

At the Fakuma 2021, the LEHVOSS Group presents sustainable solutions for the plastics processing industry based on polymer high-performance compounds

Booth B1-1109

For the LEHVOSS Group, the Fakuma 2021 will be themed as how the increased sustainability requirements of customers can be better met with sophisticated high-performance compounds and the intelligent use of recycled polymers and fibers.

LEHVOSS has used the last few years and purposefully expanded its very extensive portfolio of high-performance compounds again in order to better meet the challenges of structural lightweight construction and to enable expanded metal replacement with lightweight, fiber-reinforced compounds.

Materials for structural lightweight construction

For more than 20 years, the LUVOCOM XCF products have stood for carbon fiber reinforced (CF) thermoplastic compounds of the extra class with extreme mechanical properties. The latest development from this family is a product based on PPA. With a strength of 425 MPa, a stiffness of 47 GPa, a tensile elongation of 1.4% and 100 kJ/m² for the impact strength, it is a real alternative to light metals in many applications and due to the low density of 1.37 g/cm³ very high values for the specific modulus of elasticity and the specific strength. These have not yet been achieved by thermoplastic compounds.

LEHVOSS' own XCF technology can be transferred to all thermoplastics. Products based on PA 66, PPS, PPA, PEEK and other polymers are already in the extensive XCF portfolio. In principle, the compounds can be processed on conventional injection molding machines and tools.

For applications that require high chemical resistance with an even lower weight and good mechanical properties at the same time, LUVOCOM 60-50097 based on PP with CF is new to the portfolio and a highly interesting alternative to materials based on PA 6 and PA 66 with CF and GF (glass fibers). LUVOCOM 60-50097 offers the best mechanics on the market for this material combination: strength 170 MPa, stiffness 18 GPa, notched impact strength 11 kJ/m². Due to the lack of water absorption, it does not show any decrease in properties under humid conditions and is therefore on a par with PA compounds in terms of mechanics and temperature resistance.

With LUVOCOM 1105-50303, a PEEK compound reinforced with hollow glass spheres was brought onto the market, which with a density of only 1.01 g/cm³ is predestined for structural lightweight construction. The compound is manufactured using a specially adapted compounding process in order to avoid damage to the hollow glass spheres. The material is also characterized by a low heat capacity and a very good mechanical property profile. This makes this material particularly suitable for thin-wall extrusion. The underlying modification and production technology developed by LEHVOSS can be

transferred to other polymers, so that a large variety of polymeric substrates can be modified at the customer's request.

Thermoplastic foam injection molding and foamed extrusion applications have been used in a large number of components for a number of years, for example to reduce sink marks and weight. As the requirements are becoming more and more demanding and the feel, surface quality, dimensional stability and use in sensitive end-use applications play an ever greater role, the demands on the blowing agent concentrates used are also increasing. LEHVOSS has taken on this and developed various high-performance, physiologically harmless endothermic propellant masterbatches. These new highly loaded products can be used with very low dosages (from 0.1%) in injection molding and extrusion. LUVOBATCH PE BA 5821 is optimized for use where excellent surface quality is important despite high weight savings. LUVOBATCH PE BA 5823 has an exceptionally fine cell structure, which is a great advantage for film applications. The new masterbatches are free from azodicarbonamide (ADC) and can therefore be used in foamed applications with subsequent contact with food or drinking water. Due to their exceptionally high gas yield, these can be used as an alternative to ADC masterbatches.

Components equipped with flame protection enable safer use in transport, construction or electrical engineering. In addition to the classic, halogen-containing flame retardant masterbatches, the LEHVOSS Group has developed an extensive product line of environmentally friendly, halogen-free flame retardant masterbatches and compounds for these applications. The possible uses range from film structures to cables and components with higher wall thicknesses. Nitrogen- and phosphorus-based as well as mineral additives and intumescent systems can be used, in which the effect in the event of fire is achieved by foaming the material with subsequent formation of a stable protective layer. If required, as is customary with LEHVOSS, customer-specific solutions are developed to meet individual objectives.

With the LUVOTECH product line introduced in 2019 as part of the K trade fair in Düsseldorf, the highly individual high-performance compounds of the LUVOCOM range were supplemented by very high-quality standard compounds. The portfolio of structural materials is now being expanded with new technical compounds from the LUVOTECH PA^{HT}® product line - based on high-temperature PA. These materials are highly filled with a glass fiber content of 40 to 60 percent by weight and, with their high mechanical properties, are ideal for metal replacement applications.

Sustainable solutions

The new LUVOTECH eco products are a major expansion of the LUVOTECH product line. This product line combines the usual high and reliable performance with the use of recycled raw materials. The LEHVOSS Group is uniquely positioned in this segment, as it can not only fall back on 40 years of formulation know-how in the field of high-performance compounds, but has also a subsidiary with WMK Plastics for 5 years, which has been very much for more than 25 years successfully active in the field of recycled compounds and not only knows the challenges of the supply chain and the testing of recyclates, but also masters them. All products in the LUVOTECH eco line are characterized by a

significantly improved CO₂ footprint, which can be reduced by up to 90% when using PEEK or carbon fiber recyclates, for example.

