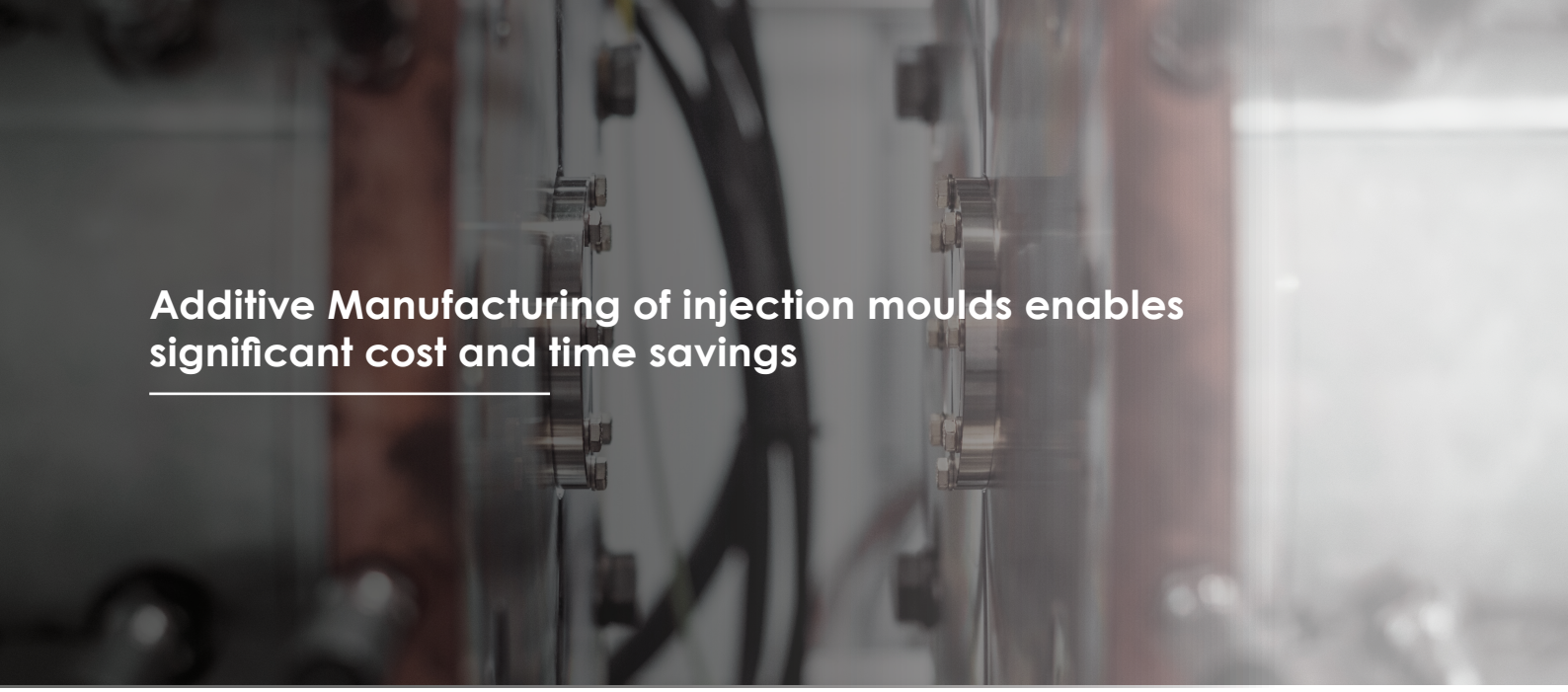
Mould Making with FFF 3D Printed CFR PEEK Parts
Time and Cost Saving Potential

Case Study

Apium
Additive Technologies GmbH



Additive Manufacturing of injection moulds enables significant cost and time savings

Facts in Numbers

	Total Production Costs	Delivery Time
Conventional Mould Making Milling + Post-treatment	**1,760€**	**6 Days**
Production with Apium P Series 3D Printer	**237€**	**2 Days**

Solution

The production of complex injection moulding tools (mould block and inserts) using conventional manufacturing methods can be a very cost-intensive process. This is because machining of complex mould tools requires highly advanced procedures and machine tools with accompanying tool wear as well as other material losses.

