



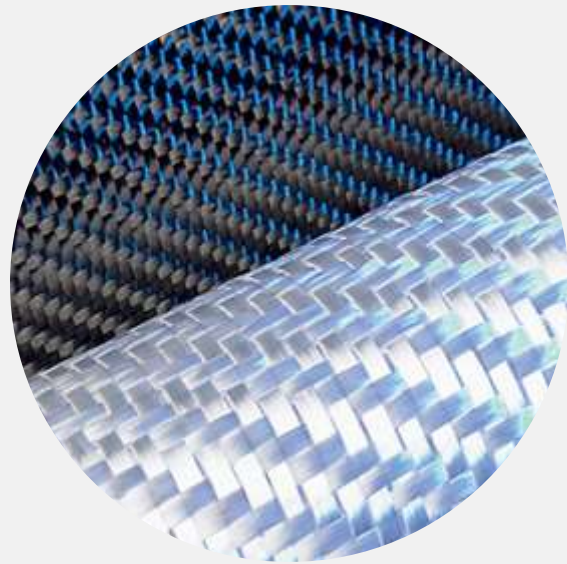
anisoprint

ANISOPRINT COMPOSER

Technology | Prices | Competition

anisoprint.com ↗

3D PRINTING COMPOSITES. SYNERGY FOR DISRUPTION



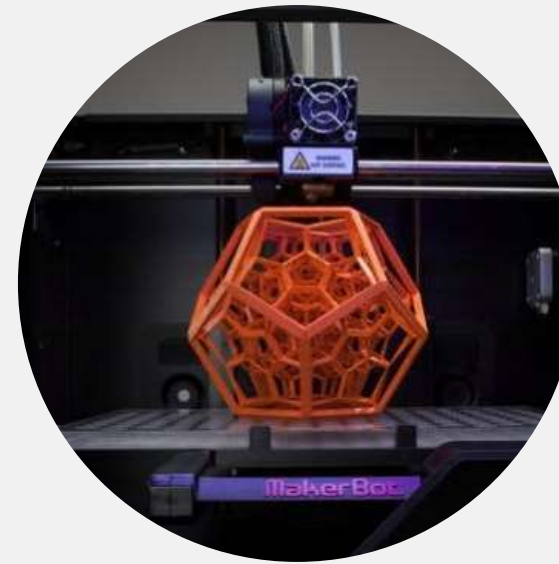
COMPOSITES
HIGH PROPERTIES

STRONG

STIFF

LIGHTWEIGHT

+



3D PRINTING
COMPLEX SHAPES

COMPLEXITY FOR FREE

CHANGES FOR FREE

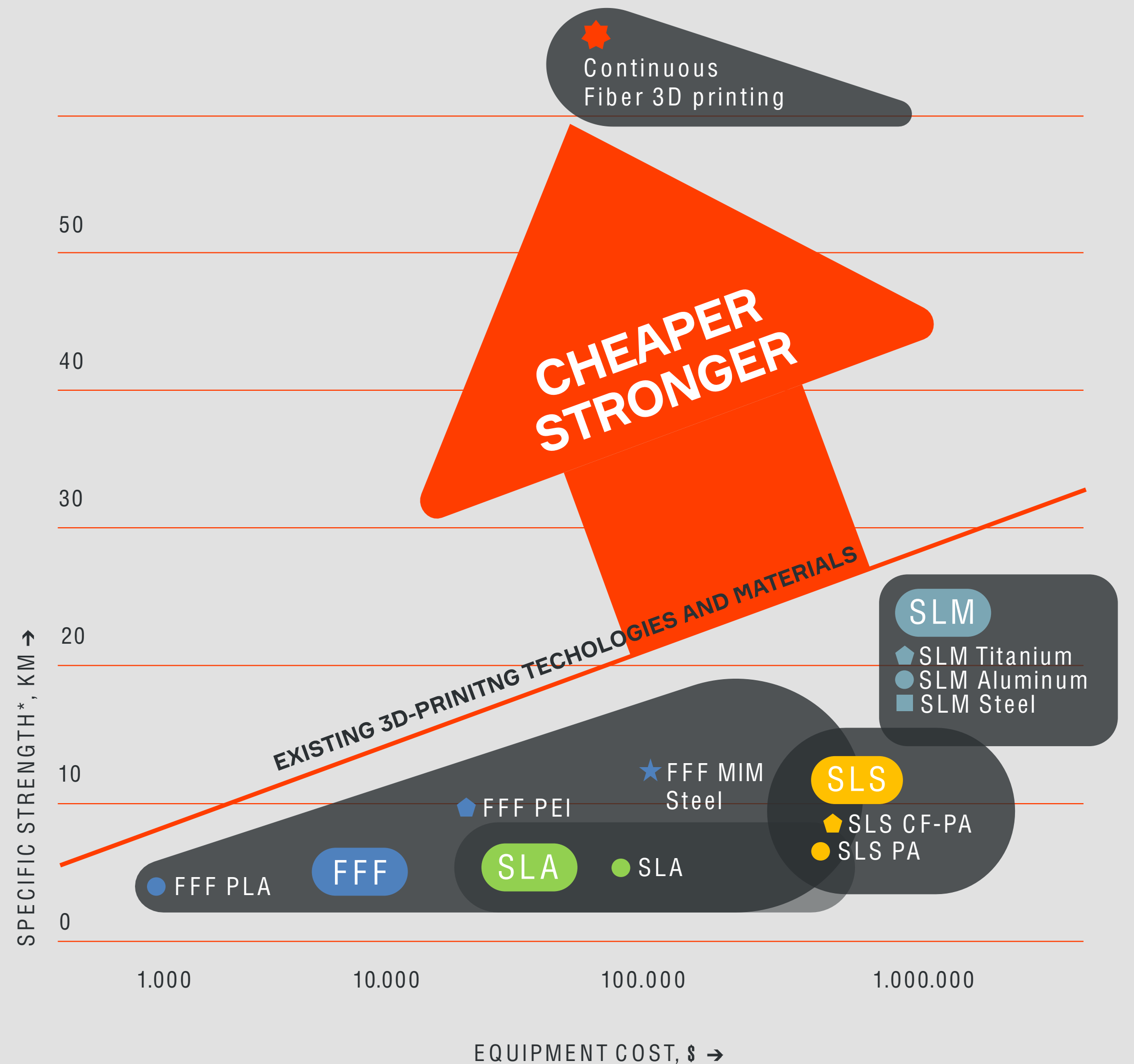
FREEDOM FOR FREE

=



ANISOPRINTING
HIGH PROPERTIES
& COMPLEX SHAPES
NO COMPROMISE

STRONG AND LIGHTWEIGHT



*Specific strength is material's strength divided by it's density.

WHY ANISOPRINT

EXPERT, PARTNER AND CUSTOMER VOICES:



“At Schunk Carbon Technology we are using the Anisoprint Composer for printing demonstrators and tools for our production. The Composer does a good job! It works precisely and reliably and together with its slicing software “Aura” it forms a capable tool”

GOTTHARD NAUDITT, R&D
Engineer Composites, Schunk
Carbon Technology



“Anisoprint Composer is an extremely handy tool for researchers to screen libraries of materials and new possible fibers layout. The perfect research tool for materials scientists in the field of composites 3d printing. We are very satisfied by the service. Very good product and customer service”

ANDREA GASPERINI, Project leader,
Brightlands Materials Center



“Thank you for ... a brilliant printer. We have made many samples with Composer A4. It varies according to usage techniques, the quality is good and we are very satisfied with various uses. Even our existing ... customers are very interested in Anisoprint Composer & Prom IS 500”

JOSH MOON,
Sales Director, 3D Cloud



“The 3D printers from Anisoprint use continuous carbon fiber reinforcements while giving the user maximum freedom in material choice and reinforcement positioning”

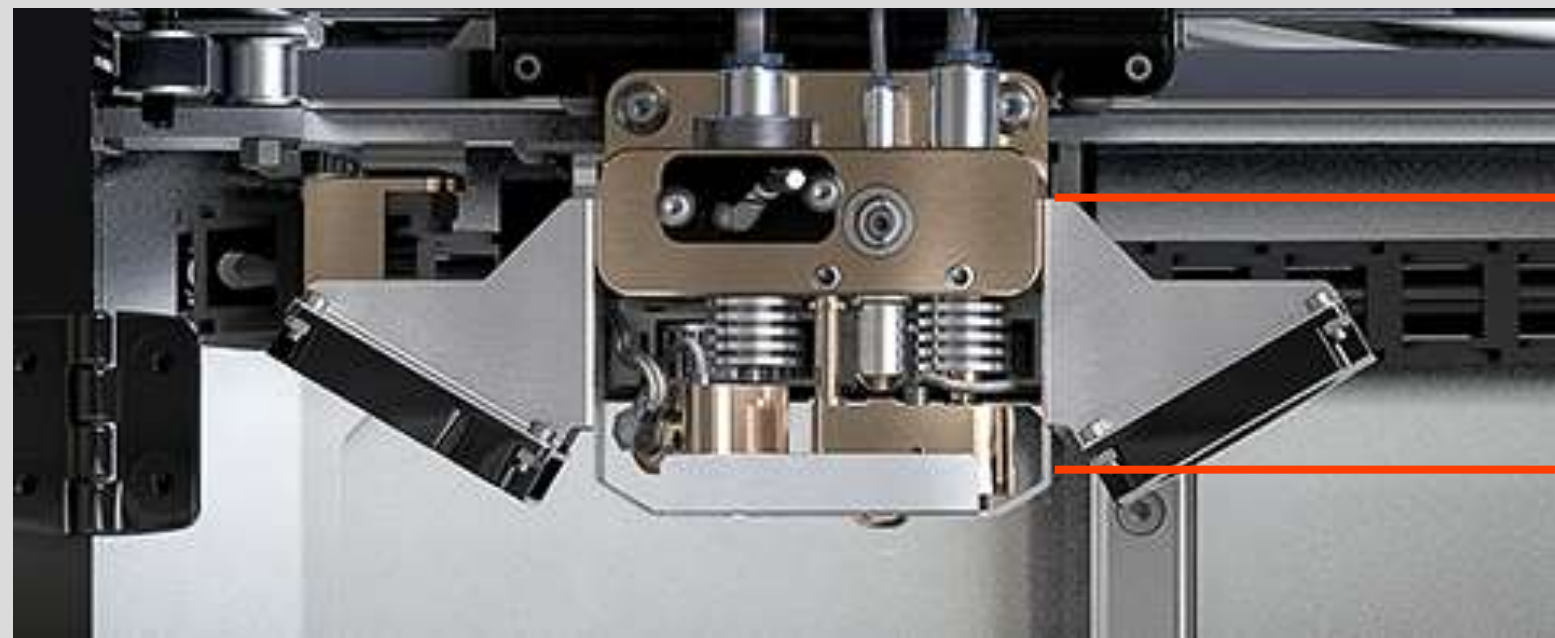
THOMAS SANLADERER,
Tom's 3D – 3D printing expert
and blogger. *275k+ subscribers*

