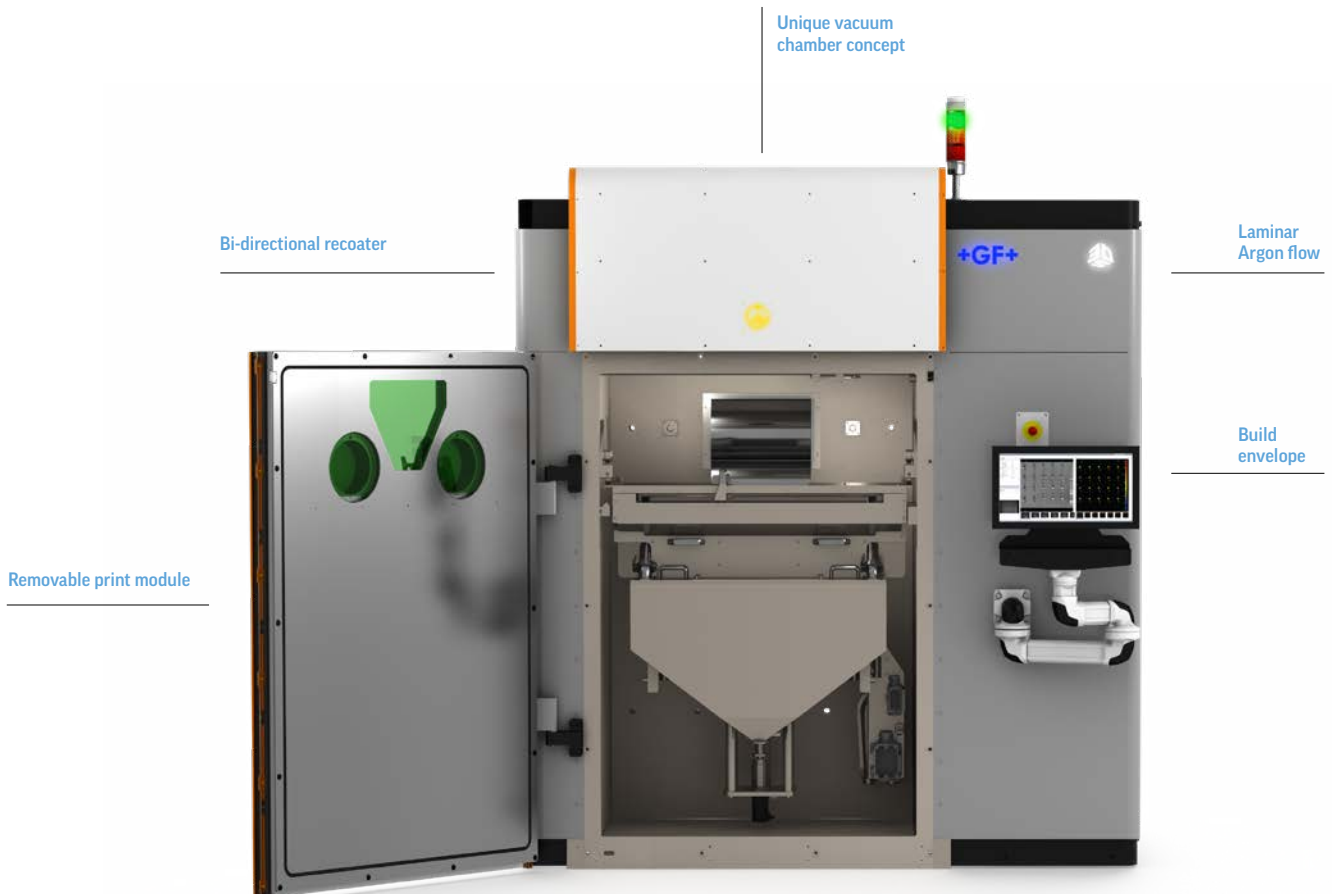
Accelerate your productivity to reduce your cost per part, thanks to our high-performance, bidirectional recoating system that consistently and accurately deposits a fresh powder layer on each pass to reduce the time that the lasers are active.

Laminar Argon flow

Maintain the best melting process in a homogeneous way throughout the whole build envelope, thanks to the always-constant laminar argon flow.

Build envelope

Print large and the highest potential parts thanks to our Z-axis of 420 mm.



DMP Factory 350

All-in-one Powder Management

DMP Factory 350 is based on the DMP Flex 350 printer but includes an integrated powder management system with high-performance sieving and automated powder conveyance. The O₂-free atmosphere of the powder workflow guarantees highest part quality as well as maximum powder usage and minimizes user powder contact.

- Internal powder handling/sieving – All-in-one
- Limits operator exposure to powder
- Powder stays protected from ambient atmosphere
- Integrated and automated sieve sequence
- Vacuum hose based powder transport
- No footprint increase
- For one single material



DMP 350 Dual & Triple Laser

High Quality Performance

Even Faster Production Speeds

The DMP 350 platform now comes in a two-laser or three-laser configuration as well, boosting productivity while maintaining high quality and repeatability, and yielding lower operational costs.

