
miniFactory
YOUR TRUSTED PARTNER IN ADDITIVE MANUFACTURING
MATERIALS & APPLICATIONS

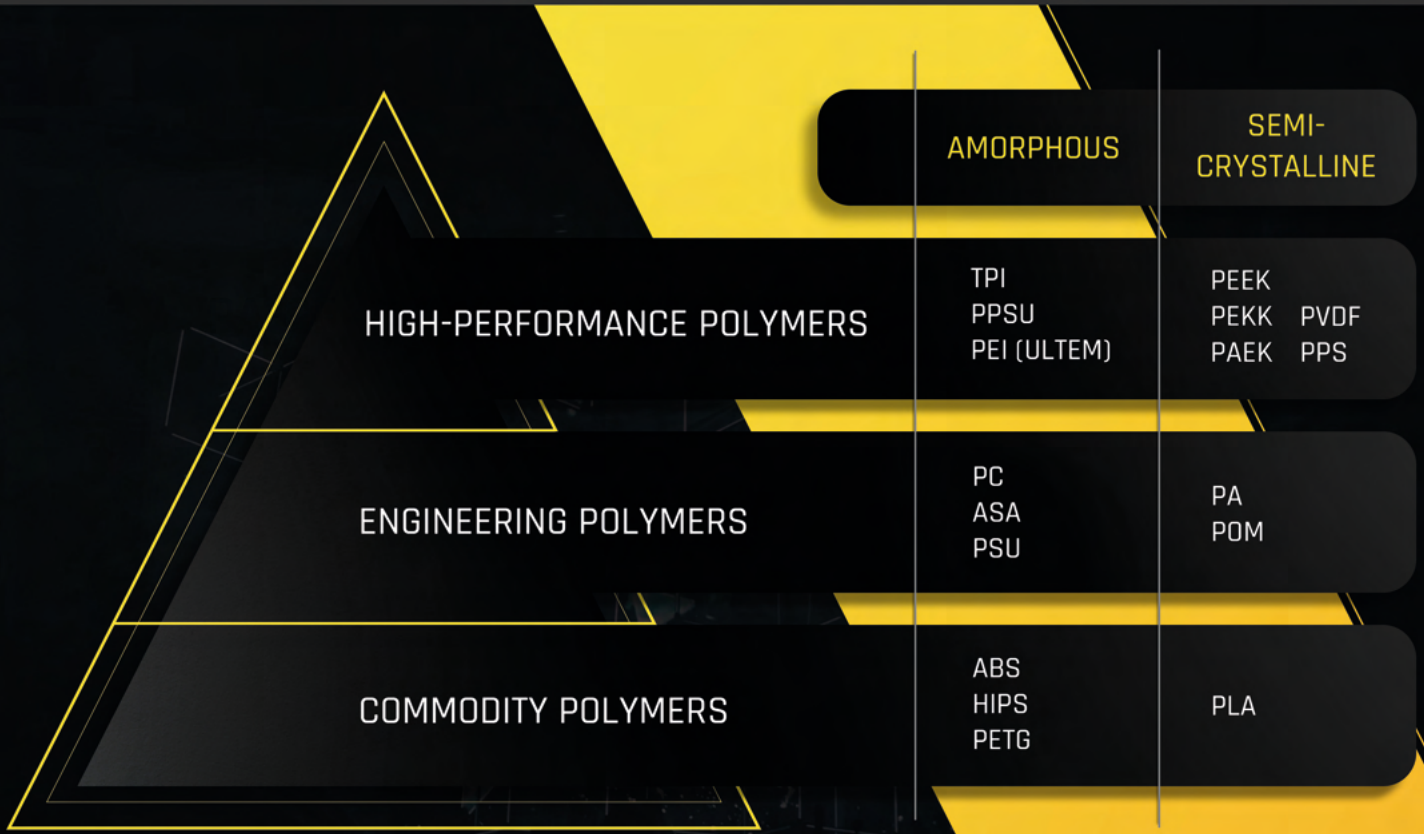
BENEFITS OF HIGH-PERFORMANCE POLYMERS

High-performance polymers combines the best features of polymers and has higher strength-to-weight ratio than metal alloys. These materials can be exposed on environments where other polymers can't withstand or where metals is not an option.