COMPOSITE FIBER CO-EXTRUSION (CFC)

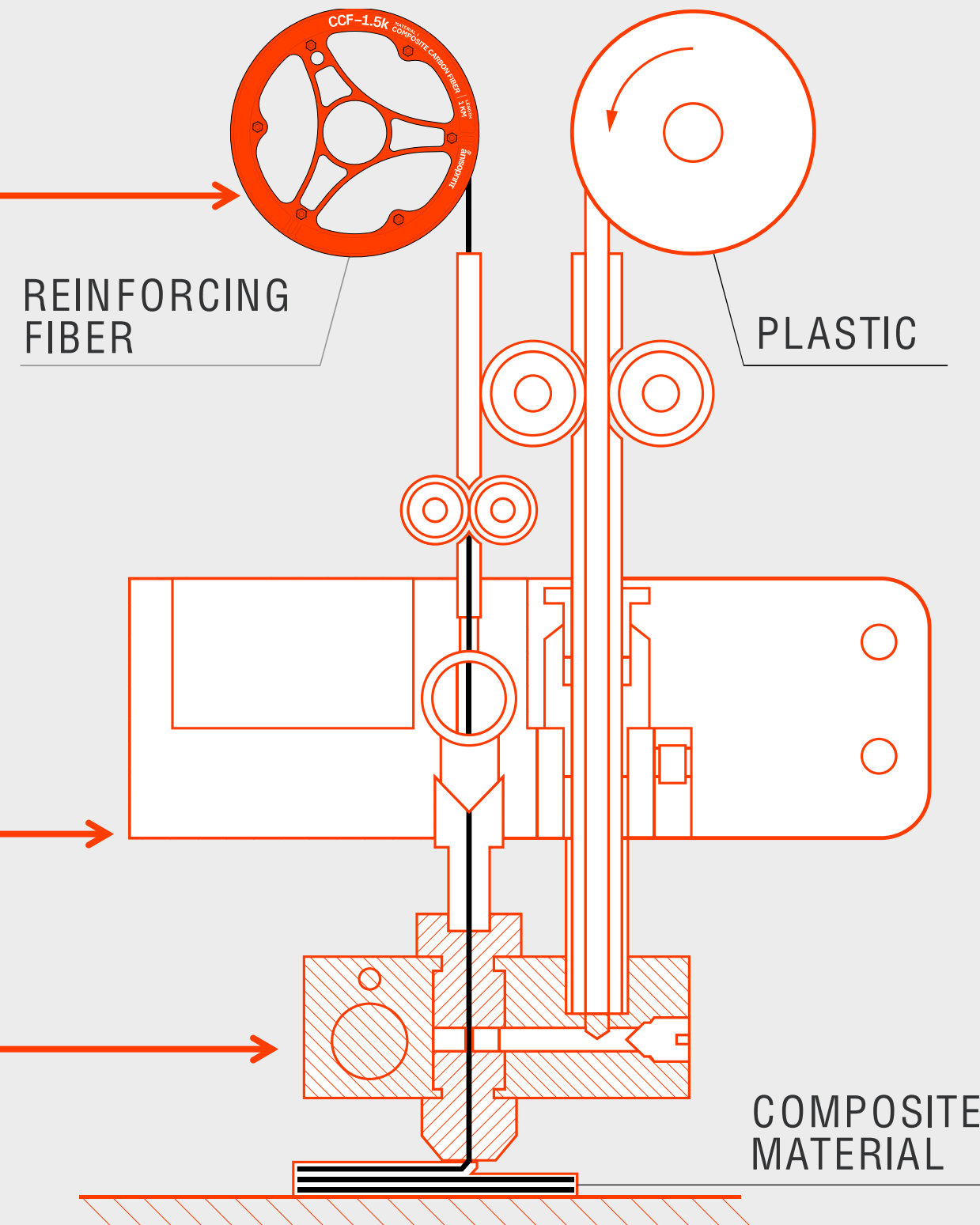
REINFORCING FIBER PRODUCTION



PRINTHEAD



METHOD FOR PRODUCTION OF COMPOSITE MATERIAL PARTS



ONE SYSTEM. CCF PRINCIPLES

- 2 MATERIALS:
COMPOSITE FIBER +
PLASTIC
- IN-SITU COMBINATION
AND CONSOLIDATION
- 3 COMPONENTS:
FIBER + RESIN + PLASTIC
- 2 INTERFACES:
FIBER/RESIN AND
RESIN/PLASTIC
- VARIOUS PLASTICS
CAN BE REINFORCED
- FIBER VOLUME FRACTION
CAN BE VARIED

DUAL MATRIX MATERIAL

DURING PRINTING — CO-EXTRUSION:

CCF/CBF

+

PLASTIC

=

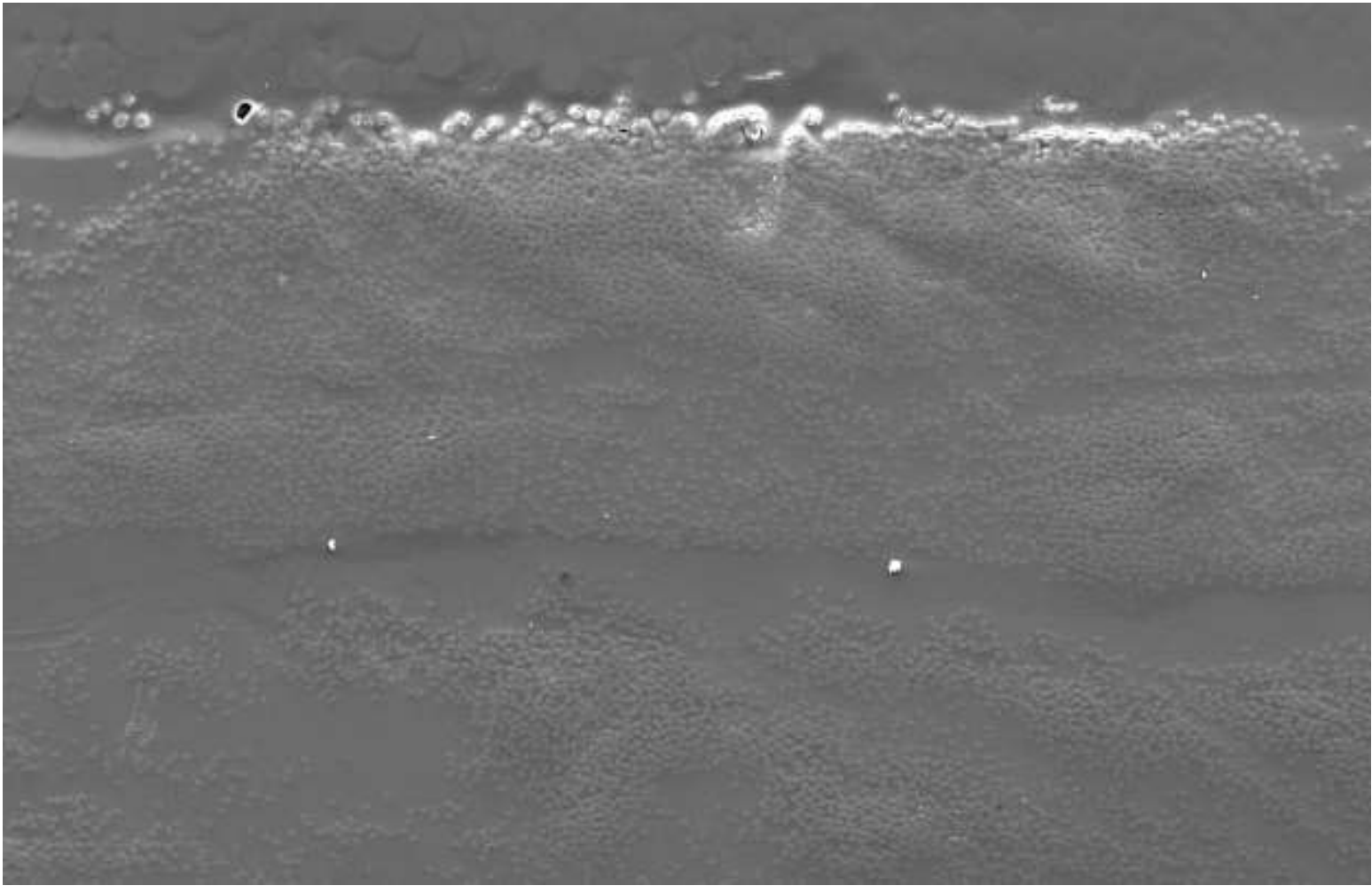
DUAL-MATRIX COMPOSITE

CFC PRINCIPLES

- Two materials: composite fiber + plastic
- In-situ combination and consolidation
- Three components: fiber + two matrices: resin + plastic
- Two interfaces: fiber/resin & resin/plastic
- Various plastics can be reinforced
- Fiber volume fraction can be varied