DMP Flex/Factory 350 Dual New features



New Dual Laser (2x 500 W) configuration
Increases productivity and reduces costs

New pre-filter cyclone system
Decreases filter costs

New heated platform
Reduces risk cracking of specific building jobs

Enhanced Removable Print Module
Enables easy, fast and consistent calibration

Enhanced coater accuracy
Decreases machine-to-machine variability

Enhanced coater cutting tool
Decreases operator errors and machine-to-machine variability

New back powder tray on exhaust
Reduces loss of powder during cleaning

New Railroad UI in Operator mode
Reduced operator error

DMP Flex 350 Triple New features



Triple Laser (3x 500W) configuration
Increases productivity and reduces costs

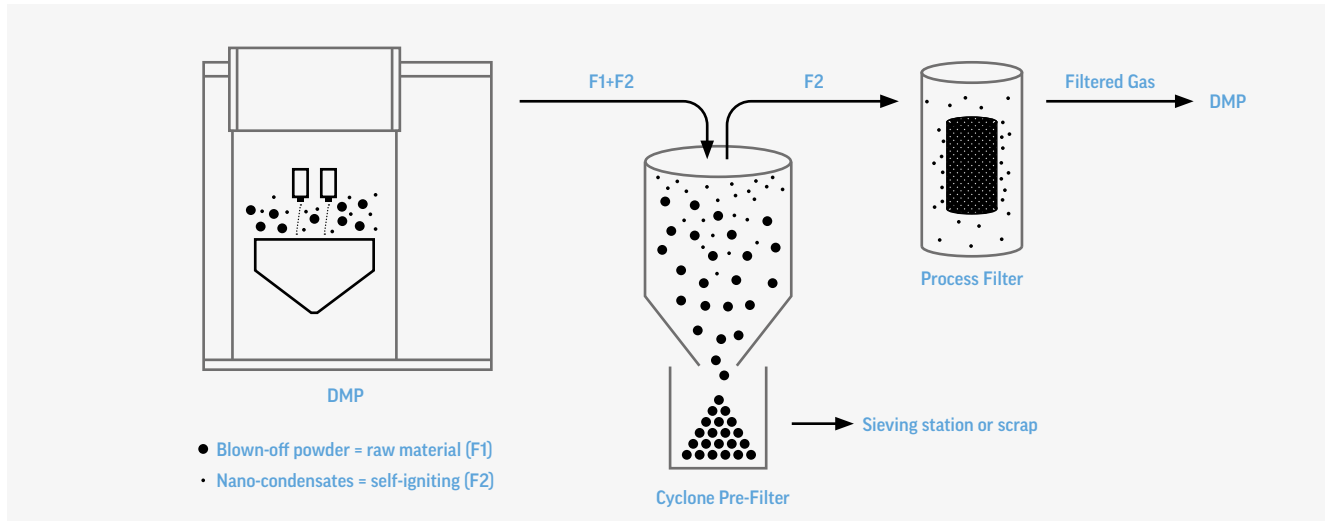
3-axis scanning systems with dynamic focusing
Better accuracy and higher productivity on large build areas

Full field laser
U'ck g'rc Vi]X`Uf[YgyUa `YggdUfhg

Configurable 275x275x420mm or 350x350x350mm RPM build volume
perfectly matching the specific application requirements

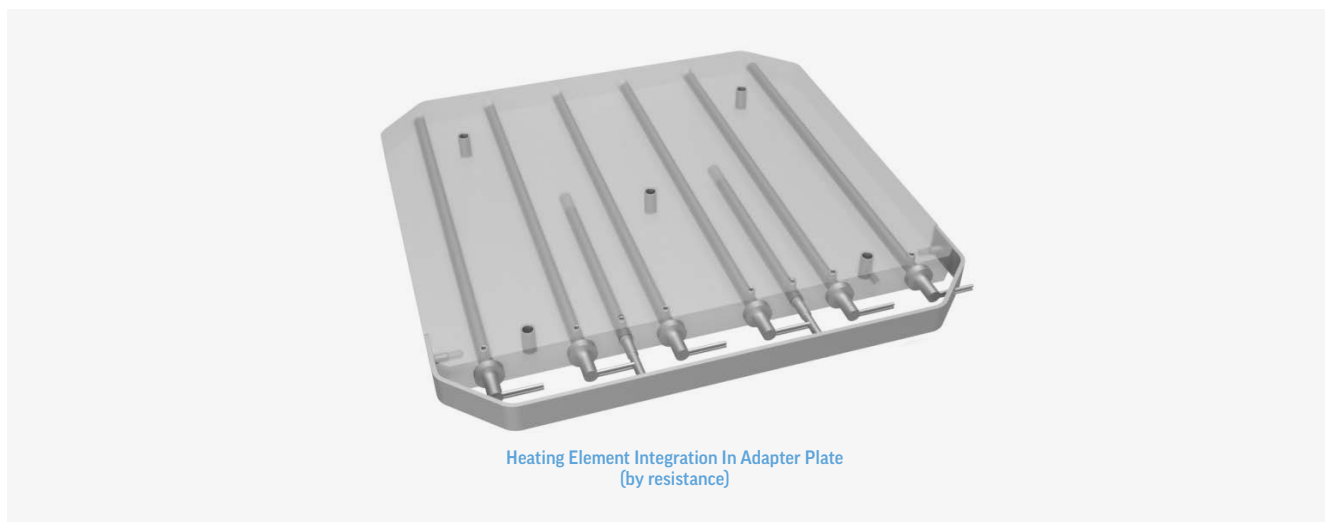
The new Cyclone pre-filter

- Allows for good separation efficiency
- Reduces powder scrap
- Increases filter lifetime



