

# HÄNSSLER LFAM

LARGE FORMAT ADDITIVE MANUFACTURING



## FROM VISION TO FUNCTION – YOUR DEVELOPMENT PARTNER IN LARGE FORMAT AM

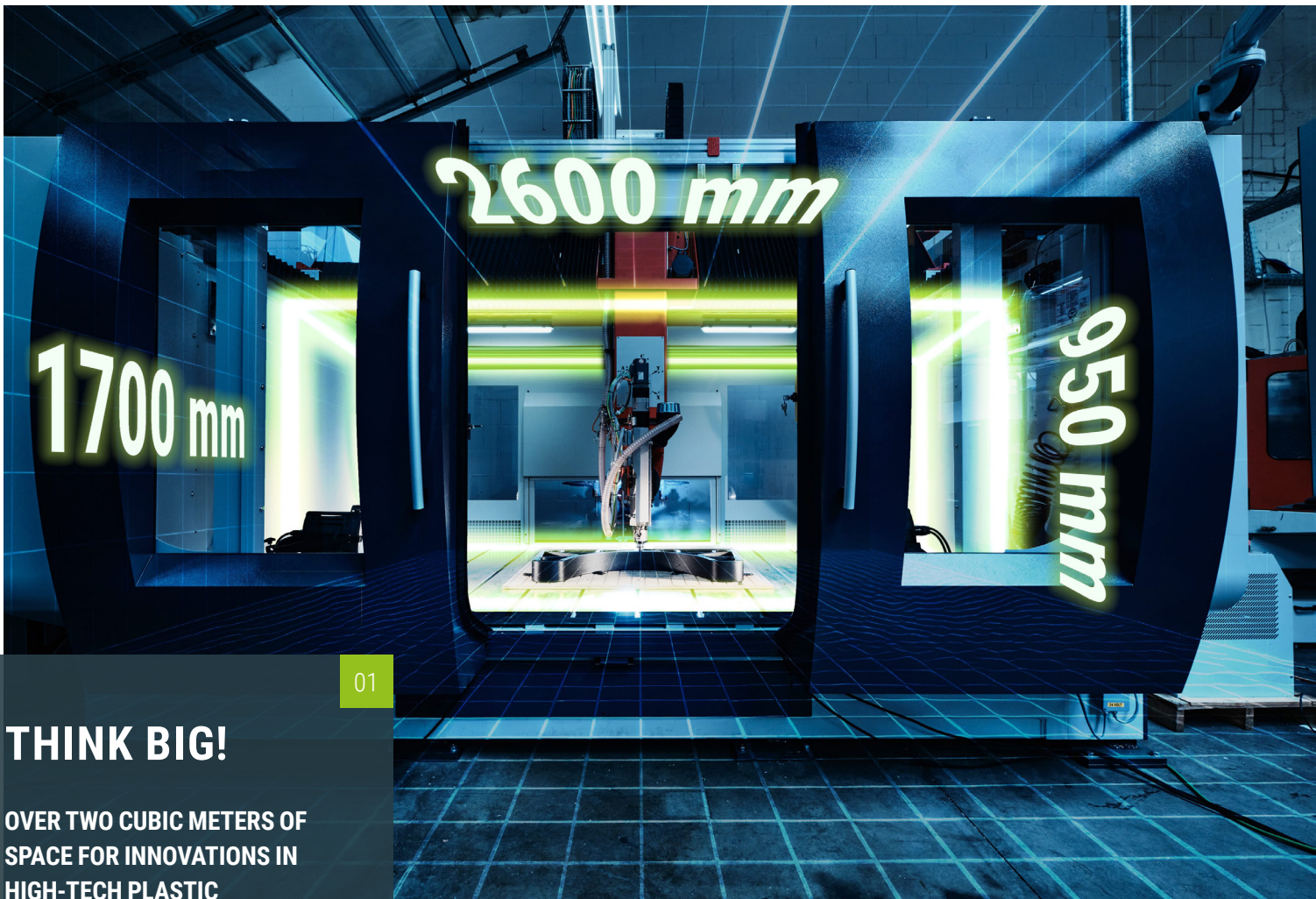
LFAM (Large Format Additive Manufacturing) combines our many years of expertise in subtractive and additive manufacturing. With this new, hybrid machining center, we manufacture next-generation plastic components. In combination with our development expertise, we are setting new standards. Discover what's possible with LFAM!



