

3D-printed and mirror-smooth

KraussMaffei offers Additive Manufacturing and surface finishing from a single source

- Unique items using 3D printing
- Seamless combination of Additive Manufacturing and surface finishing
- From large-format components to mirror-smooth surfaces

(Parsdorf, Germany, December 13, 2023) One-offs in industrial production quality - the best way to achieve this is with 3D printing. In order to smooth the strand structure created in this process, objects are post-processed, for example by milling. At KraussMaffei, the sites in Parsdorf (Additive Manufacturing) and Harderberg/ Georgsmarienhütte (toolmaking) work together for this purpose. The customer receives his complete component from a single source.

The powerPrint large-format printer can be used to produce components with dimensions of up to 2 x 2.5 x 2 meters - either by purchasing such a printer or by using print on demand. With this service, KraussMaffei takes care of the entire project, from data optimization to the perfect surface.

When customers first asked Ender Murat Ferat (Project Engineer Additive Manufacturing) in Parsdorf about this service, he did not immediately have his toolmaking colleagues in Harderberg in mind. No wonder, as they mainly work for the company's reaction technology division and produce molds for PUR processing, among other things. "We initially tried working with external milling companies, but working in-house is of course much more efficient and you also retain the expertise," explains Ender Murat Ferat.

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Once contact had been established between the sites, joint development began. In Harderberg, they had already been milling plastic as well as metal, but mostly material made from ureol, a polyurethane or epoxy resin saturated with fillers in sheet and block form. Production Manager Stefan Springrose explains: "Our products include prototypes and leatherette models for the automotive industry." Recycled PETG with 30 percent glass fiber reinforcement will now be used for 3D printing.

Milling plastics requires different machines to those used for metal, as the cutting process is simpler and involves more stock removal. For this reason, less powerful but highly dynamic machines are used to achieve the highest possible cutting speeds and fast production times. The tools used must be extremely sharp and require optimum chip removal. During tests with the glass fiber-reinforced PET, Thorsten Richter, team leader of the milling shop in Harderberg, even discovered "that diamond-coated milling cutters are necessary to withstand the abrasive material. This significantly reduces wear."

The edge structure familiar from Additive Manufacturing can thus be completely smoothed. To let customers feel how fine the surfaces can become, Ender Murat Ferat always has corresponding sample plates with him. So far, they have reached a roughness depth of RZ 12, but Thorsten Richter emphasizes that it is possible to get even smoother: "It just takes longer."

One project that colleagues in Bavaria and Lower Saxony have already implemented together is a sand casting mold for pressure pads. For this process, a negative mold is first produced, with which the actual sand mold is manufactured, which in turn holds the liquid metal (iron, aluminum, etc.). The sand mold is destroyed during demolding, and the milled 3D body can be used again and again. Until now, ureol was usually used for this. Despite the higher costs per kilo of raw material, Additive Manufacturing offers two decisive advantages: Firstly, the models are significantly more resistant to breakage, and secondly, you are independent of the standard dimensions of the ureol blocks and plates. These usually do not correspond to the

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dimensions required for the project, so they have to be glued together by hand to the required size. The associated labor costs can be saved if the 3D printer produces a blank that only needs to be built up where the end product requires material. This ultimately makes the 3D mold cheaper than its ureol counterpart, despite the higher base price for the PETG.

The cooperation between Additive Manufacturing and toolmaking benefits both sides because each area can now offer additional services. Print on demand customers receive their workpieces from a single source with a perfect finish, while existing customers of ureol models can use the more break-resistant PET GF30.

KraussMaffei is the only company in the industry that manufactures machines for all types of plastics processing - Additive Manufacturing, reaction process machinery, extrusion and injection molding. Technical developments are driven forward in the know-how network.

Photos:

KM_RPM_20231212_CNC

Mechanical machining of a steel tool substructure on a 5-axis CNC machining center

KM_AM_20231212_ Milling process

Milling process of the additively manufactured casting model

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KraussMaffei – Pioneering Plastics

KraussMaffei is among the world's leading manufacturers of machinery and systems for the production and processing of plastics and rubber. Our brand stands for cutting-edge technologies – for more than 185 years. Our range of services covers all areas of injection molding machinery, extrusion technology and reaction process machinery. In 2022 we added Additive Manufacturing to our portfolio. This broad range of technologies gives KraussMaffei a unique selling point in the industry. With the high innovative power of our standardized and individual product, process, digital and service solutions, we can guarantee customers sustained additional value over the entire value-adding chain. Our range of products and services allow us to serve customers in many sectors including the automotive, packaging, medical and construction industries, as well as manufacturers of electrical and electronic products and household appliances. KraussMaffei employs around 4.700 people all over the world. With more than 30 subsidiaries and over 10 production plants, as well as about 570 commercial and service partners, we are represented internationally close to our customers. The company was founded in 1838 in Munich.

In April 2016, China National Chemical Corporation Ltd. (“ChemChina”) became the majority shareholder of KraussMaffei Group. In December 2018, ChemChina listed the KraussMaffei Group as KraussMaffei Company Limited in Shanghai. The listing opened up access to the Chinese capital market and local investors. Now ChemChina is part of Sinochem Holdings Corporation Ltd., one of the world's leading chemical conglomerates with over 220,000 employees.

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