The new Heated build plate

- Reduces cost by stress-relieving parts during printing resulting in reduced heat treatment and support structures
- Reduces temperature gradients between the build platform and the part to enhance bonding of the first layers
- Double-secures moisture removal from powder on top of the vacuum-based purging cycle



Reduce build-to-build time



Cryogenic Manifold

3DXpert® automates 2D nesting, maximizes the number of parts and respects minimal clearance for each part

Build time reduction dual versus single laser
Both layer thickness 30 μm : 43%

Heat Exchanger

Leveraging the power of 3DXpert® software to create complex fine-featured geometries

Build time reduction dual versus single laser
Both layer thickness 30 μm : 48%



Lower total part cost

Tibial Tray, Acetabular Hip Cup & Spinal Implant

Leveraging the power of 3DXpert® software to create complex lattice structures

3DXpert® PowerSupport

Build time reduction of dual laser 90 µm high productivity parameters vs single laser at 60 µm

Tibial Tray: 65%

Acetabular Hip Cup: 56%

Spinal implant: 66%



F1 Exhaust

3DXpert® Multi Head Optimization autobalanced laser assignment and stitching protocols

1 laser: build time reference (1)
Layer thickness 60 µm

2 lasers: layer thickness 60 µm (2)
Build time reduction: 16%

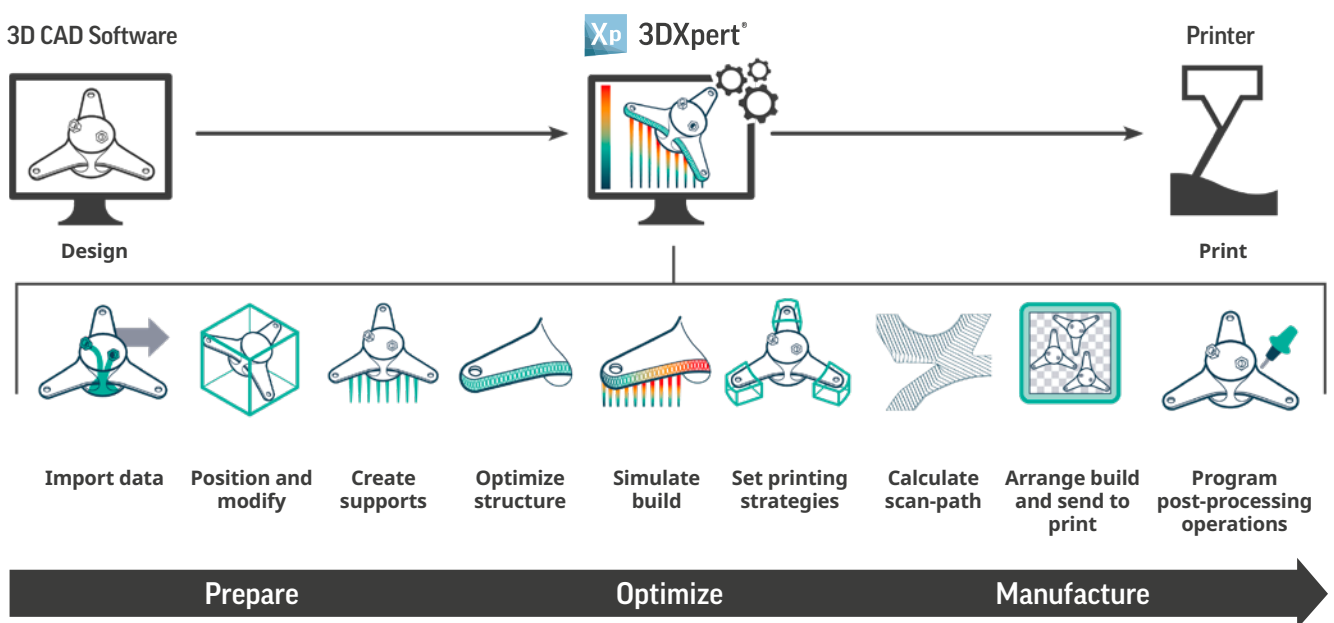
1 laser: layer thickness 90 µm (3)
Build time reduction: 31%

2 lasers: layer thickness 90 µm (4)
Build time reduction: 52%



3DXpert®: from 3D CAD model to best-in-class prints

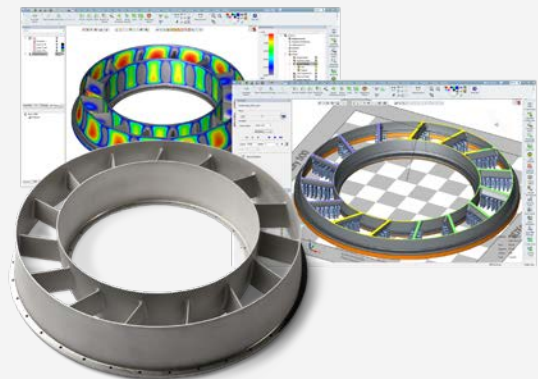
Empowering the DMP Flex/Factory 350, 3DXpert® is an all-in-one integrated software handling the entire spectrum of the AM workflow. 3DXpert® allows you to leverage the full potential of AM with complete control over the preparation, optimization and manufacturing process. Supporting every step of the AM workflow from design to post-processing, 3DXpert® streamlines your process to quickly and efficiently transition from a 3D model to successfully printed parts.