DUAL MATRIX MATERIAL PROPERTIES

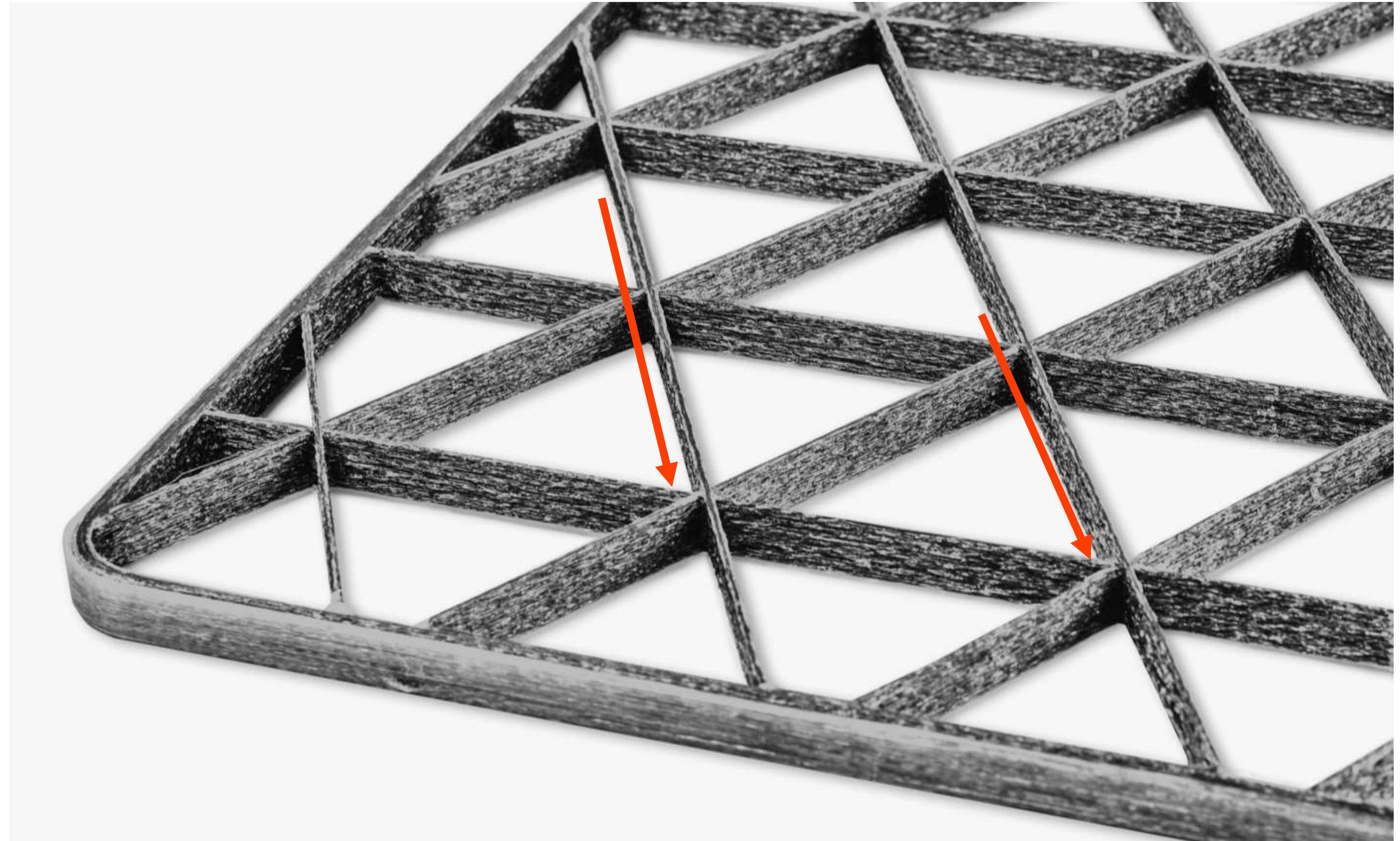
(50% Composite fiber+50% Plastic)	CCF-1.5K + PETG	CBF + PETG
Dry fiber volume fraction	30%	29%
Density, g/cm^3	1.4	1.66
Tensile modulus in fiber direction, GPa	64	27
Tensile strength in fiber direction, MPa	860	600
Compressive strength in fiber direction, MPa	290	270
Flexural Strength, MPa	520	—



CROSS-SECTION
AREA MICROSCOPY

COMPOSITE MATERIALS ARE THE BEST-FIT FOR LATTICES

IN LATTICE STRUCTURES,
MATERIAL STRESSES ARE
ONLY ALONG THE RIBS,
WHICH IS THE BEST FIT FOR
COMPOSITES, THAT ONLY
WORK ALONG THE FIBERS

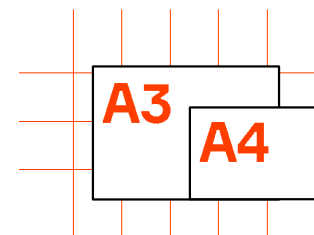


COMPOSER DESKTOP 3D-PRINTER

TWO SEPARATE NOZZLES (FFF & CFC) /
HEATED BED / ENCLOSED CHAMBER /
LIGHTWEIGHT ALUMINUM FRAME /
OPEN MATERIALS SYSTEM /
DEDICATED SLICER SOFTWARE /

A4 297x210x147mm

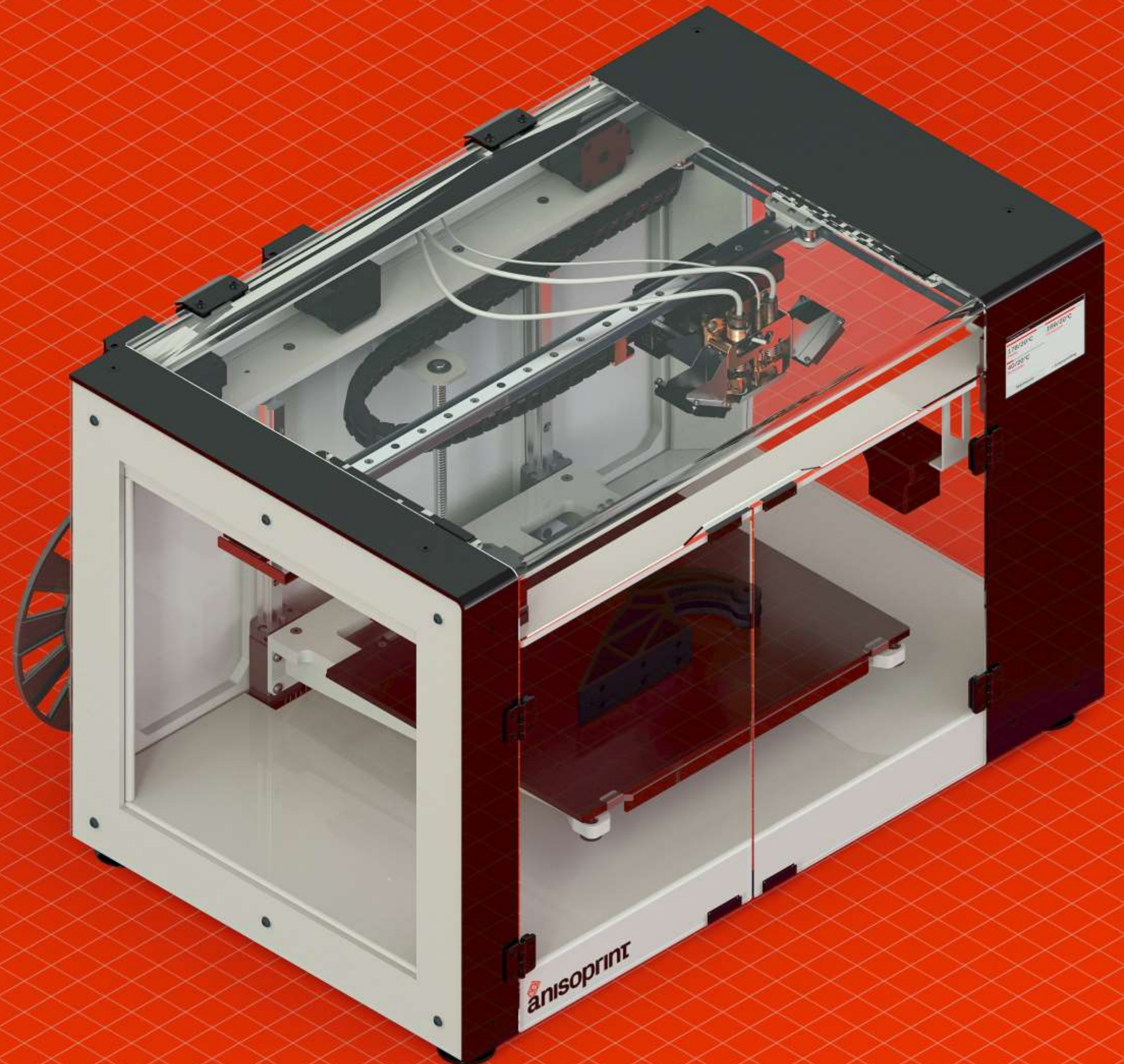
A3 420x297x210mm



MAX. EXTRUDER TEMPERATURE 270°C

MAX. PRINT BED TEMPERATURE 120°C

PRODUCTIVITY IN CFC MODE 20 cc/h



COMPOSER

- PRINT STRONG AND LIGHTWEIGHT PARTS ON YOUR DESK OR BENCH
- OPEN MATERIAL SYSTEM
- USE A VARIETY OF POLYMERSTO REINFORCE WITH CONTINUOUS FIBER
- EASY TO RUN, USE AND MAINTAIN



FUNCTIONAL PROTOTYPING

- On demand manufacturing of tools and spare parts
- Part size form 10mm to 500mm
- Low cost solution, efficient solution
- Minimum training required



R&D

- Open System
- Design freedom
- Clear VP
- Educated customers
- Easy service
- Low material usage



INDUSTRY ENTRY-LEVEL

- Fast production
- No tooling
- Easy & affordable
- Custom
- Digital

REINFORCING FIBERS: CCF AND CBF



60% DRY FIBER

+ 40%
SPECIAL
RESIN =



COMPOSITE FIBER
Cross-section area microscopy

COMPOSITE FIBER PROPERTIES

Fiber	Effective Diameter, <i>mm</i>	VF, %	Elastic Modulus, <i>GPa</i>	Tensile Strength, <i>MPa</i>	Linear Density, <i>tex</i>
CCF-1.5K	0.35	60	150	2200	149
CBF	0.30	57	50	1560	146



