

GERMANY

# INMATEC Technologies GmbH Increases Feedstock Production

Since 1998, feedstocks for CIM (Ceramic Injection Moulding) have been developed and produced at INMATEC Technologies GmbH in Rheinbach/DE. For the industrial manufacturing of ceramic components, CIM initially stood for a long time in the shadow of established shaping processes like pressing technology, extrusion and pressure slip casting. In the meantime, the product portfolio with regard to the binder systems for CIM has been widened enormously at INMATEC. Today, the company also supplies the international market with its products and specialist expertise in this highly developed manufacturing technology. Managing Director Dr Moritz von Witzleben (MvW) and Sales Director Dr Karin Hajek (KH) gave us an insight into the company's current business activities.

**CA:** *What has motivated the decision to increase the production capacity by more than 50 %?*

**MvW:** That has been a long-term decision process, which is based amongst other things on market surveys that we began back in 2012. In one area of the automotive segment, the evaluation of our technology was concluded in August 2017, and the findings were positive. Then in 2017 BASF/DE took the strategic decision that, alongside its feedstocks for MIM, it would no longer make any more products for CIM as this market volume is much smaller. At BASF, they worked with POM-based (polyoxymethylene) systems. And the users needed a substitute for BASF's POM-based CIM feedstocks. So it was good that we were already familiar with other regimes for debinding.

There are two key effects that support this decision. First, the positive evaluation for CIM in the automotive segment, and second, the widening of our product range, which has brought us an additional set of customers. The growth has come especially in the last two years. Besides increasing the production capacity, we have added to our personnel (2017: 25 employees; 2020: 60 employees). Our production runs in three-shift operation. We have increased the number of production lines from five to eight.

**KH:** Our customers have always appreciated our individual service – not only existing customers, but companies that have only started building up this technology.

**CA:** *What does this full service comprise?*

**KH:** Our services range from innovation consulting through material and mould development to project consultation in the set-up of ceramic injection moulding systems. Besides our standard products, we develop and produce individually to meet the needs of the customer, that is formulations adapted to the application.

These customer-specific feedstocks now account for three quarters of our production. We support customers in the development of products and steward the projects until they are ready for series production. That applies not only to the core components like injection moulding machine and furnace engineering, but also to the peripheral equipment. It is shown repeatedly that standard products are useful in the introduction of the technology. Tailored feedstock systems, however, help to place this technology on the market. Here we bring in our extensive know-how from the powder to the final product or even as far as packaging. Consulting brings us close to the customer and ultimately ensures customer loyalty.

**CA:** *How can the market developments of CIM be rated today, measured against MIM?*

**MvW:** The market volume of CIM is much smaller still today (15 % CIM share in the market for powder injection moulding/PIM). In the years from 2012–2017, +12 % growth per annum was registered in the PIM market. Since 2017, INMATEC has grown by 58 % per year! That is essentially down to CIM. As we are in such demand in our estab-



Fig. 1  
Managing Director Dr Moritz von Witzleben



Fig. 2  
Sales Director Dr Karin Hajek

lished market, we have done comparatively little in MIM, just contract processing. At present, CIM is growing faster than MIM and is fully established as a production technology.

**CA:** Which user segments are a particular focus?

**KH:** On a broad front, I should say automotive and consumer goods, e.g. grinding disks for automatic coffee machines. High-price luxury watches are made of ceramic. But there

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Fig. 3  
Injection moulding machine

are interesting developments in other areas i.e. medicine and medical engineering.

**CA:** Is CIM being taken up as a technology only by ceramists or by companies outside the sector – like plastics?

**KH:** Only to an extent, it is more the case for MIM. In ceramics, the production chain quickly becomes too complex for those outside the sector. The strengths of CIM components are not simple standards, but complex components – a good knowledge of ceramic technology is useful.

**CA:** “Multi-material components” are getting stronger. How are you reacting to this?

**MvW:** This development has been driven by MIM, for us the questions relevant for this are not arising on a broad front. You then have to look intensively at the upstream and downstream processes in the manufacturing chain to be able to manufacture components that are free of defects and have the required properties.

**CA:** In what direction are you steering your R&D activities generally?

**MvW:** Internally, optimisation of our binder systems is an ongoing task. That is the wax-based system (INMAFEED), and the polyoxymethylene-based system (INMAPOM) or the new polyamide-based system with good flow properties (INMAFLOW).

With the extended range of machines, it is important to push ahead with the optimisation and coordination of the production machines and processes, with the goal of achieving

even greater efficiency and stability in production. We have more than doubled our efforts in quality assurance.

New customer requirements spark developments. In the case of publicly funded projects, the focus is on 3D-printing, material aspects (e.g. new material combinations) or process aspects. And we shouldn't overlook the fact that we have more than doubled our staff in just two years. That necessitates structural changes in organisation. We have arranged for this project to be accompanied by coaching/supervision to eliminate any potential conflicts early on.

**CA:** What effect has COVID-19 had on organisation of the production planning and sales activities?

**MvW:** Internal organisation requires much more time. Back in March 2020, we decided to introduce a strictly segregated two- or three-shift system (production). We shall certainly stick with that up to mid-2021. The teams are not mixed so that if a case of Corona occurs, we still have two groups fit to work. The management team is also both spatially and chronologically separated. We are paying for Corona tests for employees to limit any risk in good time.

Where necessary, workplaces have been adapted, e.g. gateway systems at entrances and exits. For internal and external communication we are relying more on video conferences. In sales we should, of course, like more in-person talks, whether at trade fairs or customer facilities. There are situations when nothing can replace an in-person discussion.

**CA:** Thank you for talking to us.

KS



Fig. 4  
INMATEC's new warehouse