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**HÄNSSLER**  
Kunststoff- und Dichtungstechnik



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## THINK BIG!

OVER TWO CUBIC METERS OF SPACE FOR INNOVATIONS IN HIGH-TECH PLASTIC

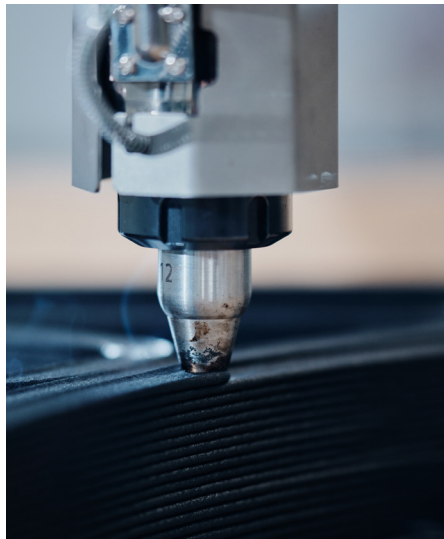
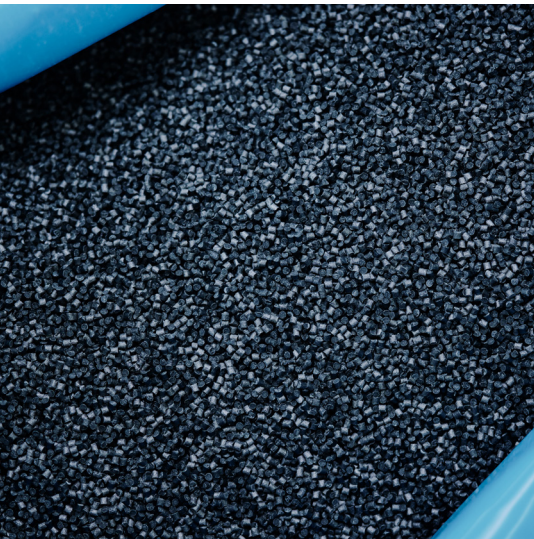
Our production process starts with the 3D printing of a near-net-shape preform, in which plastic granulate is melted in an extruder similar to that of a plastic injection molding machine.

The material is applied layer by layer through various nozzles. This additive part of production is also known as fused granulate fabrication (FGF) or pellet extrusion.

In the next step, the subtractive part, the printed blank is fully finish-machined using 5-axis CNC milling. Excess material is removed to achieve the final shape and surface quality. By combining additive and subtractive techniques, the final part delivers high dimensional accuracy, functional integration and unprecedented design flexibility.



**Any questions?**  
Please contact us!



## PRODUCTION OF LARGE MILLED PARTS

On our new system, we can also produce milled parts using traditional methods from semi-finished plastic products. With a processing volume of nearly two cubic meters, we offer new possibilities for manufacturing large-format technical plastic components.

All common engineering plastics can be machined. Thanks to multi-axis machining, even components with high geometric complexity can be manufactured precisely. The system was specifically designed for plastics processing and enables outstanding surface quality and dimensional accuracy despite its large build volume.



## MANUFACTURING LARGE PRINTED PARTS

For additive production, the system's spindle can be equipped with a modular extruder head that melts thermoplastic granulate and extrudes it through interchangeable nozzles. These nozzles range from 2 to 18 mm in diameter, allowing for tailored wall thicknesses and layer heights. This makes it possible to produce both filigree, visually appealing parts and highly rigid structural components.

A key feature of our system is its ability to perform simultaneous multi-axis movement during the printing process. Unlike conventional FDM systems, which are restricted to flat layer stacking along the X/Y/Z axes, our system allows for inclined, curved or spiral deposition paths. This enables the printing of parts with complex contours or on existing three-dimensional surfaces. For example, a structure can be printed directly onto a curved shell or at a 45° angle – without the need for post-processing or support structures.



## MANUFACTURING HYBRID COMPONENTS

3D-printed components are built up in layers. This gives the surface a corresponding structure. In addition, the dimensional accuracy of milled and turned parts cannot be achieved using pure 3D printing due to the manufacturing process. However, by combining the processes, the advantages of both technologies can be used and the respective disadvantages minimized. In concrete terms, this means first printing a near-contour blank, which can then be further processed by machining. Hybrid components therefore offer the many advantages of additive manufacturing, coupled with the familiar high quality of conventional milling and turning. Welcome to the world of LFAM.