PLASTICS

SMOOTH PA

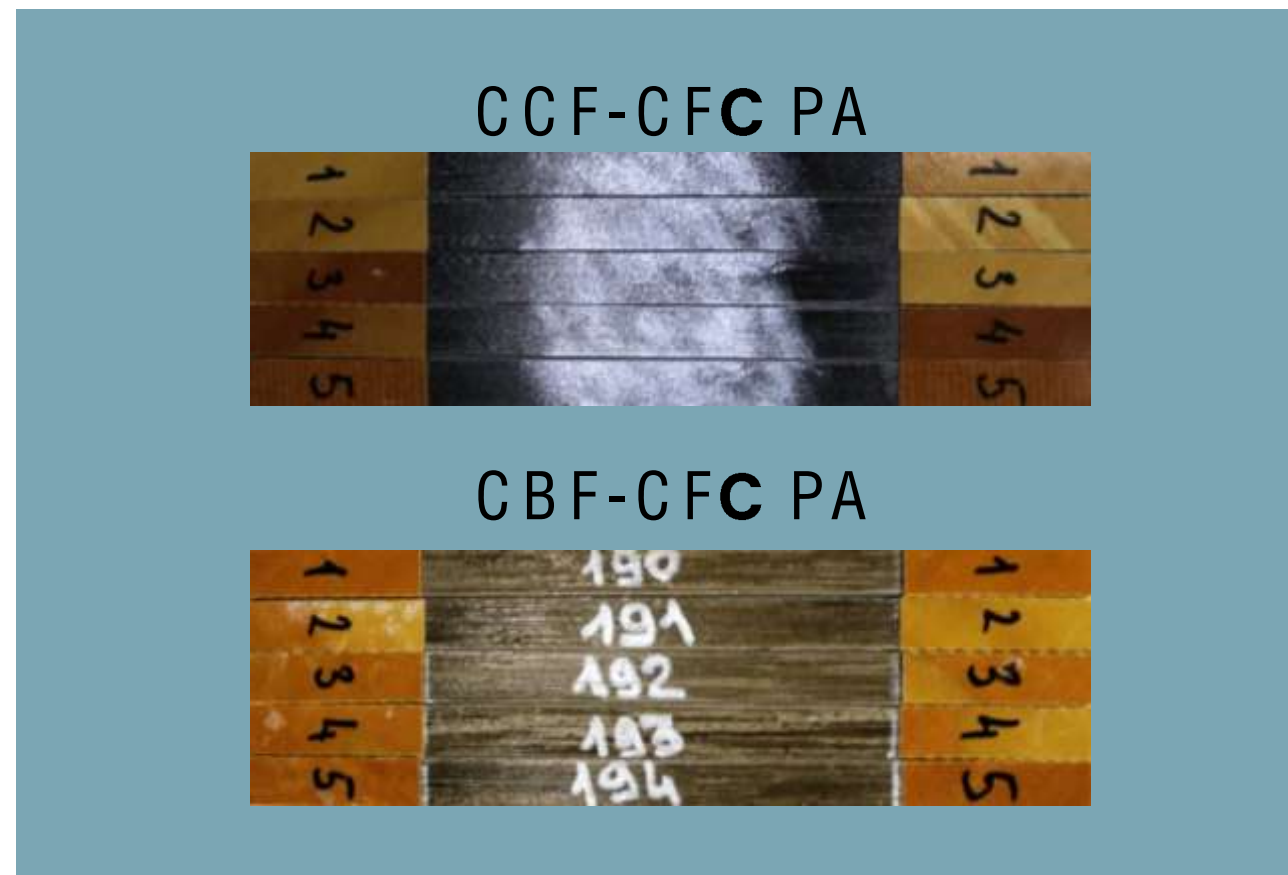
- Proprietary material for Composer
- Use on the FFF nozzle
- For plastic shells / perimeters / infills / top (bottom) layers / supports / or pure FFF parts
- Great surface finish/aesthetics
- Low moisture absorption



750cc Spool

CFC PA

- Proprietary material for Composer
- Use on the CFC nozzle
- Perfect adhesion to CCF/CBF and Smooth PA
- High print stability and properties



750cc Spool

PARTNER MATERIALS

- Best available off the shelf plastic filaments
- Use on both FFF and CFC nozzles
- Built-in material settings database
- Variety of polymers: PLA, PETG, PAs, PC, TPU and others
- Constantly adding new materials



Third-party plastics

SOFTWARE

AURA / AURA Premium

Free basic version

- Supported formats: STL, STEP, 3DS, OBJ
- Flexible settings system
- Microlayers
- Adjustable part internal structure
- Generation of fiber reinforced perimeters
- Four types of fiber reinforced infills
- Visualization of fiber, plastic printing trajectories and G-code lines
- Automatic support structures generation
- Printing with multiple extruders

Premium features

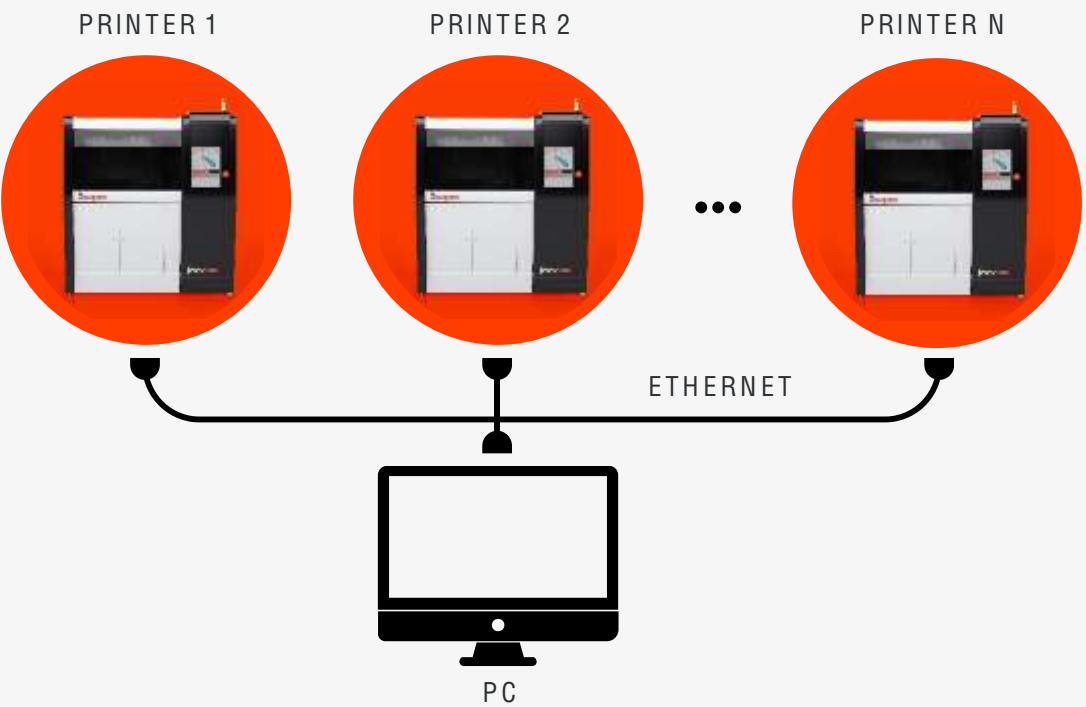
- Masks
- Support blockers and enforcers
- CLI

- Free basic version
- Premium subscription (per user)

AURA.CONNECT

Subscription

- Run and monitor print jobs from PC through Ethernet
- Job management
- Process monitoring
- User access control

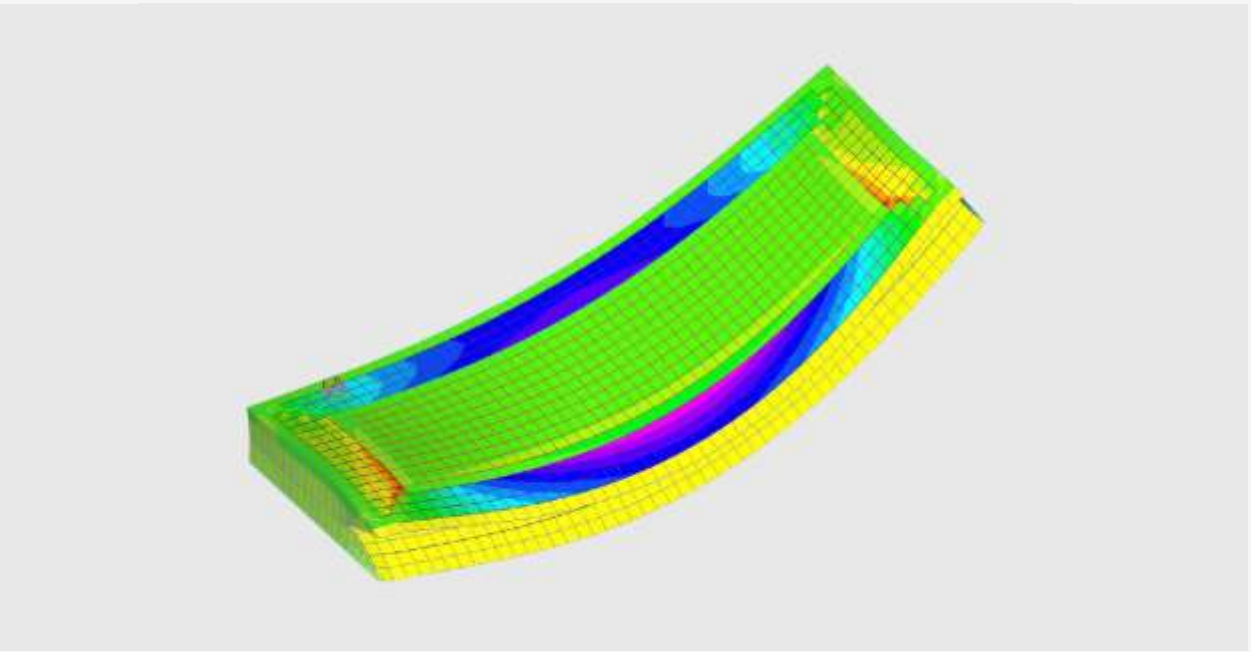


- Free for 1 hardware unit/user
- Subscription (per user/machine)

AURA+FEM (From 01.07.2021)

Subscription

- Simulation in commercial CAE (FEM) software
- FEM export: Geometry / Layer structure scheme / Material data
- Layer solid elements (supported in Nastran, Ansys, Abaqus)
- Homogenization of material properties
- Export to *.bdf format



