AIM3D receives US and EU patents for its Composite Extrusion Modelling

AIM3D, based in Rostock, Germany, has announced that it has been granted fundamental European and US patents for its compact, decentralised pellet extruder and Material Extrusion (MEX) Additive Manufacturing with high-temperature materials. The US patents also include Fused Deposition Modelling (FDM) AM for high-temperature applications and high-flow hot ends.

"We now believe more than ever in our CEM [Composite Extrusion Modelling] technology," stated Dr-Ing Vincent Morrison, CEO. "The granted patents reflect our impressive achievements in research and development as pioneers in 3D pellet printing. These patents secure our know-how for 3D pellet printers. At the same time, we are open to establishing licencing partnerships."

Since 2017, AIM3D, a spin-off from the University of Rostock, has been consistently focused on pellet-based Additive Manufacturing rather than those that process filaments. Significantly lower material acquisition costs for pellets and the inline recycling of reclaimed material form the basis for the high cost-effectiveness of this AM production strategy. The development work on pellet Additive Manufacturing technology was reflected in four patent applications between 2016 and 2018, which have now been granted in 2023. The patents protect both the topology of the AM extruder as a whole and the detailed technical solutions in the area of pellet processing

Published patents

The patents granted are published as:

- EP3463799B1 (application: May 27, 2016) – 'System for the additive manufacture of metal parts'
- EP3648946B1 (application: June 26, 2018) – 'Compact extruder and extrusion of thermomechanically deformable pellets'
- Patent US11541593B2 (application May 27, 2016) – 'Extruder for a system for the additive manufacture of metal parts using the composite extrusion modelling (CEM) method'
- The US patent US11597118B2 (application: June 26, 2018) – 'Device and method for the extrusion of thermo-mechanically deformable materials in bulk form, and compact screw extruder'

CEM technology's growth potential

The still relatively young CEM Additive Manufacturing machines have found a market alongside the more widespread FDM machines. AIM3D's ExAM 255 and ExAM 510 machines enable the use of standard pellets with or without fillers to produce robust components. This reportedly enables significantly greater cost-effectiveness for the users.

The CEM process enables the use of various materials: hybrid multi-material solutions with different Voxelfill materials and different materials for the contour or the structure of the inner walls are possible. This way, the material properties — component weight, damping properties, elasticity or changes to the centre of gravity — can be customised.

By selectively filling only certain volume chambers (selective densities), the component properties can be influenced in a targeted manner based on FE simulations. With Voxelfill, it is possible to only fill the areas of a component that are absolutely necessary for the flow of forces. As a result, from the outside, these components look like conventional parts, and can further benefit from applying conventional finishing processes, whilst benefitting from lightweighting.

AIM3D has placed around forty industrial Additive Manufacturing machines on the market (Courtesy AIM3D)

The reproducibility of CEM

AIM3D's ExAM 510 machine is aimed at industrial applications, where reproducibility is crucial for the construction of a 3D component. Reproducibility is achieved primarily through the patented pellet extruder technology, which ensures gentle processing of the material and minimises degradation of the polymers in the extruder.

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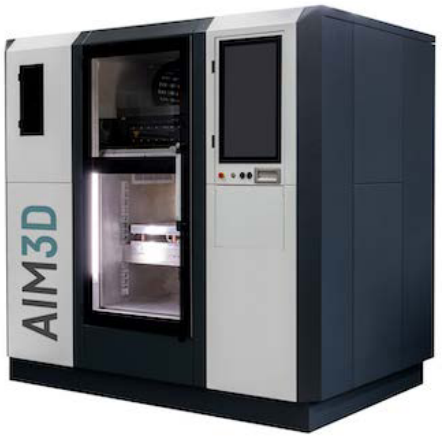

The ExAM 510 is suitable for metals, ceramics and polymers (Courtesy AIM3D GmbH)