## 1. NO LIMITATION BY THE SIZE OF THE HALF CUT / BLANK

An extruded or cast blank is usually required for the conventional milling of plastic parts. This must be obtained in the form of sheets or blocks from external suppliers. Manufacturers of semi-finished plastic products often limit themselves to a fixed delivery portfolio in terms of width, length and, above all, material thickness.

Special sizes are often not available to order, or can only be realized from a certain order quantity through special production with long delivery times. In addition, the wall thickness of fiber-reinforced plastics in particular is limited by the manufacturing process. Plastics with a higher glass or carbon fiber content are only available up to a maximum thickness of 150 mm.

We can circumvent this limitation by producing blanks directly from plastic granulate using the LFAM process that are adapted to the required component and close to the contour. These can be used to mill components that were previously unthinkable due to material availability. At the same time, a cost advantage is created by simplifying the supply chain, reducing delivery times and minimizing warehousing costs. Semi-finished products in different dimensions no longer need to be kept in stock.

## 2. HIGH EFFICIENCY

The production of near-contour blanks using the additive manufacturing process reduces the machining time for milling enormously.

Compared to production from sheet material or blocks, only a fraction of the material needs to be removed. In addition, components can be manufactured hollow or with a supporting structure inside.

This saves material and weight. In this way, many resources can be saved in the consumption and transportation of the material as well as through the reduced processing time.



**Any questions?**  
Please contact us!

### 3. MATERIAL DIVERSITY

The near-contour blanks for further processing as well as finished printed parts in large format are produced directly from plastic granulate, similar to that used in injection molding machines. For LFAM, only the mixture is adapted to the process. In principle, all thermoplastics can be processed. We continuously qualify new materials for LFAM applications. You will find a selection below. Do you need components made from a material that is not listed? Please feel free to make an appointment with our LFAM experts.

**rPETG+GF** This is an environmentally friendly material made from recycled PETG reinforced with glass fibers. This composite material combines the good printability and environmental friendliness of rPETG with the increased strength and stiffness of glass fibers, making it an excellent choice for demanding LFAM components.

**ABS+CF** stands for acrylonitrile butadiene styrene with carbon fiber reinforcement. It is a composite material that combines the lightness and strength of carbon fibers with the good processability and durability of ABS plastic. This material offers improved mechanical properties and is ideal for applications that require high strength and rigidity.

**PC+CF** stands for polycarbonate with carbon fiber reinforcement. This composite material combines the high impact strength and excellent heat resistance of polycarbonate with the high strength and lightness of carbon fibers. It is ideal for technical plastic parts that require high mechanical strength, dimensional stability and heat resistance.

**PEI+CF** stands for polyetherimide with carbon fiber reinforcement. This composite material combines the excellent thermal and chemical resistance of PEI with the high strength and stiffness of carbon fibers. It is ideal for demanding LFAM composite components that require high performance at high temperatures and under harsh conditions.

**PESU+CF** stands for polyethersulfone with carbon fiber reinforcement. This composite material combines the excellent heat resistance and chemical stability of PESU with the high strength and lightness of carbon fibers. It is ideal for demanding LFAM applications that require high performance under extreme conditions, including high temperatures and aggressive chemical environments.





#### 4. PRECISION AND QUALITY

Despite the size of the parts produced, LFAM enables high precision and surface quality. The milling step achieves outstanding dimensional and surface qualities that are equivalent to conventional milling from blanks. An optimized printing strategy avoids air pockets in the component.

Due to the high material discharge, the bond between the layers is significantly higher than with conventional printed parts. In principle, there is a certain difference between printed and conventionally extruded semi-finished products, which should be evaluated depending on the

application. Particularly in the case of large components, the dimensional accuracy can be significantly improved compared to components made from semi-finished products. If large volumes of plastic are removed, distortion of the component often occurs due to residual stresses being released. This effect must always be taken into account in conventional milling and complex countermeasures must be taken.

The near-contour blanks and the layered structure reduce this problem from the outset and significantly improve accuracy, particularly with regard to shape and position tolerances.



#### 5. INNOVATION AND COMPETITIVE ADVANTAGE

3D printing technology opens up new degrees of freedom. The familiar and established production-oriented design can be a thing of the past if 3D printing is considered as a manufacturing process.