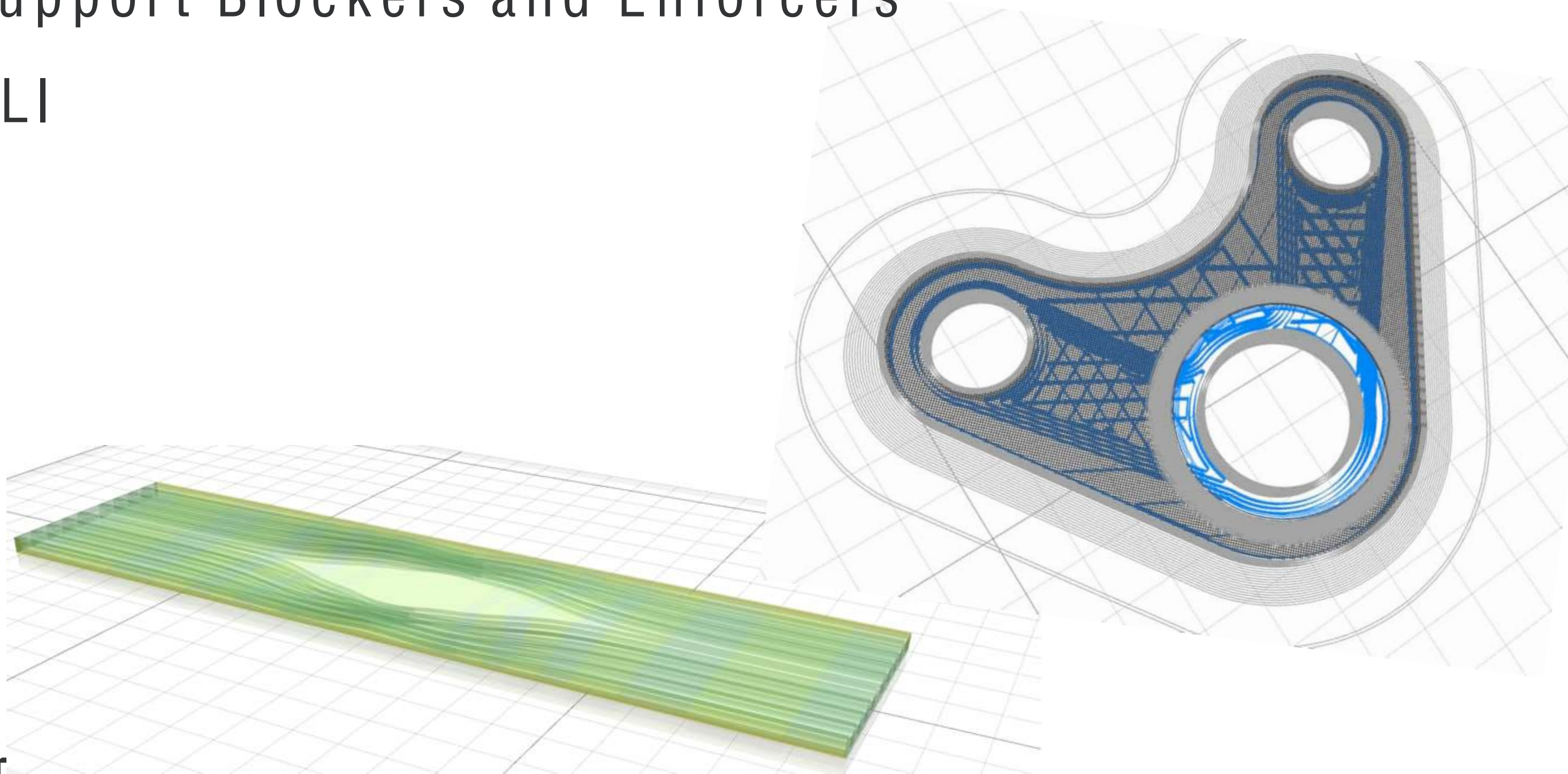
- Subscription (per user)



Premium

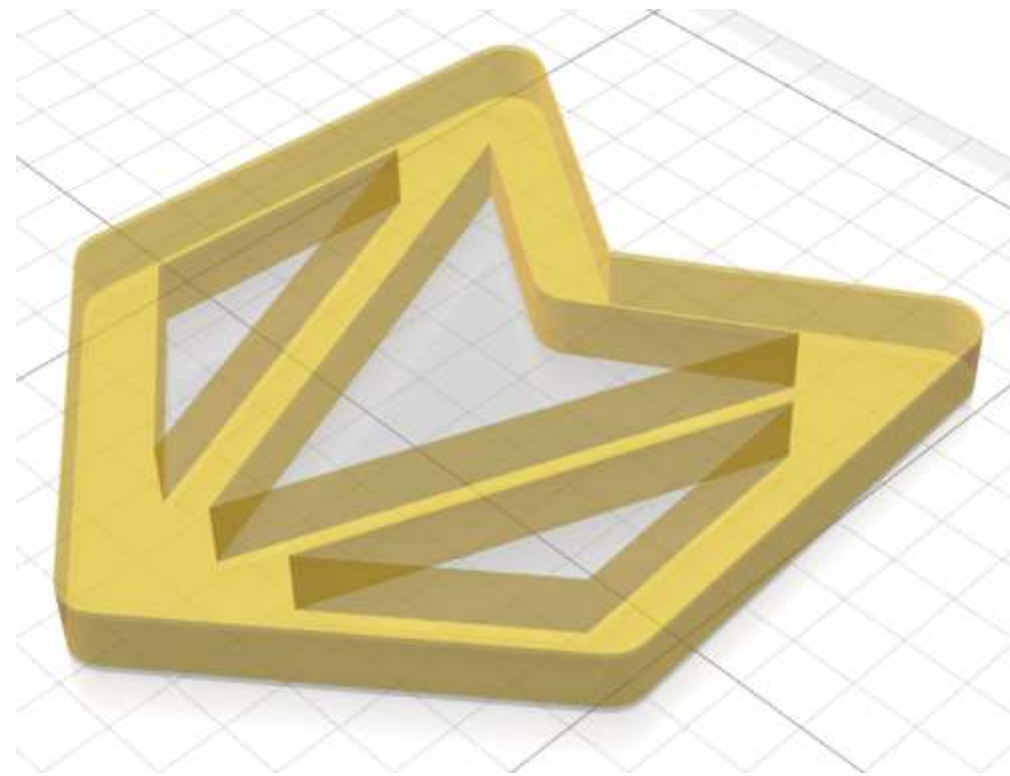
AURA

- ✓ Masks
- ✓ Support Blockers and Enforcers
- ✓ CLI

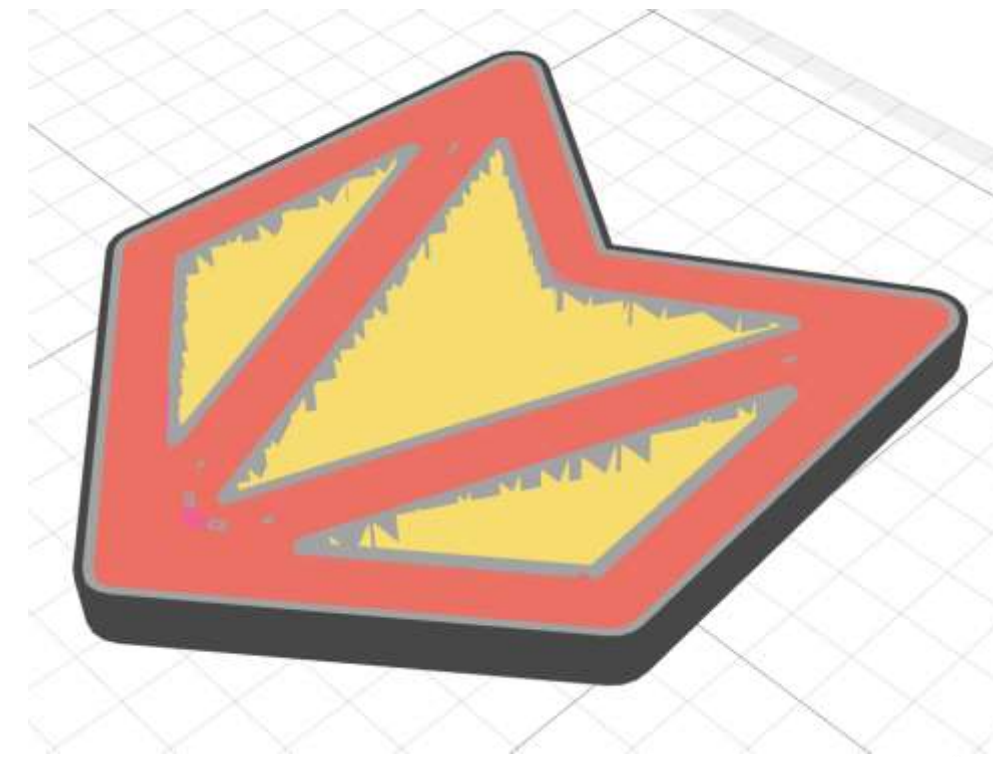


MASKS

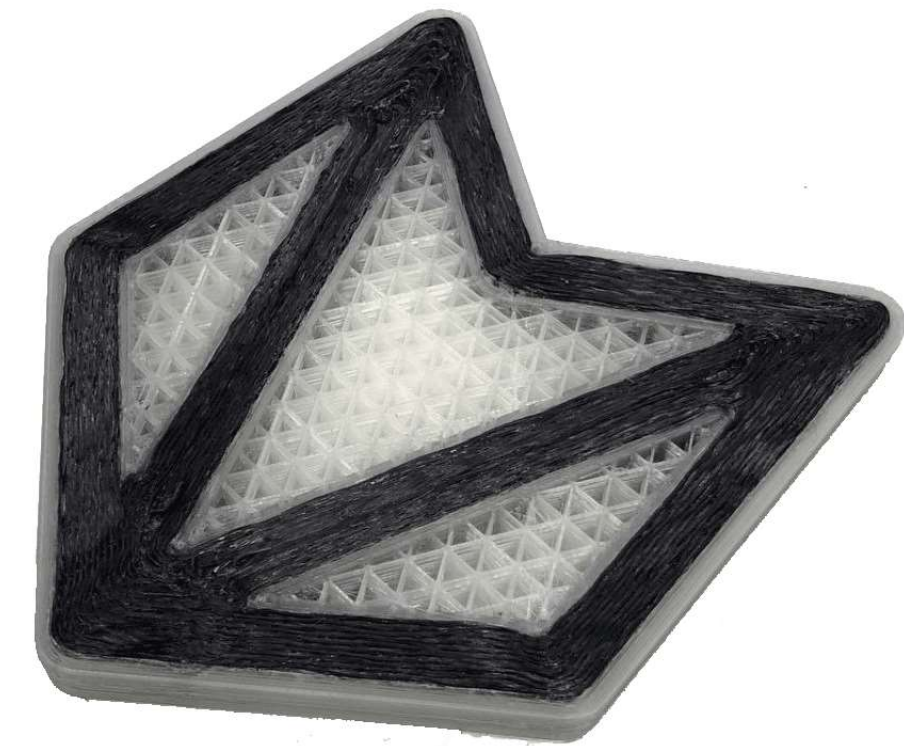
- ✓ Part masks allow setting the **custom internal structure** in different volumes of the part
- ✓ Two types of masks are available – **internal masks** and **full masks**
- ✓ **Internal masks** allow setting internal structure parameters such as perimeter count, infill type, density, etc
- ✓ **Full masks** additionally allow changing the number of external shell perimeters and top/bottom solid layers