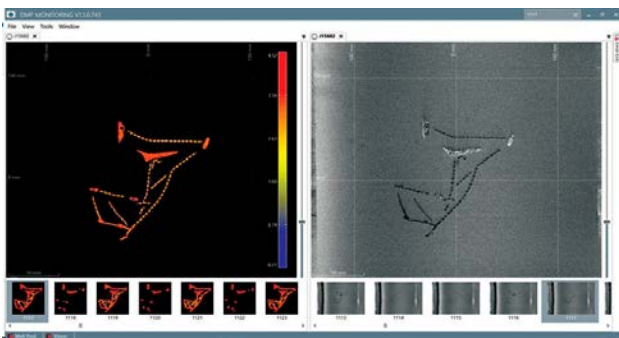
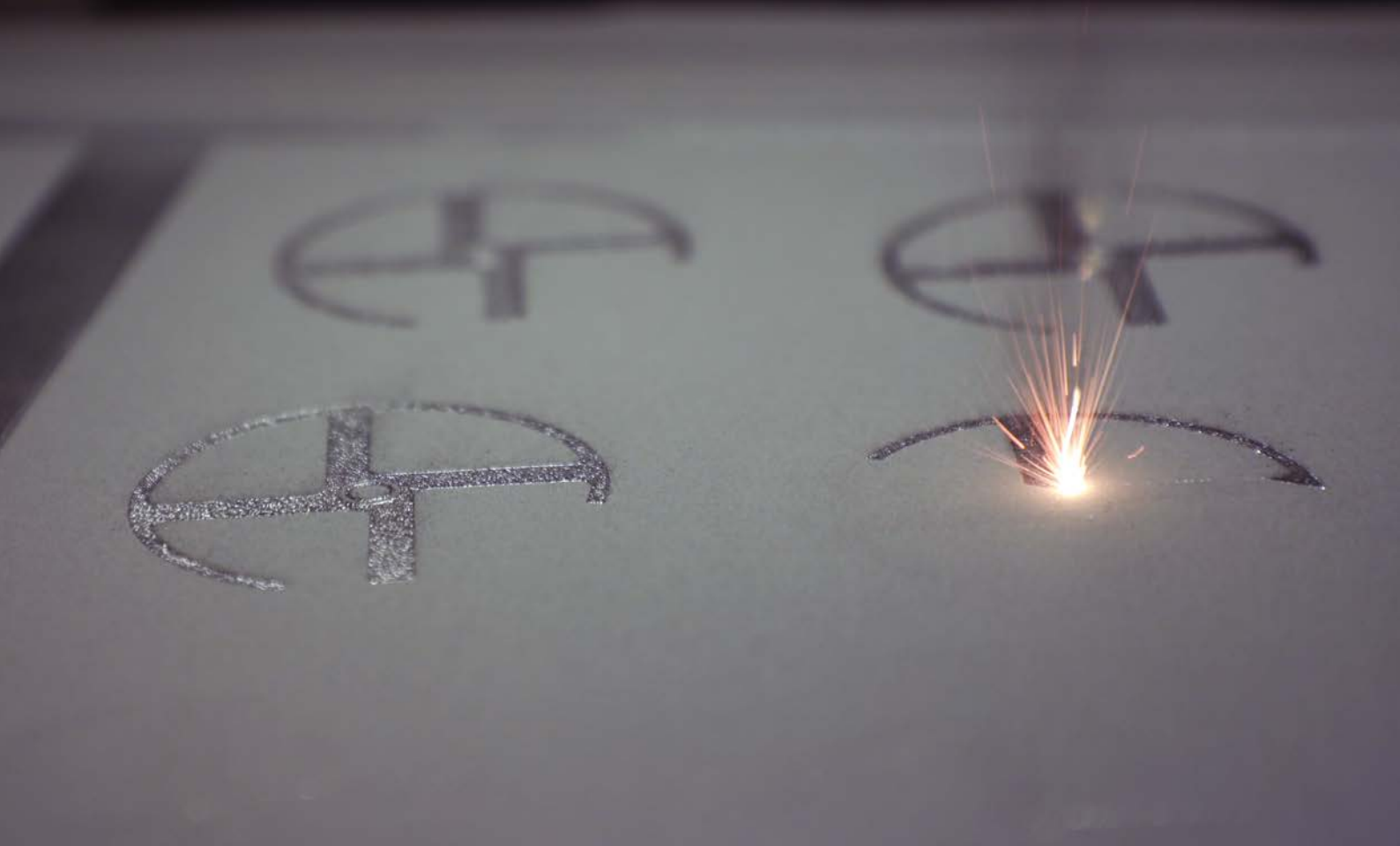
3DXpert® has features for importing, positioning, modifying, optimizing, designing, simulating, analyzing, and programming post-processing operations. 3DXpert® is the perfect tool

for innovative assemblies that reduce part counts and provide greater strength and efficiency, including optimized structure and lower weight.

- All-in-one integrated software for the entire AM workflow
- Hybrid CAD for greater agility, quality and speed
- History-based approach facilitates changes at any stage
- Controlled automation with the ultimate combination of automation and full user control
- Built-in simulation minimizes trial and error
- Optimized printing strategies to shorten print time and to ensure quality



Quality and Process control



DMP Monitoring

The DMP Monitoring toolset for enhanced quality control includes real time process monitoring, synchronized images of the melt pool and powder bed, synchronized images of real time and archived jobs for comparison, and a toolset for analyzing the magnitude of a subject area. DMP Monitoring enables the user to fully understand and control the process, allowing the user to take corrective action to minimize the inherent side effects of all metal 3D printing technologies such as spatter and lump formation to significantly improve part quality.

