

# Qualification of PC for Laser-Based Powder 3D Printing

**Fraunhofer IPA developed a sustainable 3D printing process using polycarbonate (PC) as part of a comprehensive feasibility study.**

As part of a feasibility study, the Fraunhofer IPA research team is demonstrating the high potential of low-temperature printing using polycarbonate (PC) powder, which has a 100% recycling rate.

Lean Plastics Technologies GmbH initiated a feasibility study to develop a new type of powder for the industrial 3D printing process PBF-LB/P. Currently, polyamide 12 or 11 is used almost exclusively (90% of the time). However, innovative PBF powder types are needed to enable 3D printing technology for other applications. PC, an amorphous thermoplastic, was tested for production and processing. The powder must meet high standards to allow uniform layer application and must be able to quickly fuse it into dense layers.

As part of a ZIM feasibility study, Lean Plastics' powder production technology was tested with PC. Fraunhofer IPA aimed to develop a sustainable PBF-LB/P process. Typically, the build-room temperature is close to the softening temperature, but in this case, it should be

significantly lower, preventing polymer aging and enabling complete reuse of unmelted powder.

After Lean Plastics produced a free-flowing powder, processing trials were conducted at Fraunhofer IPA using a small industrial plant. It quickly became clear that the powder had great processing potential. After optimizing laser power, scan speed, and hatch distance, the first demo parts were produced at moderate installation temperatures. After three months of intensive research, Fraunhofer IPA scientists demonstrated the powder's good processability. The unprinted powder showed no signs of aging and could be fully reused without quality loss. The powder and process can now be further developed.

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