This means that hollow components or components filled with support structures can be produced that would be unthinkable with other processes. Complex channels through the component, which would normally be impossible to demold or which a milling tool cannot produce, are now feasible. Components can be produced with a positive fit inside each other - without assembly. In addition, different materials can be combined in this process.

„There are so many possibilities when ”additive” thinking is applied as early as the component development stage. Together, we can make your ideas tangible on a new scale and in industrial quality! Please feel free to contact me.“

Dipl. Ing. Sebastian Hänssler,  
Management and design



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## STEP BY STEP TO THE PERFECT LFAM COMPONENT

### 1. CONTACT

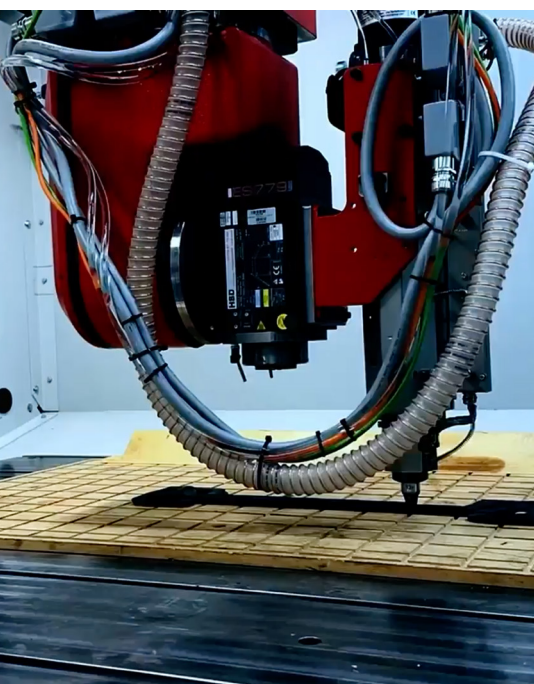
Especially because this is a new technology, we recommend contacting our specialists as early as the brainstorming stage or the start of development. In an initial discussion, we would like to understand your goals in order to derive possible solutions from them.

### 2. FEASIBILITY

The basis for the feasibility analysis is 3D CAD data, preferably in STEP format, which we use to simulate both the printing process and, if necessary, the milling process using special software. In consultation with you, we adapt the data if necessary and carry out an optimization with regard to cost-effectiveness and quality.

### 3. QUOTATION & PRODUCTION

Based on the data from the feasibility analysis, we can now prepare a binding quotation. Once the offer has been accepted, production can begin. We are your competent partner from the idea through feasibility and production to after-sales service.



**Any questions?**  
Book your free  
consultation

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## ENVIRONMENTAL ASPECTS OF LFAM

LFAM technology offers several advantages in terms of environmental compatibility and sustainability, which are important for industrial companies.



### Energy efficiency

The close contour blank production reduces the machining time enormously, which directly saves energy. In addition, less plastic is processed, which also saves energy.



### Reduction of transport emissions

As less material is used in the LFAM process due to the near-contour printing, the energy required to transport heavy and large semi-finished products and later to remove the chips is reduced. The delivery routes are reduced and additional energy is saved, which reduces CO2 emissions.



### Recycling and reuse

Our LFAM system can process recycled plastics. This can help to reduce the need for new raw materials and reduce the amount of plastic waste. With the material rPETG+GF, we already have a recycled material in our portfolio today. Others will follow in the near future.



### Efficient use of material

The strategy of printing near-contour blanks and designing thick-walled areas to be hollow or with a coarse support structure saves a considerable amount of material compared to sheets or blocks.

Only the minimum amount of allowance is added in order to achieve a clean surface after the milling process. Depending on the geometry of the final component, up to 80% plastic can be saved. In addition, there is no waste that would inevitably be produced

when preparing suitable panel blanks. By reducing the amount of material used, less waste is produced during machining in the form of chips, which are often which are often not suitable for material recycling due to contamination or degradation.

# INDUSTRY SOLUTIONS FOR LFAM

Large Format Additive Manufacturing (LFAM) will establish itself as a revolutionary technology in a variety of industries that require large-format, customized parts. We would like to highlight a few examples below.