- Real-time, in-build data collection and visualization
- Post-build process analysis
- Build parameter optimization

Metal Alloys

Ranging from aluminum & titanium alloys, maraging and stainless steels, various grades of copper, as well as nickel-based, cobalt-chrome alloys, and refractory metals, we offer you an extensive portfolio of sophisticated, ready-to-run metal alloys for direct metal 3D printing with the respective, thoroughly-tested build parameters for our metal Additive Manufacturing range.



Titanium alloys

LaserForm Ti Gr1
LaserForm Ti Gr5
LaserForm Ti Gr23



Aluminum alloys

LaserForm AlSi7Mg0.6
LaserForm AlSi10Mg
Certified Al6061-RAM2
Certified Scalmalloy
Certified Ahead CP1



Steels

LaserForm 316L
LaserForm 17-4PH
LaserForm Maraging Steel
Certified Böhler M789



Copper alloys

Certified CuCr1Zr
Certified CuCr2.4
Certified CuNi30
Certified GRCop-42
Certified Pure Cu



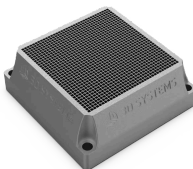
Cobalt-Chrome alloys

LaserForm CoCrF75



Nickel alloys

LaserForm Ni718
LaserForm Ni625
Certified HX
Certified GRX-810



Refractory metals

Certified Tungsten
Certified C-103

Technical specifications

DMP Flex/Factory 350 and DMP Flex/Factory 350 Dual and DMP Flex 350 Triple

Specifications

Number of Lasers / Laser power type (Fiber laser) *	1 or 2 or 3 / 500W
Build volume (X x Y x Z)	275 x 275 x 420** mm (height inclusive of build plate) – DMP 350 Single / Dual / Triple laser 350 x 350 x 350 mm (height inclusive of build plate) – DMP 350 Triple laser
Minimum feature size	200 µm (786.4 µin)
Minimum wall thickness	150 µm (590.55 µin)
Typical accuracy	±100 µm minimum (±0.1-0.2%) / ±393.07 µin minimum (±0.1-0.2%)
Layer thickness	Adjustable, minimum 5 µm (19.68 µin), typical values: 30 µm (118.11 µin), 60 µm (236.22 µin), 90 µm (354.33 µin)
Repeatability (related to actual printed jobs)	Δx (3σ) = 60 µm (236.22 µin), Δy (3σ) = 60 µm (236.22 µin), Δz (3σ) = 60 µm (236.22 µin)
Material deposition	Soft blade recoater

Space requirements

Printer dimensions DMP Flex 350 (W x D x H)	2370 x 1770 x 2670 mm (93.30 x 69.68 x 105.11 in)
Printer dimensions DMP Flex 350 (W x D x H) (Printing condition)	2370 x 2400 x 2869 mm (93.30 x 94.48 x 112.95 in)
Printer weight DMP Flex 350 (Printing condition)	4200 kg (9259 lb)
Printer dimensions DMP Factory 350 (W x D x H)	2370 x 1770 x 3470 mm (93.30 x 69.68 x 136.61 in)
Printer weight DMP Factory 350 (Printing condition)	4350 kg (9590.10 lb)

Heated build plate

Temperature / Temp. accuracy / Temp. homogeneity	250°C / +0, -30°C / ±10°C
Net part height reduction	23 mm
Set point range	50°C to max
Pre-Heating duration	40-60 min