- Resistance against aggressive chemicals and solvents
- Naturally corrosion free
- Great strength-to-weight ratio to optimize efficiency
- Service temperatures up to 250˚C opens new possibilities
- Extreme electrical insulation in all shapes and forms
- Durability and silence with self-lubricating properties
- Repeatable sterilization with all common methods
- Industry specific approvals

WIDEST MATERIAL RANGE - UNLOCK THE FULL POTENTIAL OF 3D PRINTING

Have access to tens of different materials, from commodity polymers all a way up to high-performance polymers including polymer composites and ESD materials. This picture consist the most well known materials only:



POLYMER COMPARASION

High-performance polymers can be utilized in the most demanding environments and applications.
5 is the strongest of the values, where 1 is the weakest

	PEEK / PEKK-SC	PEKK-A	PPSU	TPI	ULTEM 1010	ULTEM 9085	PA 6/66 CF	PC	ABS	PLA
Heat resistance	250°C	145°C	220°C	240°C	215°C	175°C	150°C	135°C	80°C	50°C
Flame resistance	Yes, UL94-V0	Yes, UL94-V0	Yes, UL94-V0	Yes, UL94-V0	Yes, UL94-V0	Yes, UL94-V0	-	-	-	-
Sterilization resistance	5	4	5	3	3	2	-	-	-	-
Electical Insulation properties	5	5	3	4	4	3	2	3	4	3
Chemical resistance	5	4	4	3	3	3	2	1	1	-
Dimensional accuracy	2	5	5	5	5	5	5	5	5	5
CF reinforced grade available	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ESD grade available	Yes	Yes	-	-	Yes	-	Yes	Yes	Yes	Yes

PEEK-CF

KEY ADVANTAGES

Heat resistance up to 260°C

High strength and toughness

Great abrasion and wear resistance

Excellent hydrolysis resistance

Low smoke and toxic gas emissions

MATERIAL APPLICATIONS

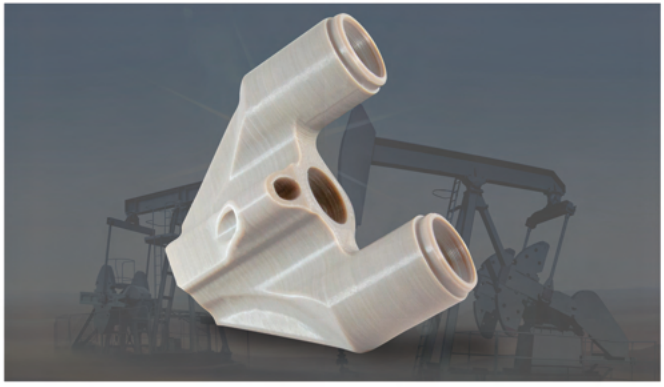
Bearing retainers

Grippers & High-temp jigs

Gears

Oil and gas processing equipment

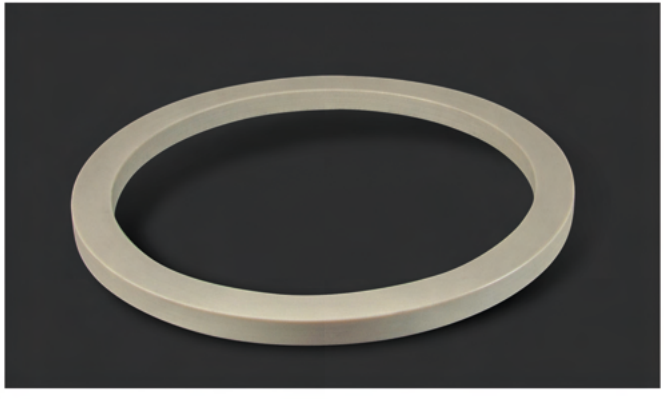
Aircraft hardware and fasteners



PEEK / PEKK

KEY ADVANTAGES

Heat resistance up to 250°C
High strength and toughness
Great abrasion and wear resistance
Extreme chemical resistance
High dielectric strength



