

GERMANY

Steinbach AG: Pioneer in Ceramic 3D-Printing

With the investment in a 3D-printer operating on the basis of the LCM process (Lithography-Based Ceramic Manufacturing) in 2016, Steinbach AG laid the foundation of its Technical Ceramics Division and entered into the manufacturing of ceramic components. Steinbach AG is a medium-sized, family-run company with its headquarters in Detmold/DE as well as representative offices in Shanghai/CN, Charlotte/US, Taipei/TW and Brisbane/AU. In the course of the almost 100-year company history, thanks to continuous product development, various divisions (Forming and Conveying Solutions, Thermal and Acoustic Insulation, Gaskets and Stamped Parts as well as Film Packaging) have been established. The latest division Technical Ceramics has been given a boost by the ongoing construction of a Ceramics Innovation Centre. The Manager of the Technical Ceramics Division Volker Sämman (VS), and the Sales Manager at Technical Ceramics Christian Tofall (CT) agreed to give us an insight into the division's activities and strategies.

CA: Steinbach AG is a pioneer in the industrial application of ceramic 3D-printing. Please briefly outline the history of this business segment.

VS: Many years of commercial business had already connected us with ceramic as a material. On top of the first printer in 2016, we have added two new printers, one in 2018 and the other in 2020. After learning about this technology with the first printer and establishing series manufacture, we have doubled our manufacturing capacity with these acquisitions. Volker Steinbach is committed to further developing Technical Ceramics. The building for the Technical Ceramics Innovation Centre (Fig. 1) is scheduled for completion in winter 21/22, and we want to move in next spring.

CA: As an "early adapter", you have helped get the technology to market maturity. Looking back, what market advantages has that brought Steinbach AG?

VS: With our early implementation of this technology, we were able to accompany the development process from the beginning and build up our know-how. This head start often helps us in talks with potential customers. With this background, together with Smartech International, we have been

very successful at our base in Charlotte NC, and also on the market in the USA.

CA: What user segments do you mainly serve?

VS: We are represented in numerous projects in medical technology, aerospace engineering, plant and machine engineering as well as sensor technology and the automotive segment.

CA: How successful have you been in moving from prototyping, through pilot plant manufacturing to series maturity?

VS: Shortly after establishing the Technical Ceramics division, we took the first steps towards series manufacture of components for the Da Vinci operating system. These filigree components with very high tolerance specifications were optimized in close cooperation with the customer for the LCM process and, over the years, they have been manufactured by Steinbach AG in high unit figures (>10 000/a).

CA: You have installed the LCM process – are you thinking about introducing other AM processes (e.g. for large components)?

VS: That is certainly something for the new innovation centre to work on. We shall, however, then not only look at

widening the range of production equipment, but also get go intensively into the development of ceramics. We are working very closely with our plant supplier Lithoz/AT with regard to modifying the slips in supplier's standard product portfolio. We have come a long way here as we have also undertaken intensive training.

For us, new processes and new materials mean even more intensive involvement with the entire AM technology. With Volker Steinbach in his honorary function as President of the Society for OWL University of Applied Sciences and Arts, we have very good contacts to the university, which we use in this connection.

CA: *What input do you get from your (potential) customers? What consulting services do you provide?*

CT: Of course, that varies. Sometimes we only get geometric data (drawings or CAD models). Generally, we have to provide advice on material selection. The core of these services remains, however, always the feasibility study (technical and economic).

We develop CAD models if required for the customers. Our suspension-based LCM process enables complex shapes and structures to an extent where conventional processes are restricted or have reached their limits.

The added advantage of 3D-printing is that we don't use moulds for the development work, so we can use an optimized CAD model to manufacture components from a batch size of one. These are then available to our customers for a performance test in their own plants for their own customers.

CA: *Is the customer training another relevant aspect?*

CT: Naturally, we can provide a lot of information at our facility or directly at the customer's facility. At present, a training session is planned with potential new customers. In future, further facilities will be available to us for training at the "Ceramic Innovation Centre" currently under construction.

CA: *In your view, are CIM and AM competing technologies or rather processes that together can advance progress in manufacturing technology?*

CT: When new components are to be developed, more and more often, the route taken goes via 3D-printing. AM is ideal for small to medium series. For the production of higher unit numbers (with corresponding geometry), the CIM process is the more economically viable route. As we don't need to develop and make moulds, we can deliver a prototype (in series quality) for testing much faster and help shorten the important "time-to-market". We deliver components with high precision and surface quality, which undergo our internal quality testing prior to dispatch.

CA: *How has COVID-19 impacted your business activities?*

VS: The division has so far got through this time unscathed. For 2022, we have big plans with the innovation centre and we are looking very positively to the future. Our company will exhibit at the next formnext (16–19 November in Frankfurt) at the joint stand of PROTIQ in hall 12.0 – B79.

CA: *Thank you for talking to us.*



Fig. 1
Steinbach's headquarter in Detmold



Fig. 2
Team GB Technical Ceramics (f.l.t.r.): Christian Tofall, Johann Seidel, Bastian Endler, Kirstin Junghans, Volker Steinbach, Volker Sämann, and Viktoria Lieder (not in the photo)



Fig. 3
Ceramic parts manufactured by the LCM process

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