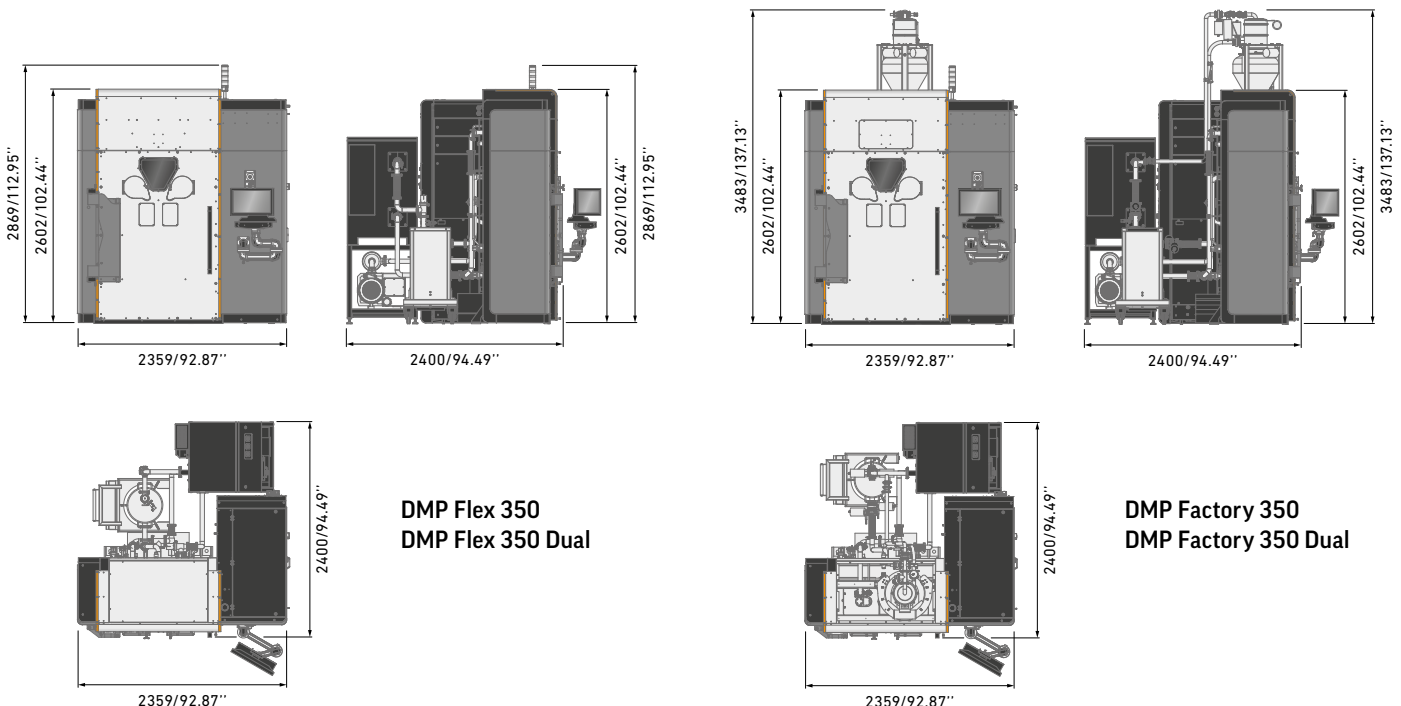
Control system and software

Software tools	3DXpert® all-in-one software for Metal AM
Control software	DMP Software Suite
Operating system	Windows 10 IoT Enterprise
Input data file formats	All CAD formats, e.g. IGES, STEP, STL, native read formats incl PMI data, all Mesh formats

Quality control

DMP Monitoring	Optional
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* Maximum laser power at powder layer is typical 450 W for 500 W lasers ** height inclusive of build plate





Additive Manufacturing Solutions

Metal

Direct Metal Printing (DMP): a metal additive manufacturing technology in which a high-powered laser scans over a bed of fine metal powder to micro-weld particles in the pattern prescribed by a cross-section of the CAD file. 3D Systems' precision metal manufacturing solutions integrate DMP with thoroughly tested print parameters for LaserForm materials, 3DXpert® all-in-one software, and expert application support.

Full Color

ColorJet Printing (CJP): a binder is selectively jetted from inkjet print heads onto a powdered core material, causing the core to solidify. The build platform lowers with each subsequent layer, and CMY or CMYK color is applied to the outermost surfaces resulting in a full-color 3D model.

Application Innovation Group

3D Systems' Application Innovation Group can help you solve your most difficult design and production challenges with additive manufacturing solutions. This team of experienced application experts can help identify your needs, working with you to optimize your designs, prototype, validate and define a manufacturing flow.

Plastic

Selective Laser Sintering (SLS): a high-powered laser selectively fuses powdered material, layer-by-layer. SLS machines are available in large build sizes and compatible with robust materials to enable durable, high-heat and chemically resistant applications.

Stereolithography (SLA): a UV laser scans over a layer of liquid photopolymer material to build up a part. SLA delivers the highest accuracy and smoothest surface finish of all 3D printed parts and is available in large build platforms with high resolution settings.

Figure 4 Technology: a projector images each layer of a build within a UVcurable, liquid material. Figure 4 offers precise, cost-efficient printing at fast throughput speeds, with six sigma repeatability.

Multijet Printing (MJP): a printing process that uses piezo printhead technology to deposit either photocurable plastic resin or wax casting materials, layer-by-layer. These high resolution printers are economical to own and post-processing is virtually hands-free, enabling delicate and complex features to be printed and cleaned without damage.

Software Solutions

Geomagic Design X™, Geomagic Wrap® and Geomagic for SOLIDWORKS® Scan-to-CAD Software reverse engineering with 3D scanning and can introduce dramatic time savings in product design and yield more accurate and customized final products.

Geomagic Freeform®, 3DXpert® for SOLIDWORKS, 3DXpert®, 3D Sprint®, 3D Systems' design products help accelerate and optimize designs across organic shapes, tooling design and dedicated solutions for Design for Additive Manufacturing (DfAM). Robust and diversified toolsets help users bring new and innovative ideas to life with application-specific tools to fast-track and fine-tune projects.

