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Desktop Metal Set to Transform Continuous Fiber 3D Printing

Introducing Fiber, the first 3D printer with AFP continuous carbon fiber reinforcement using high temperature resistant PEEK and PEKK, designed to deliver industrial fiber performance on the desktop

BURLINGTON, Mass.--(BUSINESS WIRE)-- Desktop Metal, the company committed to making 3D printing accessible to engineers and manufacturers, announces the launch of Fiber™, the world's first desktop 3D printer to fabricate high resolution parts with industrial grade continuous fiber composite materials used in automated fiber placement (AFP) processes. Based on a new process called micro automated fiber replacement (μAFP), users can now print parts with a superior level of strength and stiffness, and in a broad range of materials, that traditionally required million dollar AFP systems.

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20191101005294/en/

The Desktop Metal Fiber printer is the first 3D printer with AFP continuous

This affordable new platform produces parts using materials that are two times stronger than steel at one-fifth the weight. Fiber printers feature one of the largest build envelopes of any continuous fiber desktop printer and are designed to be arranged in print farm configurations of 6 or 10 printers.

"For the first time, Fiber printers combine the material properties of high performance AFP continuous fiber materials with the affordability and speed of a desktop 3D printer," said Ric Fulop, CEO and co-

carbon fiber reinforcement, delivering industrial fiber performance on the desktop. (Photo: Business Wire)

founder of Desktop Metal.

Introducing Fiber™
Fiber is the first continuous fiber desktop printer to miniaturize AFP technology, typically found in the highest end carbon fiber production processes, and combine it with Fused Filament Fabrication (FFF), the most widely-used 3D printing technology. The printer uses a robotic tool changer architecture for future expandability and is capable of storing up to four tools, including additional FFF heads for different materials or future enhancements such as automated in-process inspection.

The Fiber print platform is available in two models through a novel subscription service:

- Fiber HT is bringing a new level of performance to the continuous fiber market. It is designed to produce parts with continuous composites having <1 percent porosity and up to 60 percent continuous fiber loading with advanced matrix, including PEEK and PEKK. It can make flame retardant parts to withstand high temperatures up to 250 degrees Celsius, in addition to ESD compliant parts. Fiber HT starts at $5,495 per year.
- Fiber LT is an affordable way to produce high strength, ESD compliant, non-marring parts using continuous fiber with <5 percent porosity with PA6 thermoplastics. Fiber LT starts at $3,495 per year.
- Fiber printers are available in a hardware-as-a-service subscription plan that allows customers to have the latest technology at an affordable price, without risking technology obsolescence. Minimum subscription term is three years and includes comprehensive support.

With one of the largest build volumes offered in a continuous fiber 3D desktop printer (310 x 240 x 270 millimeters), both Fiber HT and Fiber LT are designed to combine the benefits of 3D printing with continuous fiber materials that are qualified for high-performance applications.

- **Stiffer, stronger parts:** Parts printed on Fiber feature targeted continuous fiber reinforcement along critical load paths to build a fully dense fiber core with exceptionally low porosity (<1 percent porosity with PEEK and PEKK, and less than five percent with PA6). Featuring 12k tows, up to 60 percent fiber volume fraction, and multi-directional reinforcement with user-defined tow placement, the resulting parts are up to 60 times stiffer and 75 times stronger than ABS plastic parts.
- **Extensive continuous composites material library, including high temperature thermoplastics:** Fiber offers engineers a large selection of composite materials for a desktop printer, starting with a chopped carbon fiber filled Nylon (PA6) that is ESD-compliant, and a chopped fiberglass filled Nylon (PA6). The materials library also includes chopped carbon fiber filled PEEK and PEKK filaments that provide excellent mechanical properties and chemical resistance, and yield parts that can withstand continuous operation in high temperatures relative to other thermoplastics. Each of these materials can be reinforced with continuous carbon or glass fiber. This wide portfolio of materials is designed for versatility to support a broad set of industrial applications.

Key Applications

Composite parts can be indispensable for manufacturers during the early design stages of prototyping as well as for critical end-use parts that require high stiffness and fast lead-times over machined counterparts. Key applications, which benefit a wide variety of industries, from manufacturing, tooling and automotive to consumer electronics, sporting goods, medical, education/research and marine, include:

- **Jigs and fixtures,** including robotic end effectors, CNC soft jaws, laser etching fixtures for medical tools, ESD and fixtures for manufacturing;
- **End-use parts,** including automotive, electronics, consumer goods such as racing bicycles, marine, aviation and machine design; and
- **Components where lightweighting is critical for performance**, such as wheelchairs and sports racing equipment.

“Despite all the advantages, polymer-based AM has been lacking in the strength needed for high performance applications, specifically a technology that bridges the gap between existing AM technology and automated fiber placement of high-performance composites as used in industry,” said David Hauber, Engineering Manager of **Trelleborg Sealing Solutions Albany, Inc**. “After more than three decades of development, AM has finally reached a tipping point. With Desktop Metal’s new AM technology, engineers will be able to print industrial quality, continuous fiber reinforced composite structures. This breakthrough technology now offers the ability to print continuous fiber reinforcement with high fiber volumes and high Z-axis strength. These benefits are combined with high resolution printing and beautiful surface finishes that give users flexibility in how they can cost-effectively design and manufacture high performance composite structures.”

“I’m excited about the possibility of working with a desktop 3D printer that utilizes continuous carbon fiber thermoplastic composites,” said Mel Clauson, Director of Business Development at **Composite Resources, Inc**. “This machine and material format will greatly improve the stability and durability of shop fixtures produced over existing plastic printers. Additionally, the potential for the Fiber printer to produce low touch labor fly-away parts should provide the opportunity for a wide range of industrial composite manufacturers.”

"Weight is everything in racing,” said Will Turner, President of **Turner Motorsport**. “Being able to replace critical metal components with 3D printed continuous fiber means we can retain the strength of metal while lowering the overall weight of the car -- making it even faster and more competitive."

Innovation
Fiber printers have resulted in dozens of innovations with numerous patents pending. The technical effort is led by Dr. Konstantine Fetfatsidis, Vice President of Composite Products for Desktop Metal, who was previously the advanced manufacturing R&D lead for Aurora Flight Sciences, a Boeing company.

“As a long-time user of multi-million dollar AFP technology for various development-to-production aerostructures programs, I am excited to bring AFP technology to the manufacturing floor for smaller, more complex parts,” said Fetfatsidis. “This new print technology finally brings the material properties of AFP composites to small parts under 20 pounds, which would typically require expensive tooling, extensive manual labor, multiple consumables, and multi-step, long process cycles.”

Availability
Fiber printers are available to order atwww.desktopmetal.com/fiber, as well as through the company's reseller network. Printers are scheduled to ship in Spring 2020. To learn more about Fiber, visit www.desktopmetal.com.

About Desktop Metal
Desktop Metal, Inc., based in Burlington, Massachusetts, 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 and manufacturers around the world. Desktop Metal was selected as one of the world's 30 most promising Technology Pioneers by the World Economic Forum; named to MIT Technology Review's list of 50 Smartest Companies; and recognized among the most important innovations in engineering in Popular Science's "Best of What's New." For more information, visit www.desktopmetal.com.

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