MATERIAL APPLICATIONS

Semiconductor applications
Wear resistance applications
Electrical insulations
Compressor plate valves
Gears

TPI

(Thermoplastic polyimide)

KEY ADVANTAGES

Heat resistance up to 240°C

High dielectric strength

Inherent flame resistance (UL94 V-0)

Halogen free

Excellent creep resistance

MATERIAL APPLICATIONS

Electrical insulation parts

Connectors

High-temperature assemblies

Molding applications

Semiconductor applications

Courtesy of Heinz-Glas Decor

ULTEM 1010 / PEI-1010

KEY ADVANTAGES

Heat resistance up to 210°C

Excellent electrical insulation properties

Good chemical resistance

Inherent flame resistance (UL94 V-0)

FDA grade available

MATERIAL APPLICATIONS

Electrical insulation parts

Thermoforming molds

Composite Lay-Up tooling

Custom tools for metal and plastic

FDA applications

ULTEM 9085 / PEI-9085

KEY ADVANTAGES

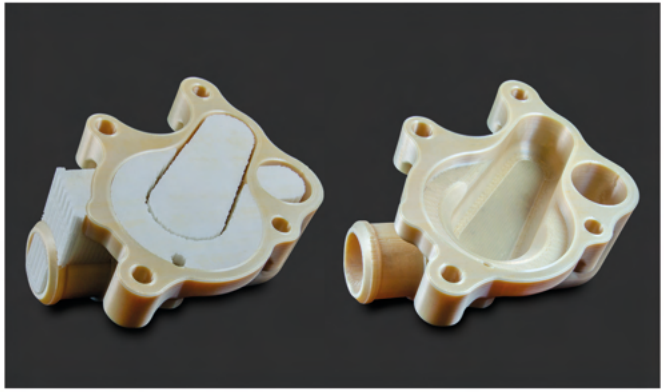
Heat resistance up to 170°C

Certified for aircraft components

FST compliant with an OSU rating of 55/55

Inherent flame resistance (UL94 V-0)

Fire Protection of Railway Vehicles (EN45545-2)



MATERIAL APPLICATIONS

Interior components

Ventilation system components

Cable ducts

Latches

Housing parts

PEKK-A

KEY ADVANTAGES

Heat resistance up to 150°C

Extremely low outgassing

Inherent flame resistance (UL94 V-0)

Fire Protection of Railway Vehicles (EN45545-2)

Low FST (Flame, Smoke, Toxicity)