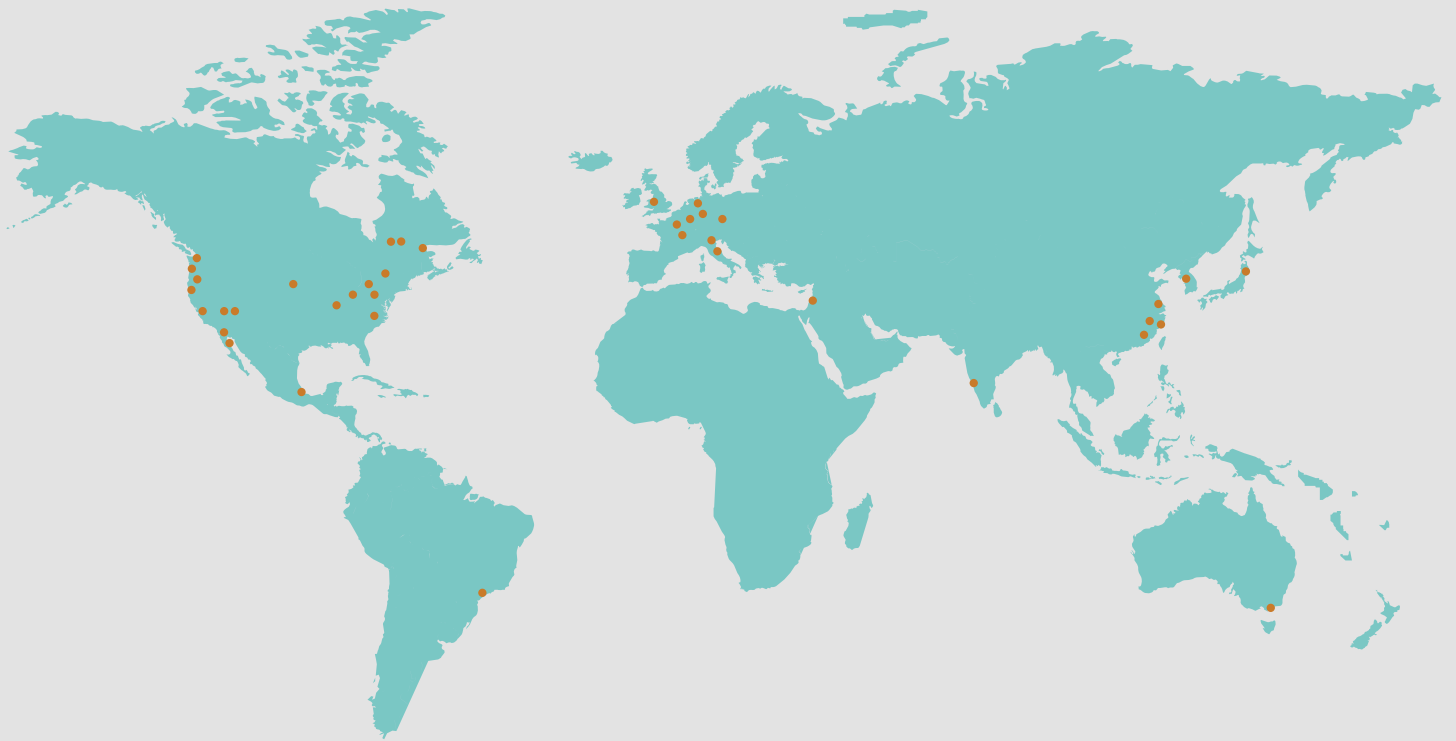
Geomagic Control X™ 3D Inspection Software 3D metrology and automated digital inspection tools verify design intent, ensure quality outcomes, and facilitate reporting in a streamlined process that can save significant time and money.

Healthcare & Dental Solutions

3D Systems partners with surgeons, healthcare professionals, medical device manufacturers, and medical teaching staff to offer a range of precision healthcare solutions, including virtual reality simulators, 3D printed anatomical models, VSP® (Virtual Surgical Planning), patient-specific surgical guides, instrumentation and implants. In the world of digital dentistry, 3D Systems offers a broad range of clinically validated technologies and materials that allow dental labs to access advanced digital workflows, driving speed, efficiency and precision of a range of indications delivered to patients.

Customer Support

With locations worldwide, 3D Systems offers best-in-class end-to-end support and services across the globe. 3D Systems' highly trained application engineers and field service technicians are available to assist customers at any stage: from the design phase and technology selection, to machine installation and maintenance.



More information on www.3dsystems.com



Multi-technology solutions provider

Our commitment to you and your specific applications is proven by the value-adding intelligence, productivity and quality delivered by our multi-technology solutions. Your success is our chief motivator. That's why we are continuously advancing our legendary technical expertise. Wherever you are, whatever your market segment and whatever the size of your operation, we have the complete solutions and the customer-centric commitment to accelerate your success—today.

EDM (Electrical Discharge Machining)

Wire-cutting EDM

GF Machining Solutions' wire-cutting EDM is fast, precise and increasingly energy efficient. From ultraprecise machining of miniaturized components down to 0.02 mm to powerful solutions for demanding high-speed machining with respect to surface accuracy, our wire-cutting EDM solutions position you for success.

Die-sinking EDM

GF Machining Solutions is revolutionizing die-sinking EDM with features like iGAP technology to dramatically boost machining speed and reduce electrode wear. All of our die-sinking systems offer fast removal and deliver mirror finishes of Ra 0.1 µm (4 µin).

Hole-drilling EDM

GF Machining Solutions' robust hole-drilling EDM solutions enable you to drill holes in electrically conductive materials at a very high speed—and, with a five-axis configuration, at any angle on a workpiece with an inclined surface.

Tooling and Automation

Tooling

Our customers experience complete autonomy while maintaining extreme accuracy, thanks to our highly accurate System 3R reference systems for holding and positioning electrodes and work pieces. All types of machines can easily be linked, which reduces set-up times and enables a seamless transfer of workpieces between different operations.

Automation

Together with System 3R, we also provide scalable and cost-effective Automation solutions for simple, single machine cells or complex, multi-process cells, tailored to your needs.

Milling

Milling

Precision tool and mold manufacturers enjoy a competitive edge with our Mikron MILL S solutions' fast and precise machining. The Mikron MILL P machines achieve above-average productivity thanks to their high performance and Automation. Customers seeking fastest return on investment benefit from the affordable efficiency of our MILL E solutions.

