Additive Manufacturing in High Performance Plastics

#PrintStrongLikeMetal

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Reference Markets

Consumer/desktop:

- Contained costs (300€-3k€)
- Quality limitations
- Limited materials available
(ABS, PLA)

Architects, designers, hobbyist, schools…

Production:

- High costs (>100k€)
- Print quality
- High performance materials
(Nylon, PC, PPSU, PEI..)

Large organizations capable of hefty investments

Roboze technology

Contained costs in relation to material and print quality

Small and medium-sized enterprises

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Roboze Technology

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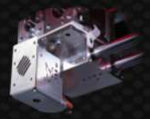
Roboze One

BELTLESS SYSTEM TECHNOLOGY

The most accurate FFF printer mechatronic-wise (25µm)

PLA, ABS, ABS-ESD, PC, TPU, Nylon 6, Carbon PA

Roboze One+400



HVP Extruder (High Viscosity Polymers)**:T=500°C**

PEI
PEEK

ARGO 500

HVP Extruder: T=550°C
Build Volume: 500x500x500mm

Carbon PEEK

TECNO-POLIMERS
Rapid prototypes and functional parts

SUPER POLYMERS
Metal Replacement

Technopolymers

PLA

ABS

ABS–ESD

PC

TPU

Nylon 6

- Conceptual prototypes
- Electronic components
- Gaskets
- Mechanical components

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Carbon PA: High Performance Composite Material

CARBON PA: Polyamide reinforced with 20% carbon fiber

- Exceptional resistance for a material printed with FFF technology
- Metal replacement applications: lightweight/high strength combination
- High aesthetic quality

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Mechanical Properties	XY	XZ
Tensile Strength (MPa)	136	138
Elastic Modulus (Gpa)	15.5	14.7

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Automotive and Motorsport Industries

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- Possibility of optimization and renewal of design
- Limited-edition custom series
- Spare parts
- Reduction in weight, fuel consumption and CO_2 emissions

Artisanal and Manufacturing Industries

Jigs and Fixtures

Advantages :

– Optimized cycle time
– Design freedom
– Reducing inventrory space

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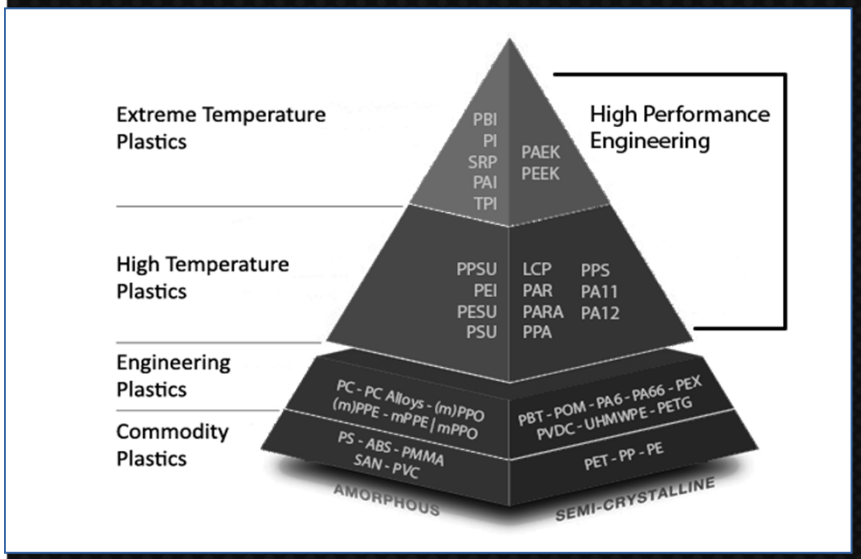
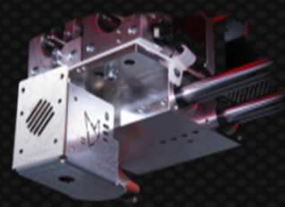
Super Polymers



The solution for extreme challenges
Unique combination of properties:

- Mechanical
- Thermal
- Chemical
- High Tg and Tf
- High Viscosity
- PEI
- PEEK
- Carbon PEEK

T extruder > 500°C



PEEK: Thermal Properties	
Melting Point	343°C
Glass Transition	143°C
HDT (@1,8 Mpa)	145°C
CUT	250°C

Carbon PEEK: Thermal Properties	
HDT (@1,8 Mpa)	280°C
CUT	250°C

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PEEK and Carbon PEEK

Roboze - leader in PEEK 3D printing

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- Metal Replacement for extreme environments
- Lightweight
- Few highly customized pieces
- No limits on geometric complexity

Automotive and Motorsport

Aircraft/Aerospace

Oil and Gas

FFF vs CNC

Two Opposite Approaches

- Costs
- Time
- Tolerances
- Freedom of Design

Advantages CNC	Advantages Roboze FFF
•Tighter tolerances •Surface finish	• Cost • Time • Design freedom

Reduced Costs:
- Zero material waste
- Zero operator costs
- Zero use costs

Time saving:
- One step process
- Zero planning
- Multi-3D Printing
- Shorter delivery time

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Direct Tooling:

Autoclave composites molding with Roboze PEEK

Metal replacement: Roboze PEEK vs CNC Anticorodal 6082

Tool 1	Roboze PEEK	CNC Anticorodal6082
Price	45 €	35€/h = 105€
Time	2,5 h	3h
Tool 2	Roboze Carbon PEEK	CNC Anticorodal6082
Price	57 €	35€/h = 175€
Time	3 h	5h

60-70% savings on costs and time reduction:

- No waste material
- No labor costs
- Possible to print several parts in a single print launch
- No need to revise the process in case of design change

Autoclave process with pressure of 7 bar and temperature of 180°C.

Future Developments

- New high performance composite materials
- Support materials for high temperature polymers
- Greater adhesion and mechanical properties
- Biomedical sector: PEEK permanent implants, scaffold

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Thank you for your attention!

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