When it comes to material recycling, the LEHVOSS Group largely concentrates on the upper end of the material pyramid in the areas of engineering plastics and high-performance plastics and offers recyclate-based products from PC/ABS to PA to PEEK.

Recycled materials in 3D printing

The eco materials are used across all processing technologies. The need for sustainable materials is also growing in the field of 3D printing. For such requirements, the LEHVOSS Group has developed the LUVOCOM 3F eco PET, which is 90% based on recycled PET. This is currently the highest known recycling rate on the market. The LUVOCOM 3F eco PET can be used in both FFF (Fused Filament Fabrication) and FGF (Fused Granulate Fabrication) processes. Like all products from the LUVOCOM 3F product line, this material also impresses with its very good processability and excellent product properties. Areas of application are functional prototypes and series parts in numerous industries, such as mechanical engineering, automotive engineering and medical technology.



3Dprinted impeller made of LUVOCOM 3F eco PET 50291 BK

In addition to the development of materials, holistic considerations are also important for reducing the CO₂ footprint. The creation of cost- and handling-optimized lamination standards (lamination molds or lamination tools) for the production of highly developed orthoses from CFRP laminates is still done nowadays using thermoset PU molded foams. These are milled and this creates waste as well as the later disposal of the molds.

For a case study, the mold manufacturing process using 3D printing was examined with the company adViva. LUVOCOM 3F PET CF 9780 BK was selected as the material. This is characterized by high strength and temperature resistance. In addition, it has good chemical resistance and is easy to print.

Process-related requirements, such as the required heat resistance and freedom from moisture for the curing process in the oven vacuum process, are fully met by the printed lamination forms. Since minimal use of material is taken into account in the construction of the model - supported by the high strength of the selected 3D printing material - it is possible to work with little infill (support structure in the component). This results in an even smaller volume of material as residual material. The LUVOCOM 3F PET CF 9780 BK can be collected separately and sent for technical plastics recycling. After the components have been ground, new technical parts can be created using injection molding, for example. When the process is established in this application, a sorted return of material can be organized and nothing stands in the way of recycling.



3D printed molds, finished CFRP orthotic

High-performance compounds for medical technology

The LEHVOSS Group has been a leading supplier of high-performance plastics for medical technology for many years. In addition to materials for mechanically highly stressed surgical instruments, a focus is on modern colors based on PEEK high-performance plastics, which are available unreinforced and fiberglass-reinforced. New here is a product portfolio that covers a wide, standardized color spectrum and offers customers the following advantages and a high degree of flexibility:

- Available color and price lists for individual material selection (on request)
- Short-term availability from 20 kg purchase quantity
- As granulate in bags for classic injection molding or extrusion
- In semi-finished form for the fast, machining production of sample parts or small series

Press Info



- As filaments for the 3D printing of the first samples and functional parts
- Proof of all materials according to EN ISO 10993-5 and -12 (cytotoxicity proof)
- Partial food conformity
- All materials are suitable for multiple, sustainable use in accordance with the current processing methods.
- In addition to this range, we also offer individually colored materials for our customers from a certain purchase quantity. For ecological reasons, we also offer PEEK materials based on industrial qualities / recycled materials that have properties comparable to those of new goods.
- Manufactured in Germany based on more than 35 years of experience in PEEK compounding

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The LEHVOSS Group under the management of Lehmann&Voss&Co. is a group of companies in the chemicals sector that develops, produces and markets chemical and mineral specialities for various industrial clients. Lehmann&Voss&Co., Hamburg, was founded in 1894 as a trading company. Since that time, the owner-run company has evolved into a powerful global organization – with long-standing connections to prominent, mainly foreign suppliers and with its own production sites in Europe, the USA and Asia. www.levoss.com

The Customized Polymer Materials division has been a partner to industry since 1984 in terms of material selection, development, and production, technical advice and support, from design to production. LUVOCOM® high-performance compounds, LUVOTECH® and LUVOTECH® eco technical compounds expand the possible uses of plastics and in many industries ensure that products made from them reliably fulfill their function even under high requirements. The materials with precisely defined properties are based on almost all available thermoplastics and are tailored to individual customer and application requirements.

With the 3D printing product lines LUVOSINT® and LUVOCOM® 3F the LEHVOSS Group offers innovative and customized polymers for 3D printing. They are dedicated to the most common technologies as powder bed fusion, fused filament fabrication (FFF) and fused granulate fabrication (FGF). The materials provide good processability and excellent material properties. www.luvocom.com

The Masterbatches and Additives division is an international partner of the plastics processing industry and develops, produces and sells high-quality and customer-specific masterbatches and additives in their pure form. Our experienced and committed team of experts stands for high flexibility and individual service. With development, production, laboratory, technical center and sales, all functions are bundled under one roof. We offer our customers maximum individuality and speed of innovation. www.luvobatch.de

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