GERMANY

Steinbach AG: Industry Partner with 3D Printing of Ceramics

This year, Steinbach AG is celebrating its centenary. On 10 October 1923, Fritz Steinbach established a business as a "wholesaler of chemical and technical products" in Constance, Germany. The move to Detmold was completed in the 1930s.
In 2002, the company began operating as Steinbach AG and is represented by Volker Steinbach. Besides the 3D printing of Technical Ceramics introduced in 2016, Steinbach AG is also an expert in quality membranes, gaskets and seals as well as film packaging.We have already reported on 3D printing on industrial scale at Steinbach AG in CERAMIC APPLICATIONS 11 (2023) [1] 14–16.
This article is supplemented with information on the company philosophy and strategy that we were given in a talk at the company headquarters with Volker Steinbach (VS), CEO at Steinbach AG; Volker Sämann (VSä), Head of the Technical Ceramics Division and Viktoria Lieder (VL), who heads Production/CAD Design.

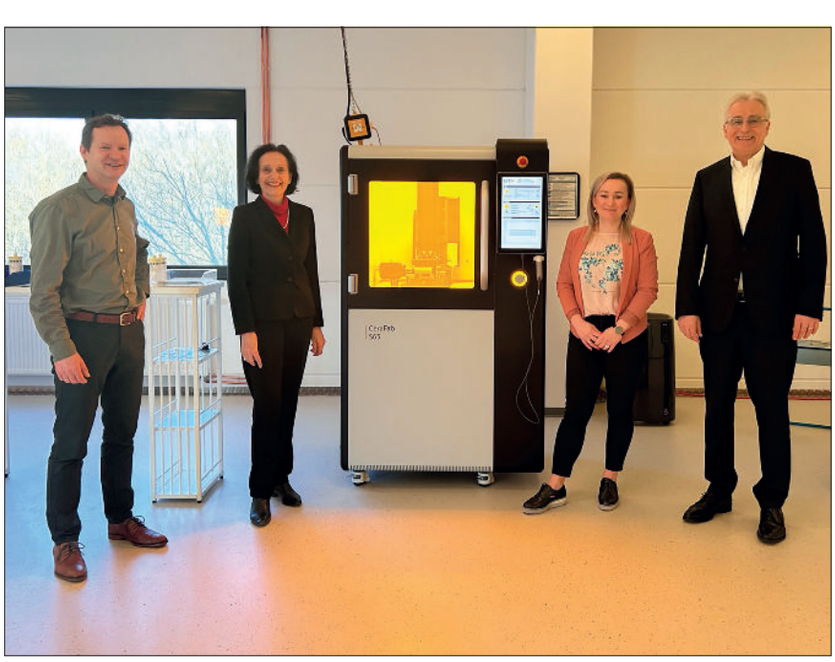

Fig. 1
Volker Sämann, Karin Scharrer, Viktoria Lieder and Volker Steinbach (f.l.t.r.)

CA: *Technical Ceramics is the youngest division at Steinbach AG. What prompted you to go into technical ceramics?*
VS: Besides our headquarters in Detmold, we are active in Shanghai/CN, Charlotte/US, Taipei/TW and Brisbane/AU.
In the USA and Taiwan, even before investing in our first 3D printer in 2016, we were already engaged with ceramic activities in CIM. Our aspiration is to use material expertise, know-how and lots of high-tech products to be a partner for key industries. So you also need activities in technical ceramics for specific applications.
At our Detmold base, this investment made sense as in Germany and the neighbouring countries, a good level of development for this ceramic shaping technology has already been reached.
With further investment in equipment at this location and the setup of the Technical Ceramics Innovation Center in 2022, we have strengthened this centre of expertise within the company group. Since 2016, we have invested around EUR 2,5 million in equipment. The focus is the fabrication of filigree components of the highest quality down to the smallest detail, e.g. complex geometries with high strength and precision for aerospace as well as medical technology or machine engineering.
Steinbach's corporate culture also means close and trust-based cooperation with all national and international busi-

ness partners. We are always keen to expand our presence in future markets.

CA: *As we reported back in 2021, Steinbach is one of the pioneers in 3D printing of ceramics. You have now proven your expertise in series manufacture. What hurdles have you had to overcome in this regard?*

VL: On the one hand, it is, of course, about the development of the component itself. Even if 3D printing can do a lot that other shaping technologies don't offer, it is still necessary to optimally adapt the components to be printed for the technology in order to realise cost-efficient processes in series manufacture. Accordingly, it is about the geometric design and material selection, but as soon as the printed component exists, there are still some aspects to be clarified in post-processing. That includes efficient cleaning of the parts, for which we have installed an airbrush system, and the development of burn-out and sintering curves. As generally the components produced are really complex, it is important to design suitable support structures and holders for firing, which are often also fabricated by means of 3D printing. Our core expertise, naturally, also includes the development of customised CAD models.

That can easily take 1,5 years of development even if Lithoz/AT – our printer supplier – and other external partners give us tremendous support.

One customer for whom we are now producing around 12 000 highly complex components per year not only has very high specifications for extremely narrow dimensional tolerances and surface quality, but also for defined structural properties. Our inhouse quality control is commensurately complex, and corresponding investments in this have naturally been necessary over the last two years.

VSä: We have, however, established that today we produce these components more or less round the clock and fully utilise the capacity of one of our four printers. If higher unit numbers are required, then it seems expedient to use printers with a larger build platform. For this reason, we are currently conducting a market study to ascertain the demand in the industry to fully utilise larger printers. The size of the components ultimately determines the maximum possible unit number for a defined platform size.

Our focus is series manufacture as then the technology is viable. Prototyping is also done of course. However, we approach this with the goal of going into series manufacture. The art in responding to the many different enquiries we get is to correctly assess this potential.

CA: *Where do you see opportunities to further improve what you have already achieved in series manufacture?*

VL: For even higher unit numbers, semi-automation will certainly be one aspect. At the moment we are not yet using simulation technologies to calculate sintering shrinkage/warpage in advance. That can also help to shorten development times. For such tasks, we need external partners.

At present, we are involved, for instance, as an industry partner in a research project coordinated by the Fraunhofer IKTS/DE.

CA: *What customer segments are you addressing?*
VSä: That is not only the supply of components to users of the parts. We are also contracted by ceramics manufacturers that don't operate Additive Manufacturing or manufacturers that process other materials. Contacts arise through the active network of the community: equipment suppliers, developers, etc. We also see good opportunities to make new contacts through our ceramics colleagues within the Steinbach Group.

CA: *Do you also want to introduce other printing systems, e.g. for larger components?*
VL: At the moment, we want to stick with LCM technology as filigree parts are our expertise. Our new facilities provide space for around another ten printers for series manufacture – that is our vision just now. At the next trade fairs, formnext 2023 and ceramitec 2024, we are also anticipating good opportunities to make new contacts.
CA: *Thank you for talking to us.*

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