Comparable to Stratasys ANTERO800NA material

MATERIAL APPLICATIONS

Railway interior parts

Space grade parts

Trays and packaging

EMI/RFI shielding

Technical insulation parts

ESD-PEKK

KEY ADVANTAGES

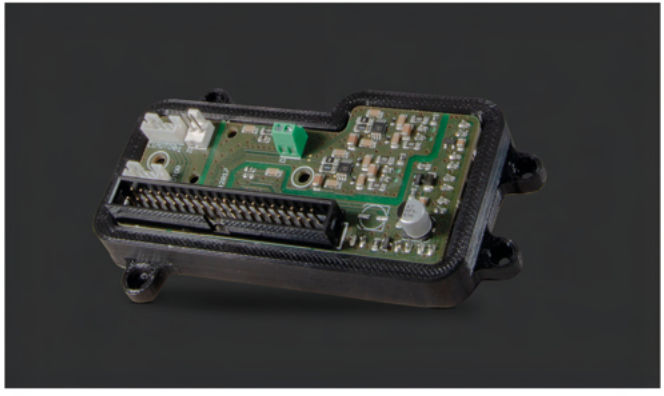
Heat resistance up to 150°C

10^7 to 10^9ohm surface resistivity on 3DP sample

Consistent surface resistivity

Low outgassing - ideal for space related applications

Excellent resistance to a broad range of chemicals



MATERIAL APPLICATIONS

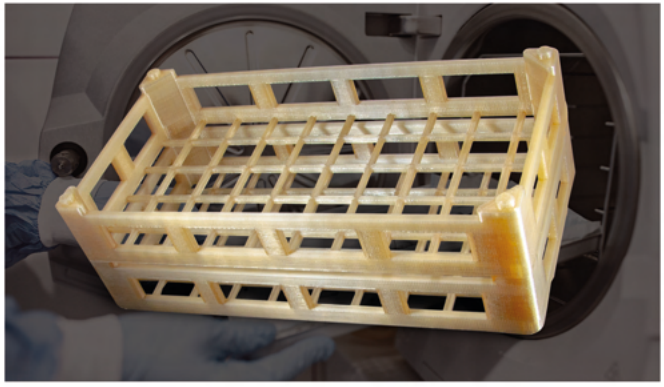
ESD-safe parts

Functional prototypes

ESD-safe jigs/fixtures

Aerospace / space vehicle components

Electronics industry parts



PPSU

KEY ADVANTAGES

Heat resistance up to 220°C

Excellent chemical and thermal resistance

Sterilization capable –
incl. EtO gas, radiation, steam autoclaving, plasma etc.

Excellent hydrolysis resistance

Exceptional toughness and durability

MATERIAL APPLICATIONS

Sterilization trays and cases

Surgical instrument handles

Clean-room compatibility parts

Hot water fittings

Low-volume injection molds

PVDF

KEY ADVANTAGES

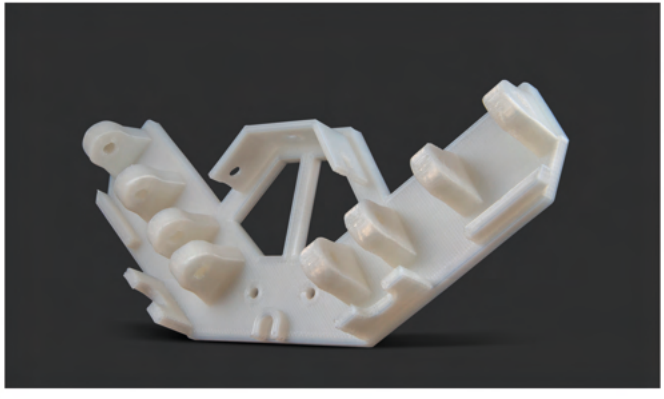
Heat resistance up to 150°C

Good resistance to acids and solvents

Extremely high electrochemical stability

Great abrasion and wear resistance

Outstanding resistance to sunlight/UV exposure



MATERIAL APPLICATIONS

Semiconductor applications

Wear resistance applications

Electrical insulations

Chemical process equipment

UV resistance applications

PA-CF

KEY ADVANTAGES

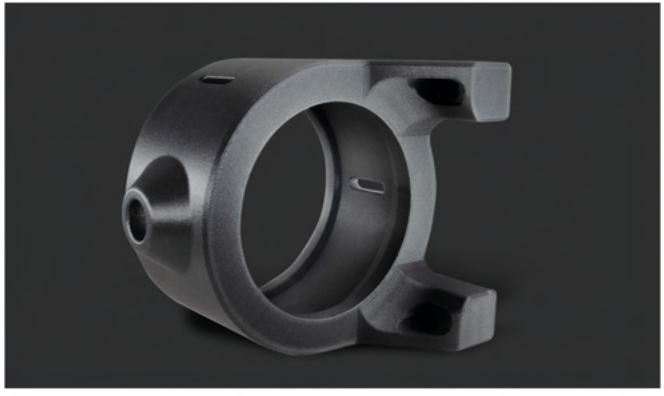
Heat resistance 150°C

PA6/66 – up to 100% stronger than PA11/PA12

Strong and durable

High dimensional stability

Supreme surface quality



MATERIAL APPLICATIONS

Racing applications

Protective and supporting sports gear

High performance functional parts

Manufacturing jigs and fixtures

Light weight applications

PC-S

KEY ADVANTAGES

Temperature tolerance (from -100°C to +140°C)

Sterilization capable

Excellent impact resistance

Low hydrolysis sensitivity

Food contact certification EU10/2011, FDA 21 CFR

MATERIAL APPLICATIONS

Processing line parts

Dispensers

Housing parts

Jigs

Grabbers

INDUSTRIES THAT UTILIZE HIGH-PERFORMANCE POLYMER 3D PRINTING

miniFactory technology is trusted by many industries in over 20 different countries.