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## CONSTRUCTION INDUSTRY

Here, LFAM can be used for the production of customized components, such as façade elements or load-bearing structures. By using recycled or bio-based materials, LFAM could help to improve sustainability in the construction industry. Initial projects in which plastic molds are used for concrete casting enable individual designs with a reduced amount of concrete.



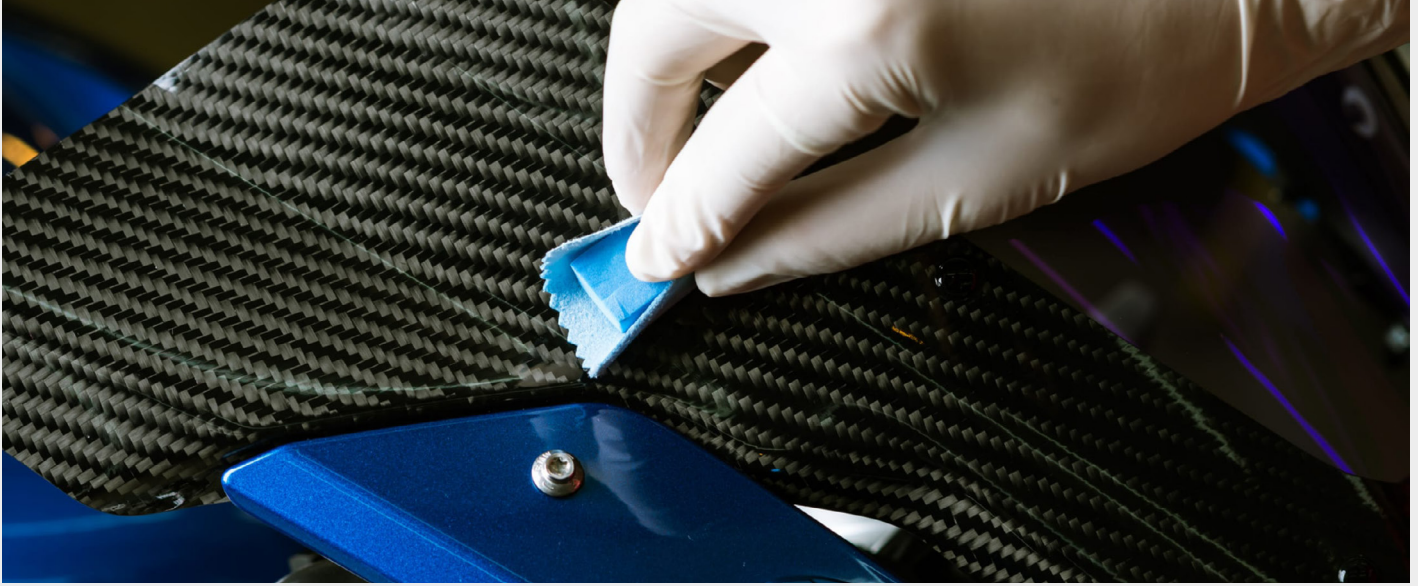
## MACHINE AND PLANT ENGINEERING

Large components that were previously made of steel or aluminum can be replaced with lighter plastic components. This saves weight and reduces the number of components. With LFAM, more complex geometries can be produced and several functions can be realized with fewer components. Due to its high flexibility, LFAM is also suitable for small quantities or one-off production. LFAM is an optimal solution for special machine construction.



## MEDICAL TECHNOLOGY

In medical technology, LFAM could be used for the production of customized medical devices or prostheses. By using biocompatible materials, LFAM could help to improve patient safety and comfort.



## CARBON LAMINATION AND AUTOMOTIVE INDUSTRY

LFAM is also used to produce molds for carbon lamination. This process takes advantage of LFAM's ability to produce large, precise, high-quality molds quickly and cost-effectively. The resulting molds can then be used for carbon fiber lamination to produce lightweight and high-strength components. One example of this is the production of molds for

carbon lamination in the aerospace industry.

LFAM can be used to produce molds for the manufacture of aircraft parts such as wings, fuselage structures or interior components. These parts benefit from the outstanding mechanical properties of carbon fibers, such as high strength

and low weight. LFAM technology enables fast and efficient production of these parts through efficient mold making. Another example is the production of molds for carbon lamination in the automotive industry.



## AEROSPACE

The aerospace industry often requires large, lightweight and high-strength components. LFAM enables the production of such components from high-performance plastics and composites. Aircraft parts such as wings, fuselage structures or interiors can be manufactured in one piece with LFAM, which significantly reduces assembly time and weight.