Besides it may take several months of development for the moulds and tools due to iterations on design with no guarantee that a working design can be fabricated. For this reason, the process technology may not attain a break-even point in production especially for batches of small to medium sizes.

Material Extrusion 3D printing technology addresses these challenges in mould tool manufacture making it possible for users to design and fabricate tools that are more efficient under production conditions.

So did LIM Technics and together with Apium's 3D printing technology they could achieve enormous time and cost savings.

Company

LIM Technics is specialized in injection moulding of 1 or 2 or multi-component parts (silicone / thermoplastic / metal) and focused in fast prototyping, followed by serial production. As a previous owner and founder of Silcotech AG Switzerland (1984) and later Silcotech Bulgaria (2008), they bring along over 30-years of technical knowledge and experience in Plastic/ LSR injection moulding and tool making. LIM Technics has the goal to equip their production facility with a fully functional tool and injection shop with brand new high level machinery.

Challenge

Production of low-cost moulding tools in pre- and small-series production. Using AM, one is able to print test tools and parts within a short time.

Functional 3D printed CFR PEEK moulds

First test results have shown that using the 3D printed PEEK moulds LIM Technics could produce over 50 parts. During a production time of 6 hours the moulds were cycled in the temperature range 120-130°C. The parts were produced at an injection pressure of about 200-300 bar.

Conventional mould making milling + post-treatment	Costs Bulgaria	Costs Central Europe (estimated)	Time Required
Prepare inserts	90 €	200 €	1 Day
Electrode milling	330 €	660 €	1 Day
Contour milling	1,100€	1,600€	2 Days
Create CAM-software	120 €	480 €	1 Day
Eroding deep ribs	120 €	280 €	1 Day
Total costs	**1,760 €**	**3,220 €**	-
Total time required	-	-	**6 Days**

Production with Apium P Series 3D Printer	Costs Bulgaria	Costs Central Europe (estimated)	Time Required
Preparing 3D model	120 €	250 €	0,5 Days
Printing (material, personnal and depreciation costs)	77 €	77 €	1 Day
Post-treatment	40 €	120 €	0,3 Days
Total costs	**237 €**	**447 €**	-
Total time required	-	-	**2 Days**

86% Cost Saving

66% Time saving

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From the first contact until today, Apium`s Service Center has supported us to enhance our usage of Apium P155.

The advanced training and continuous technical support for generating G-code files help us improve our print quality and personal skills with additive manufacturing of high performance polymers. We are very satisfied with the Customer Service.

”

Udo Lange
Vice President, LIM Technics OOD

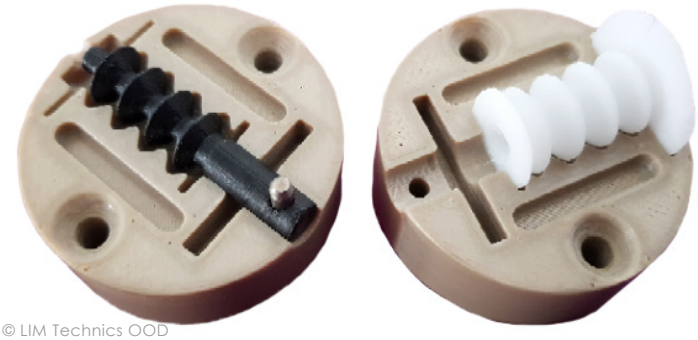
Conclusion:

- Fast and independent production with short delivery times
- No additional cost resulting from intensive post-processing of complex component design
- Virtually no material loss or tool wear due to milling

By using the Apium P Series 3D Printer in the example of LIM Technics, the total production costs can be reduced by up to **86%** while saving on the total time required can be up to **66%**.

As a result of time and cost efficient production, the risk of failing design iterations can be reduced to a minimum and, at the same time, rapid amortization may be ensured for production of small to medium batch sizes.

For further information and questions about PEEK 3D Printing, please contact our experts.



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