

Red Series®

Your all-in-one solution for digital composite production

High performance composites possess excellent mechanical and chemical characteristics, making them applicable for various industries such as aerospace, automotive, medtech and leisure.

Remouldability and high fracture toughness of thermoplastic based matrix systems led to new applications with short cycle times in production and high damage tolerance. However, the comparably high costs associated with carbon fiber composite parts to its aluminium or steel contenders, remain a constraining factor. A higher degree of freedom to optimize the part geometry and the fiber layout in combination with increased automation in manufacturing will reduce the current constraint.

3D printing, an additive manufacturing technology, is believed to deliver on those demands for manufacturing.

A competitive 3D printing approach for manufacturing of composite parts in series production requires the understanding of the material (high fiber volume contents), the required part quality (low void content) and the cost structure.

9T Labs' radically new approach to 3D printing of performance composites consists of all three aspects by introducing high fiber volume content (>60%) materials, ensuring part quality by introducing appropriate consolidation steps and scalability through parallelization of affordable printing units.

Red Series® a game-changing solution for composite production

The Red Series® is your all-in-one solution for digital composite production.

For all industrial use-cases with scaling potential, our Red Series® solution comes as a subscription model with three main features.

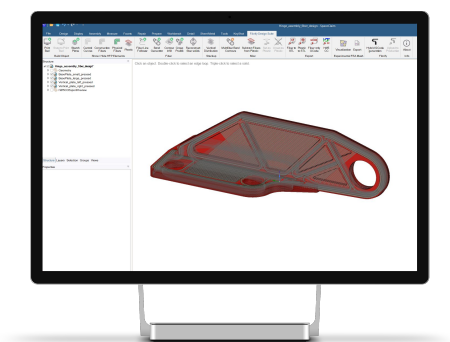
1. It lowers your production entry barrier in a composite field used to massive machine investments such as handling robots, autoclaves to name a few of them.

Effectively, it frees you from investment decisions tying your company for over ten years. And it lowers the need for labour to manually layup fiber materials.

2. It ensures up-to-date equipment, thus avoiding obsolescence. In fact, we develop the equipment ourselves and observe the high speed of development in some components.

We believe that you should get hardware updates just like you are used to with software, ensuring you remain at a high level of productivity.

3. It includes engineering services to quickly bring you up-to-speed to produce your serial parts and avoid the costly trial-and-error phase.



Create with fibrify® - Quickly manufacture optimal designs

Fibrify® Design Suite enables the user to quickly define the fibre designs and fully optimise them by directly exporting the composite parts to commercially available FEA simulation packages for verification of their structural ability. Fibrify® Production lets you control, monitor and manage your equipment in real-time.

Firstly, Red Series® increases the design freedom of composite parts with fibrify® Design Suite.

Particularly, it enables variable fiber angles and designs that include plastic regions exempt from fiber reinforcements.

The Design Suite is the design engineer's toolkit to leverage these possibilities and bring new designs to life. It features an intuitive manual workflow that gives the user full control over fiber placement throughout the part. In addition, intelligent fiber lay-up proposals are made based on user inputs to accelerate the design process.

Secondly, fibrify® Design Suite enables a quick iterative design process (*results within minutes*). In fact, our fibrify environment enables you to maximize the use of digital prototyping. This means that you only start the production of the physical parts once all the states of the digital twin are known and verified along the entire process. This results in an optimal part design.

Finally, as the Red Series® Build Module and Fusion Module are connected, they can easily be managed through fibrify® Production.

In addition to controlling, monitoring and logging the production process, fibrify® Production includes a workflow management tool to efficiently distribute the work between connected devices and users of the platform. After the production of a part, a record is created that allows the user to quickly view the parts history.

Build and Fusion Modules

Produce industrial applications - one-offs & serial parts

Additive Fusion Technology™ (AFT) allows full part consolidation by combining state of the art additive manufacturing equipment - Build Module - with advanced post processing - Fusion Module - and results in parts that can be used in the most extreme conditions.

AFT allows automated manufacturing of optimized part designs coming from the fibrify® software by first using the Build Module to produce a fiber layup.



- Build volume: 350mm x 270mm x 250mm
- Hybrid plastic and CF/plastic printing
- Heated build chamber up to 100°C
- Integrated heated material storage up to 100°C
- Deposition temperature up to 450°C

At this stage, the resulting preform part is already benchmark for continuous fiber composites with highest-performing polymers. However, it does not yet fulfill the quality required of a structural composite part for serial manufacturing. This is achieved by the Fusion Module, by applying heat and pressure to consolidate the preform part. This proprietary 2-stage process ensures part quality, reproducibility and cost competitiveness for your series production applications.