PACKAGING INDUSTRY

HEINZGLAS
family-owned since 1622

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CHALLENGE

Heinz-Glas Décor Ltd. is a highly specialized company engaged in the research and production of glass bottle printing and decoration for the leading cosmetic and perfume manufacturers around the world.

SOLUTION

The printing and decoration process for glass products requires different production jigs. which always differ according to the geometry of the glass product. The requirements for the materials used in the jigs are extreme, as very high temperatures are used in the process. In addition to the high temperature, the material used in jigs must be able to withstand UV radiation, pressure and have good resistance to harsh chemicals.

The integration of high-performance polymer 3D printing into serial production has accelerated the leading time of production jigs from days and weeks to minutes and hours.
In addition, manufacturing costs have dropped by 50-70% compared to traditional manufacturing.

MOTORSPORTS

JML-SPORTS

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CHALLENGE

Jari-Matti Latvala has been around rally cars almost his entire life. He has turned his passion into his job by being a rally driver but also by being an entrepreneur. His company JML-Sports is focused on re-building the "cult" cars of 80' and 90' to a historic rally cars. The availability of spare parts for those cars is extremely limited and the manufacturing is usually complicated and expensive

SOLUTION

With 3D printing, the team can significantly speed up the manufacturing of parts and with the fraction of the cost of traditional manufacturing. What used to take multiple weeks to manufacture has now turned to overnight production under their own roof. At best, this happens within hours, without special tools, moulds, or multi-stage manufacturing methods. In most occasions they can even outperform the original part with the 3D printed version.

"With miniFactory Ultra 3D printer, we are able to create end use parts with integrated features. Those parts used to be difficult to get or even manufacture. Excellent example of such part is the new turbo intake pipe that we 3D printed. The complex geometry combined with optimized airflow keeps me amazed."

- Jari-Matti Latvala, JML-Sports

AEROSPACE INDUSTRY

esa
European Space Agency

miniFactory

CHALLENGE

The project called HighPEEK was launched in September 2019.
The project will ultimately produce parts applicable to space technology.
The project is funded by the European Space Agency – ESA.
Since the cost for every kilogram launched to orbit can be up to $30.000,
considerable budget savings can be achieved even with small weight losses

SOLUTION

Finnish research group's project aims for spacecraft that are lighter and faster to manufacture. The research focuses on the development of 3D printed polymer components suitable for use in space. The research of the project aims to reduce at least 50% of the weight of the parts and minimize the lead time.

The idea is to replace metal parts, so the materials used in the project generally need to be the most extreme high-performance polymers. 3D printing of such materials is extremely cost-effective way of manufacturing which is in the interests of the space launch market. The material used in the 3D printed version is carbon fiber reinforced PEEK.

RAILWAY INDUSTRY

ALSTOM

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CHALLENGE

The life cycle of trains can be up to 30 years, which presents a major challenge for spare parts. Some spare parts also change as development progresses, which is a challenge for traditional manufacturing methods. Spare parts for newer trains are often widely available.

When it comes to a train more than 15 years old, the issue is much more complicated. In most cases, such spare parts are no longer available, or tools do not exist. This makes the cost of manufacturing individual parts very high and unprofitable for everyone involved in the process.

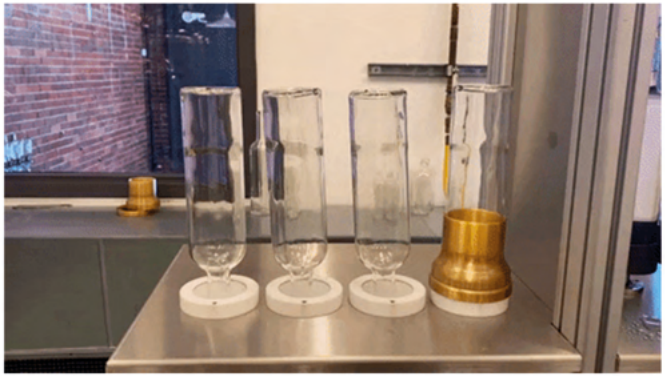
SOLUTION

3D printing of certified EN45545-2 materials offers the possibility to manufacture spare parts individually or in small series.