Model with mask



Slicing result

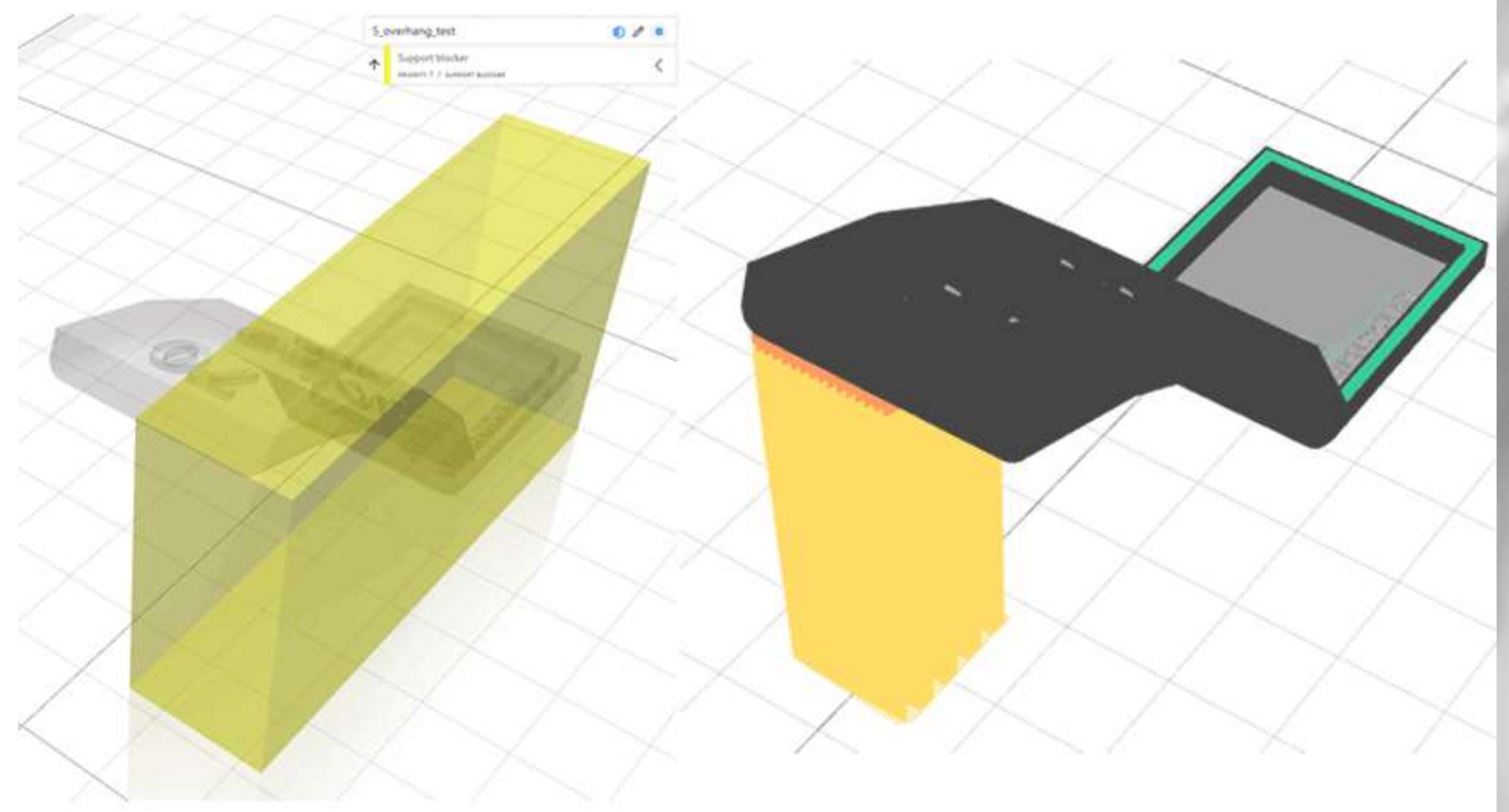


Printed part



SUPPORT BLOCKERS

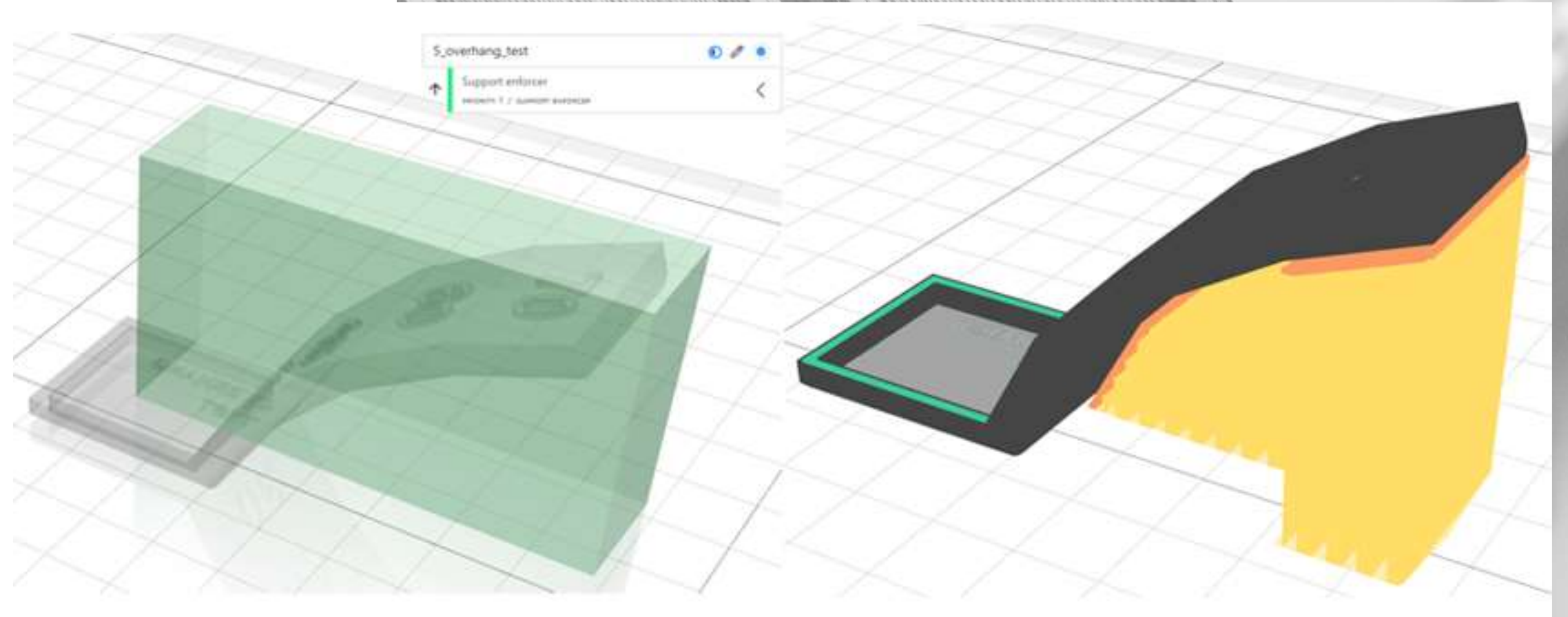
Allow **preventing** the generation of supports under the surfaces that are inside the support blocker volume



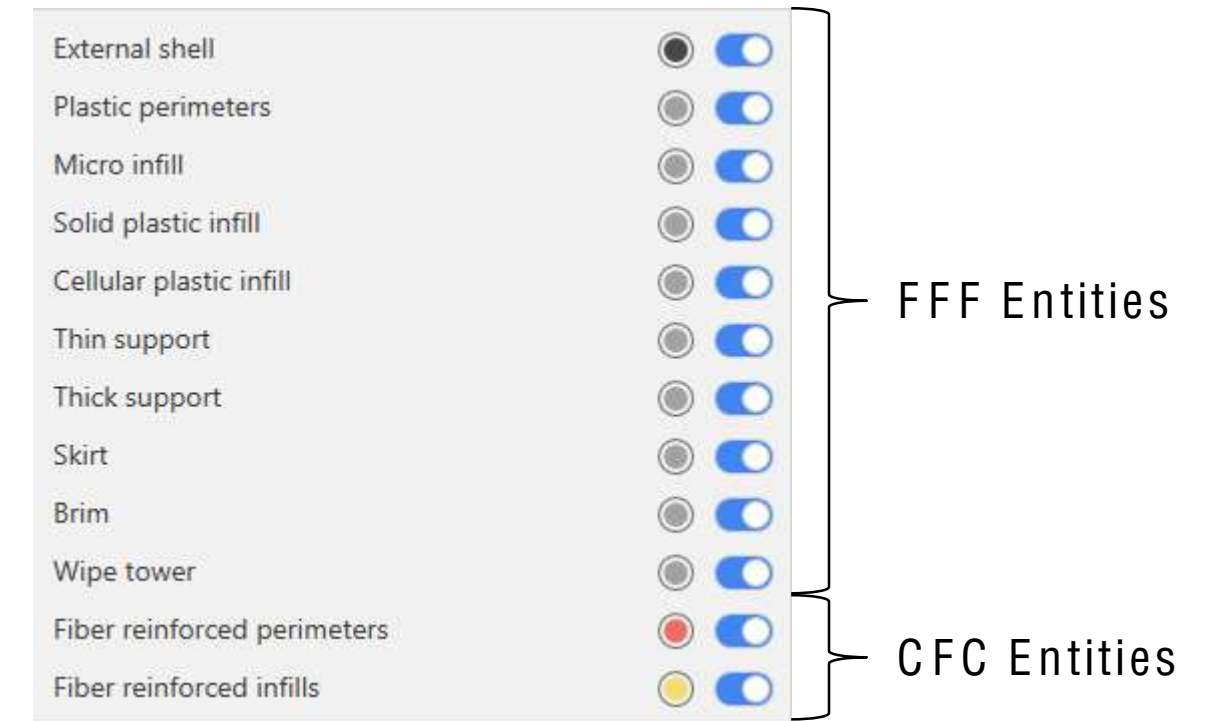


SUPPORT ENFORCERS

Allow **forcing** the generation of supports under the surfaces that are inside the support enforcer volume