- Fusion volume: 350mm x 270mm x 250mm
- Modularly configurable fusion chamber
- Active pressure regulation > 20 bar
- High temperature fusion chamber up to 400°C



Engineering Collaborate closely

Besides advanced software and hardware, 9T Labs supports you with our application engineering team to jointly transform your series production ideas into production cases.

Industry-standard materials

Using the most high-performance composites, the proprietary 9T Labs' technology was developed to allow the use of industry-standard materials.

The current material portfolio includes PA12 and PEKK matrix materials.



Over the next months and years 9T Labs will continuously add high performance materials to its offering.

- Continuous carbon fiber type: AS4
- Matrix: PA12, PEKK
- 60% fiber volume content

USE-CASES

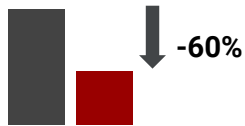
Democratizing load carrying fiber composite structures in various markets

MEDTECH Aiming arm



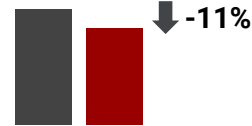
This application showcases composite substitution of an existing aiming arm with 3D printed composite material using continuous carbon fibre and PEKK.

Material / Part



■ Convent. Composite

Part Weight



■ 9T Labs CF/PEKK

AEROSPACE Helicopter hinge



This application showcases metal substitution of an existing helicopter door hinge bracket with aerospace-grade composite material.

Costs / Part



■ Aerospace-grade steel

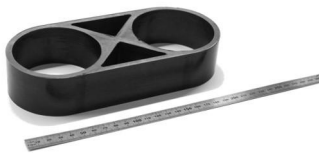
Part Weight



■ 9T Labs CF/PEKK

* Cost estimation based on 1'000 parts/year.

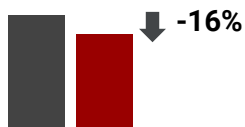
AUTOMOTIVE Bracket



This application showcases metal substitution of an existing series production automotive bracket with 3D printed industry-grade composite material using continuous carbon fibre and PA12.

This part was manufactured in collaboration with Setforge Engineering, Arts et Métiers Institute of Technologies, using the patented AFT and EPITHER processes.

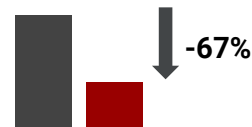
Costs / Part



■ Titanium ■ 9T Labs CF/PEKK

* Cost estimation based on 860 parts/year.

Part Weight

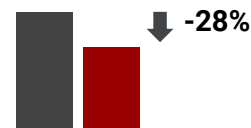


LUXURY Watchcase



This application shows a 3D printed CFRP watch case combining the benefits of carbon fiber with those of high-performance polymers, ensuring lightweight design, as well as excellent abrasion resistance. The flexible fiber orientation allows the customer to have a watch with a unique shock-resistance / scratch-resistance case design.

Costs / Part



■ Convent. Composites ■ 9T Labs CF/PEKK

* Cost estimation based on 1'200 parts/year.

Red Series®

Your go-to platform for digital composite production



Better utilization of fiber layup

- Lighter parts
- Reduced material use
- Reduced material waste



Increased Automation

- Reduced costs
- Reduced human error (higher reproducibility)



Higher accessibility

- High vertical integration
- Short part design times
- Reduced lead time



Increased use of thermoplastic composites

- Rapid cycle times
- Superior mechanical & chemical properties
- Remouldability

Based on the previous items, 9T Labs developed two complementary offerings as the go-to platform for industrial-grade continuous carbon fibre 3D-printed composites. You produce, we support.



Prototyping & Series Production



Structural Parts



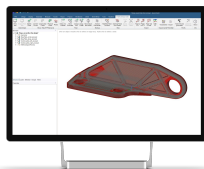
Higher Part Performance > 50% lighter designs



Lower Costs > 20% production cost reduction

Red Series® offering

We provide an end-to-end solution for prototypes & serial production of small and complex fiber composite parts



The optimal part is created inside our design & simulation environment.



Additive manufacturing is used to produce complex parts cost competitively.



Welding of printed parts is the game-changer for high value applications and serial production.



Our cloud-based platform **controls the workflow** and manages production data.

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