It is also more cost-effective, and the parts can be manufactured directly to where it is needed.

FOOD INDUSTRY

Our/Vodka



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CHALLENGE

Our/Vodka is a global company that produces vodka in micro-distilleries all around the world. Their concept is to let their international partners add their own mark on the products by producing them locally. Our/Vodka is constantly launching new products. That requires the ability to adapt production equipment quickly and efficiently to meet their needs. The production equipment was originally developed for a one specific purpose, making it challenging and expensive to modify.

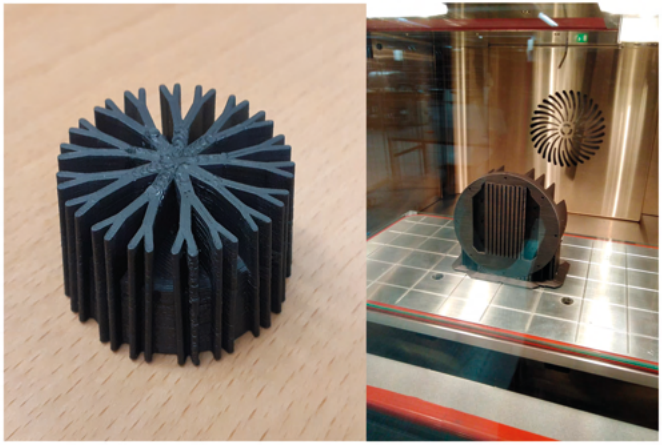
SOLUTION

3D printing provided a flexible and relatively inexpensive solution to reconfigure their current equipment. In this case, custom holders for one of their new product solutions was 3D printed. First, the bottles were scanned with a 3D scanner, to be able to model the parts according to shape and size.

The design of the parts was then determined after extensive testing and revisions and then printed using the miniFactory Ultra.

EDUCATIONAL INSTITUTE

XAMK
South-Eastern Finland
University of Applied Sciences



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CHALLENGE

South-Eastern Finland University of Applied Sciences (Xamk) has started a project called AMAP. It aims to provide valuable information to the local industries about the possibilities of professional 3D printing. One of the first needs was to find a 3D printer that would be capable to produce parts from high-performance materials with FFF-technology. During the project Ultra 3D printer will be used as a professional tool for the research purposes. The aim is to find the applications that would benefit from the additive manufacturing with the local companies.

SOLUTION

"Having a versatile high-performance printer has benefitted both XAMK and the local industries. There are 10 co-operation companies involved in the project. The Ultra has been going nonstop. During the first year we printed 214 parts at XAMK. This reveals the huge demand and interest, and the opportunities of high-performance polymers combined with what 3D printing can offer. 3D printing has taken its place on selection of manufacturing methods. 3D printing brings more new possibilities. We just need to rethink the manufacturing according to the possibilities 3D printing provides".

– Ilkka Vanttaja, R&D Specialist, XAMK

3D PRINTING SERVICE

SME
Elektro-Group

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CHALLENGE

SME Elektro-Group provides contract manufacturing of demanding precision mechanics and industrial electronics for international machine and device manufacturers. Their customers are appreciated/ valued high technology companies that provide high quality products in their business fields.
SME Elektro-Group employs 120 people and is located at Salo, Finland.

SOLUTION

"We decided to start high-performance polymer 3D printing based on the demand of our customers. Our customers had certain parts that were challenging to machine and had to withstand use in challenging environments. With 3D printing, you can achieve shapes that you can't achieve with other technologies, while being a much more cost-effective option for many parts .

Now, 3D printing of different special polymers has become such a large part of our production range that we have begun to favor 3D printing as our primary technology. We start by thinking about making parts by 3D printing instead of doing it by machining."

- Joni Niemi, CEO, Sorv-Elektro Oy

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