FFF Plastic	Smooth PA
Reinforcing fiber	CCF-1.5K
CFC Plastic	CFC PA
Print time	20h
Material cost	€108,25
Solid part volume	240cc
Price per cc	€0,45
Total material volume	100cc
Total part weight	120g
Price per gram	€0,9
Layer structure scheme	
External plastic shells	5
Outer fiber perimeteres	2
Inner fiber perimeteres	2
Infill type	Fiber isogrid
Infill density	35%

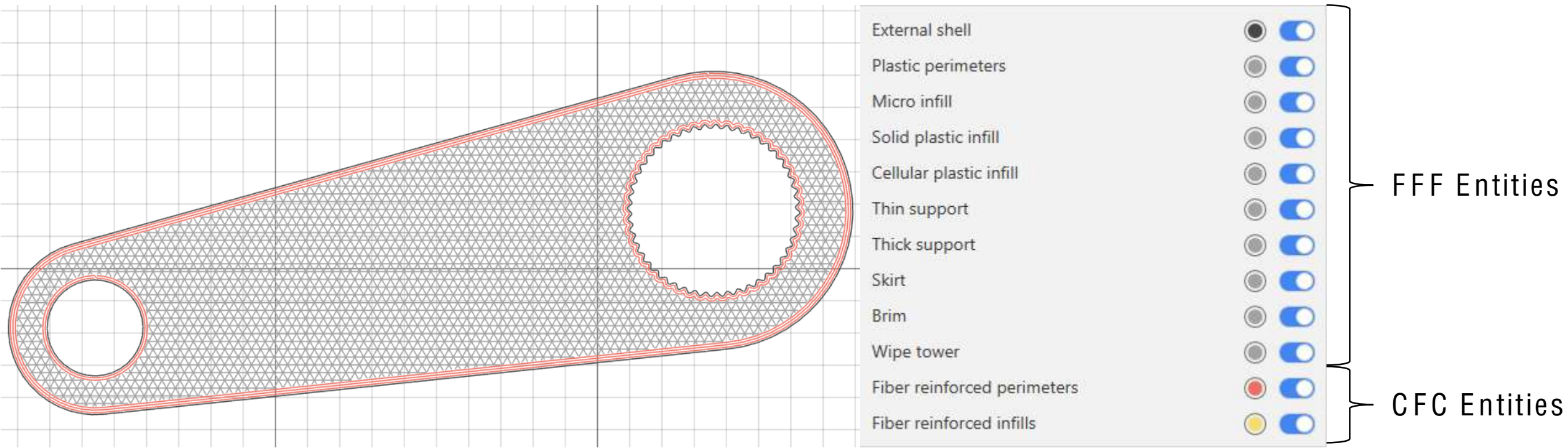


Material usage		Price, €
FFF plastic volume	50 cc	~5,5
length (1.75mm filament)	20m	
weight	55 g	
CFC plastic volume	25 cc	~2,75
length (1.75mm filament)	10 m	
weight	27,5 g	
CCF volume	25 cc	~100
length	250 m	
weight	37,5 g	

SAMPLE PART

1/6 CFC VOLUME FRACTION






Part data	
FFF Plastic	PETG PolyMax
Reinforcing fiber	CCF-1.5K
CFC Plastic	PETG PolyMax
Print time	55h
Material cost	€120,6
Solid part volume	550 cc
Price per cc	€0,22
Total material volume	300 cc
Total part weight	381,25g
Price per gram	€0,31
Layer structure scheme	
External plastic shells	2
Outer fiber perimeteres	3
Inner fiber perimeteres	2
Infill type	plastic
Infill density	50%



Material usage		Price, €
FFF plastic volume length (1.75mm filament) weight	250 cc	~18,73
	100 m	
	312,5 g	
CFC plastic volume length (1.75mm filament) weight	25 cc	~1,87
	10 m	
	31,25 g	
CCF volume length weight	25 cc	100
	250 m	
	37,5 g	

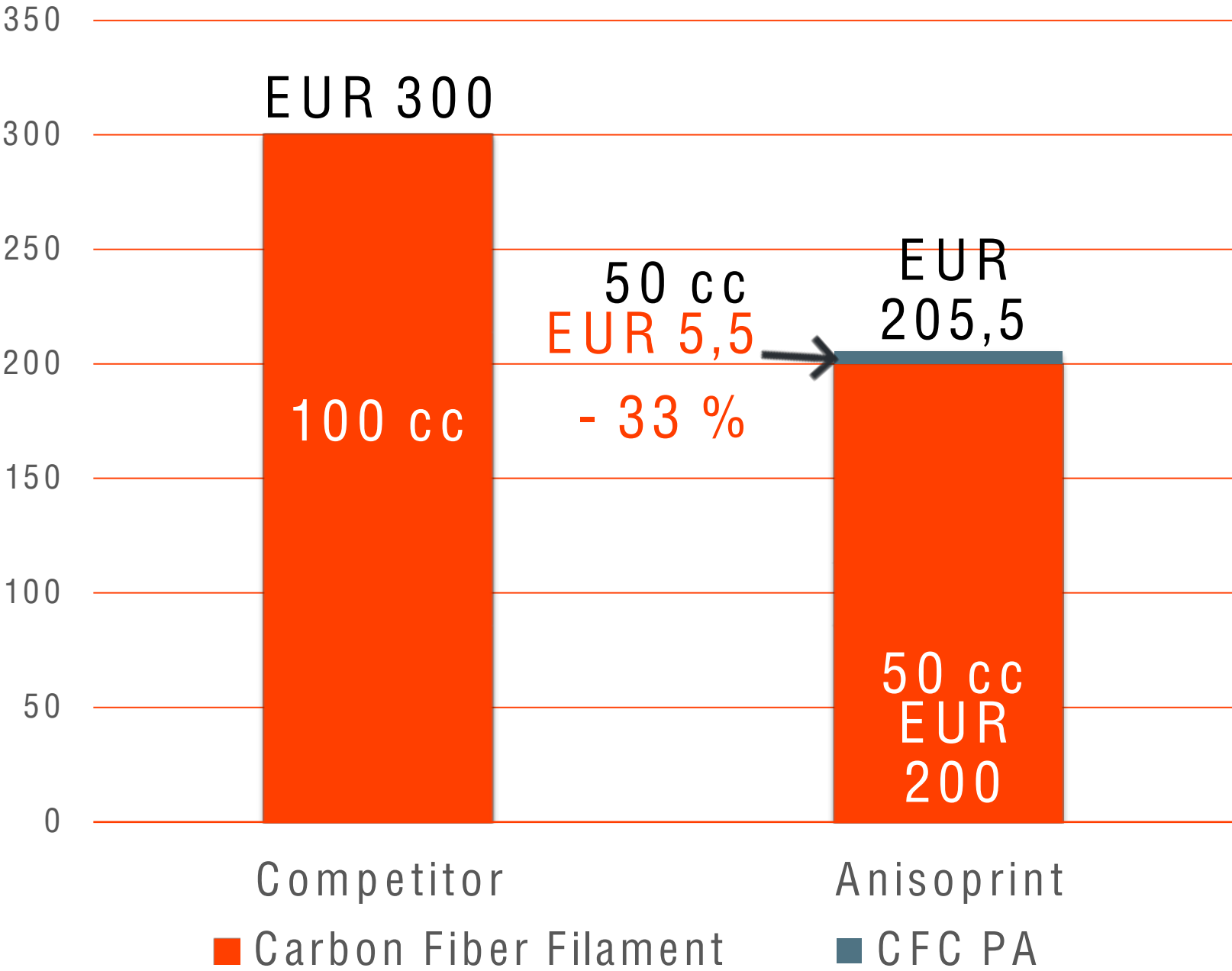
COMPARED TO COMPETITORS



Matrix material	Nylon (PA6), PEEK, PEKK		Nylon only		Any plastic	
Reinforcing schemes	Solid infill only		Perimeters / Solid infills		Perimeters, solid infills / Lattice infills	
Fiber steering	No		Only based on perimeters		Arbitrary fiber steering	
Hardware	DESKTOP		DESKTOP	INDUSTRIAL	DESKTOP	INDUSTRIAL
						
Build volume	310x240x270mm		320 x 132 x 154 mm	330x250x200mm	420x297x210mm	600x420x300mm
Printer cost	\$ 3,495 / year \$ 17,475 / 5 years		\$ 18,000	\$ 70,000	€12,000	€200,000
Material cost, 50cc	From \$ 149 (carbon)		From \$ 150 (carbon) From \$ 80 (fiberglass)		From €100 (carbon) From €60 (basalt)	From €40 (carbon) From €25 (basalt)