High Performance Airfoil Machining

Our Liechti turnkey solutions enable the highly dynamic manufacturing of precision airfoils. Thanks to the unique performance and our expertise in airfoil machining, you increase productivity by producing at the lowest cost per part.

Spindles

As part of GF Machining Solutions, Step-Tec is engaged in the very first stage of each machining center development project. Compact design combined with excellent thermal and geometric repeatability ensure the perfect integration of this core component into the machine tool.

Software

Digitalization solutions

To drive its digital transformation, GF Machining Solutions acquired symmedia GmbH, a company specialized in software for machine connectivity. Together, we offer a complete range of Industry 4.0 solutions across all industries. The future requires the ability to adapt quickly to continual digital processes. Our intelligent manufacturing offers embedded expertise, optimized production processes, and workshop Automation: solutions for smart and connected machines.

Advanced manufacturing

Laser texturing

Aesthetic and functional texturing is easy and infinitely repeatable with our digitized Laser technology. Even complex 3D geometries, including precision parts, are textured, engraved, microstructured, marked and labeled.

Laser micromachining

GF Machining Solutions offers the industry's most complete line of Laser micromachining platforms optimized to meet the increasing need for smaller, smarter parts to support today's leading-edge products.

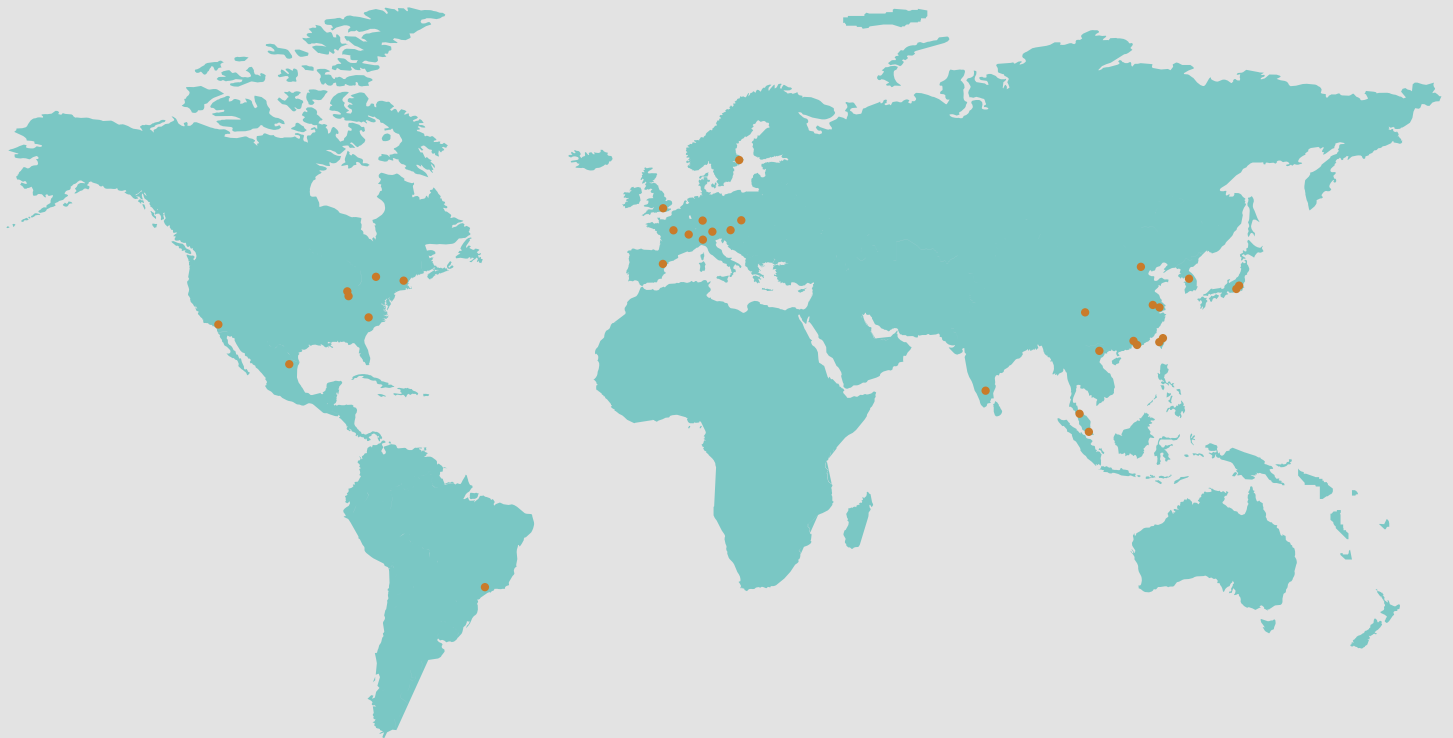
Laser Additive Manufacturing (AM)

GF Machining Solutions and 3D Systems, a leading global provider of additive manufacturing solutions and the pioneer of 3D printing, have partnered to introduce new metal 3D printing solutions that enable manufacturers to produce complex metal parts more efficiently.

Customer Services

Worldwide for you

Ensuring the best performance throughout the lifetime of our customers' equipment is the goal of our three levels of support. Operations Support offers the complete range of original wear parts and certified consumables. Machine Support includes spare parts, technical support, and a range of preventive services to maximize machine uptime. Business Support offers customer-specific business solutions.



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3DS-10204B

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