## SHIP AND YACHT BUILDING

In shipbuilding, LFAM can be used to produce large parts such as hull structures, deck components and interior fittings. By using lightweight and corrosion-resistant materials, LFAM can help to reduce the weight of the ship and is particularly suitable for small series and one-off productions. This technology is also ideal for complex or customized design solutions.



## FURNITURE INDUSTRY

In the furniture industry, LFAM can be used for the production of customized furniture or decorative elements. This gives designers greater creative freedom and allows the production of personalized furniture.



**Any questions?**  
Please contact us!

# OUR CORE COMPETENCIES IN THE LFAM SECTOR



Personal contact



Development & optimization of plastic parts



Selecting the right material



Selection of the right manufacturing process



Quality from in-house production



Responsible production



Certified to DIN EN ISO 9001 (quality)



Flexible and on-time production



Networked processes



Short and precise delivery times



## FREQUENTLY ASKED QUESTIONS ABOUT LFAM

### What is Large Format Additive Manufacturing (LFAM)?

LFAM is a manufacturing process that combines large-scale 3D printing with CNC machining. It enables the production of oversized, complex plastic components by using thermoplastic granulates as the raw material. The process is particularly suited for parts that are difficult or impossible to manufacture using conventional methods due to their size, complexity, or material requirements.

### How does the LFAM process work in detail?

The process begins with the additive phase, in which plastic granulate is melted and deposited layer by layer to create a near-net-shape blank. This is followed by a subtractive phase, where the printed preform is finish-machined using multi-axis CNC milling. This hybrid approach ensures high dimensional accuracy, functional integration, and excellent surface quality.

### What differentiates LFAM from conventional 3D printing methods?

LFAM is specifically designed for large-format parts and uses pellet-based extrusion rather than filament. Unlike standard FDM printers, it combines additive and subtractive manufacturing in a single process chain. This results in greater efficiency, higher mechanical precision, and more flexibility in geometry and materials.

### In which areas of application is LFAM mainly used?

LFAM is mainly used in areas that require large, customized parts, such as aerospace, mechanical and plant engineering, shipbuilding and wind energy.

### What is the difference between LFAM and Fused Granulate Fabrication (FGF)?

FGF refers purely to the additive part of the process, where thermoplastic granulates are melted and extruded. LFAM goes a step further: it integrates CNC post-processing into the same workflow, enabling precision surfaces, tight tolerances, and hybrid designs. In short, LFAM = FGF + machining.

### How can LFAM contribute to improving product quality?

LFAM can improve product quality by producing excellent surface quality with high precision. Complex internal structures and geometries are possible that would not be possible with conventional manufacturing methods. It also allows the use of high-performance materials and composites, resulting in improved mechanical properties.

### In which industries is LFAM primarily used?

- Aerospace and aviation
- Machine and plant engineering
- Automotive and motorsport
- Medical technology (e.g. prosthetic molds)
- Shipbuilding and yacht design
- Architecture and construction
- Furniture and design prototyping

### What are the key benefits of LFAM for industrial applications?

- Scalable size: Component dimensions beyond conventional limits

- Design freedom: Complex geometries, hollow structures, integrated features
- Material efficiency: Near-net-shape blanks minimize waste
- Speed: Shorter lead times and fewer process steps
- Versatility: Suitable for prototyping, one-offs, and series production

### What materials can be used with LFAM?

LFAM supports a wide range of engineering thermoplastics, including reinforced grades such as:

- rPETG+GF (recycled PETG with glass fibers)
- ABS+CF, PC+CF, PEI+CF, PESU+CF (carbon-fiber reinforced materials)

We continuously qualify new materials. If your required polymer is not listed, our development team will evaluate its feasibility for LFAM use.

### What is the dimensional accuracy of LFAM components?

Thanks to CNC finishing, dimensional tolerances and surface quality are comparable to conventional milled parts. The hybrid process avoids warping due to internal stresses and enables tight tolerances even in large-format parts.

### What post-processing is required?

Post-processing may include:

- Surface machining (milling or polishing)
- Removal of optional support structures
- Drilling, fitting, or functional feature integration
- Optional coatings (e.g. for UV resistance or aesthetics)

The extent depends on functional and visual requirements.



**Any questions?**  
Book your free consultation

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