PRICE COMPARISON

SUPER-HARD COMPONENT 100 cc of pure CF

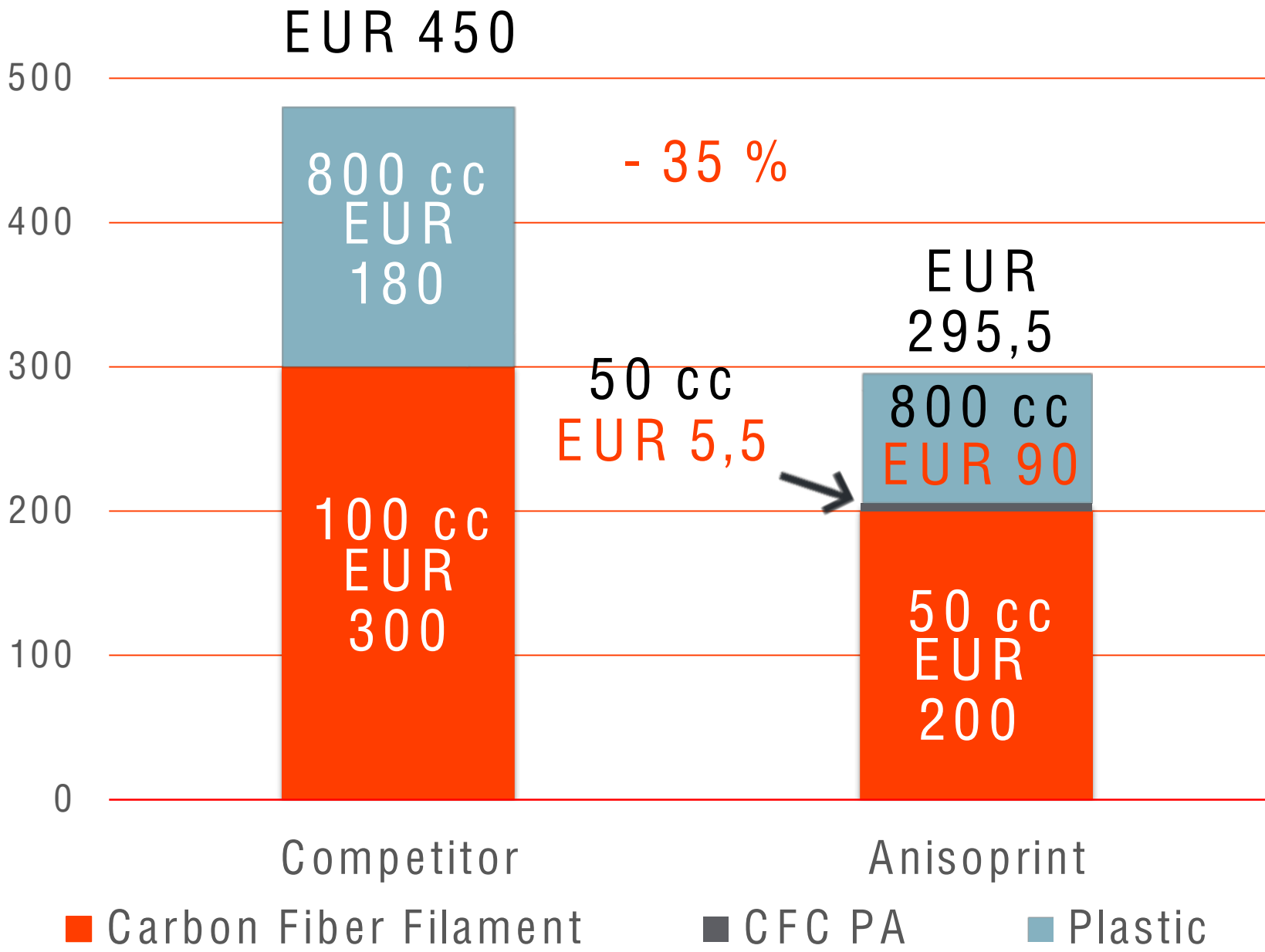


Dry Fiber
Content

30 %

30 %

CF-REINFORCED COMPONENT 100 cc of CF + 800 cc of PA

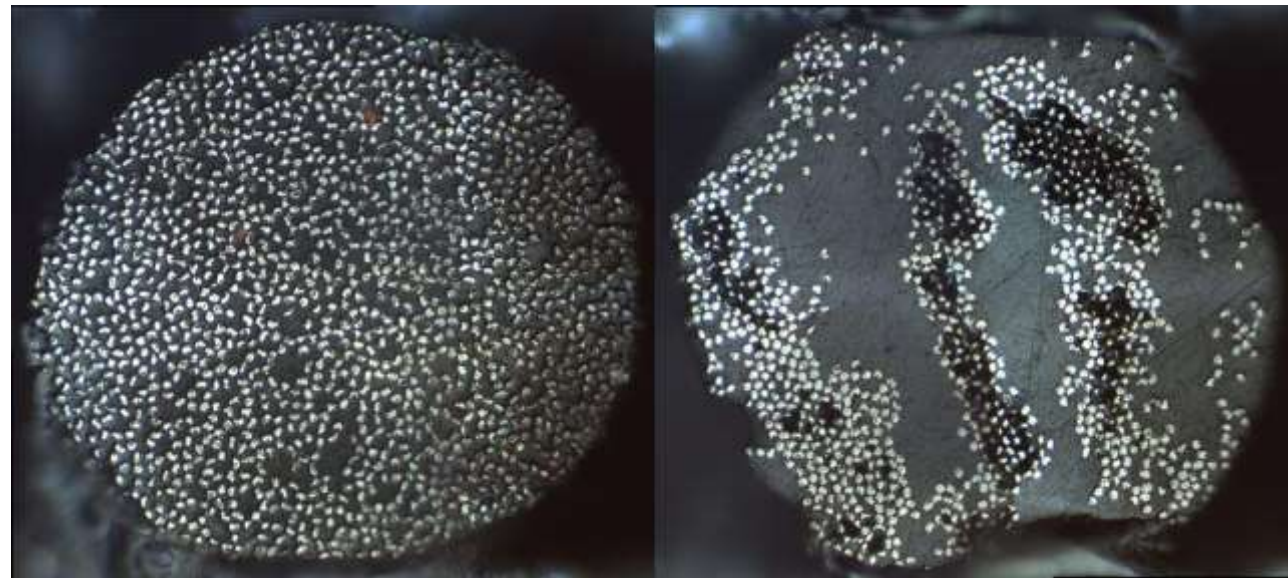


3,3 %

3,3 %

MICROSCOPY COMPARISON

Products with more than 2% pores cannot be certified for many industrial applications (including Aerospace). With less than 1% pores Anisoprint exceeds this critical threshold.



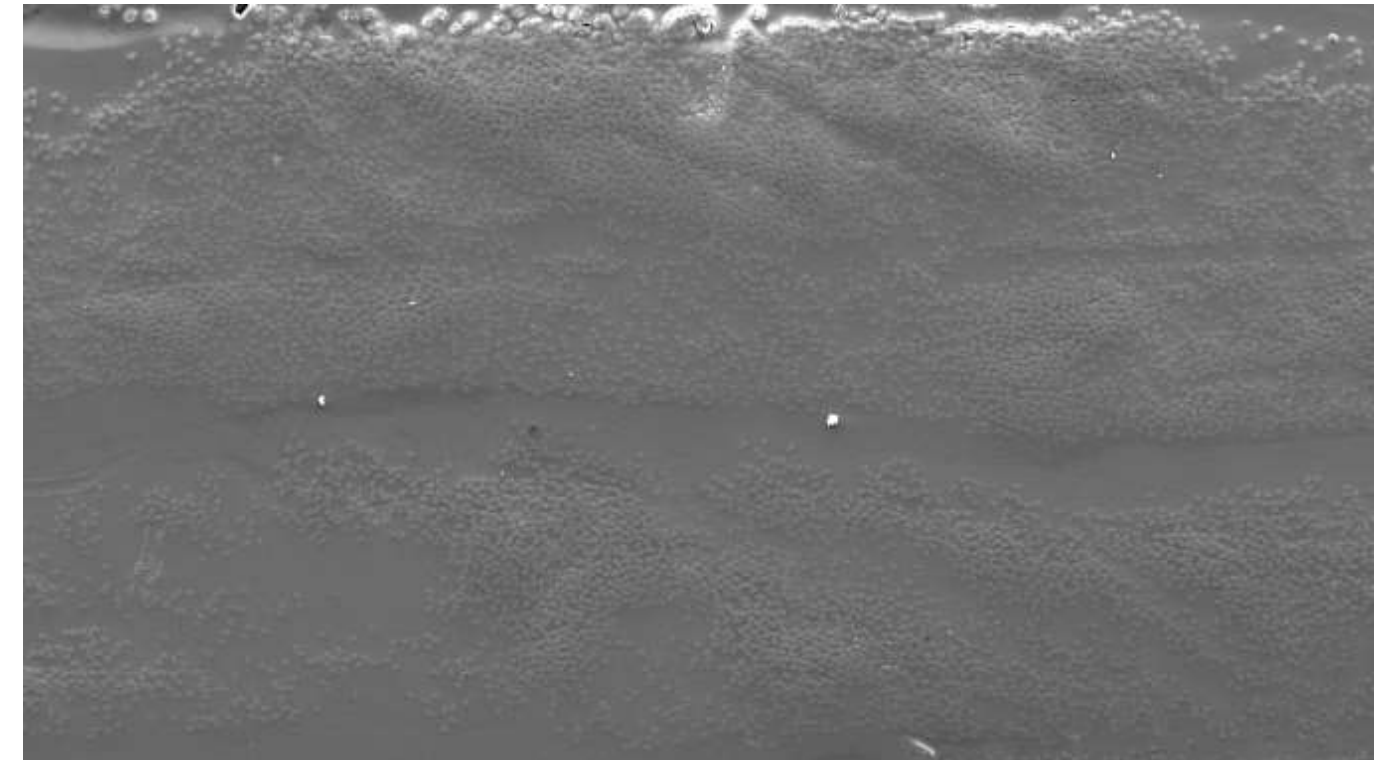
- Anisoprint reinforcing fiber cross-section
- 65% fiber volume content
- <1% porosity
- Round shape

- Competitor's reinforcing fiber cross-section
- 28% fiber volume content
- >5% porosity
- Lots of resin reach zones

- 1 MICROSCOPY ASSESSMENT RESULTS OF COMPETITOR
~ 8% of pores in the final product



- 2 MICROSCOPY ASSESSMENT RESULTS OF COMPETITOR
< 2% of pores in the final product



**STOP METAL
THINKING → START
ANISOPRINTING**



anisoprint

Fedor Antonov

CEO

+352 (661) 686832

antonov@anisoprint.com



ANISOPRINT SARL
9 AVENUE DES HAUTS
FOURNEAUX, ESCH-SUR-
ALZETTE L-4362,
LUXEMBOURG

anisoprint.com ↗