

LANXESS – Tepex continuous-fiber-reinforced thermoplastic composites in lightweight automotive engineering

All-plastic brake pedal receives SPE Grand Award

- **Weighs 50 percent less than steel counterpart**
- **High levels of flexural and torsional strength thanks to multi-axial fiber layer construction**
- **Manufacturing process capable of large-scale series production using hybrid molding**

Cologne – An all-plastic brake pedal with an insert made of Tepex dynalite from LANXESS has been awarded first place in the “Body Interior” category of the Automotive Award of the Society of Plastics Engineers (SPE). The safety component is used in the Porsche Panamera NF and the Bentley Continental GT. It was jointly developed by BOGE Elastmetall GmbH, a global supplier in the field of rubber-metal parts, chassis and powertrain suspension mounts and precision-manufactured plastic components for the automotive industry, headquartered in Damme (Germany), and the LANXESS High Performance Materials business unit. “Special recognition was given to the fact that the brake pedal weighs about half as much as a comparable steel structure. It can also be manufactured in large-scale series production using a cost-effective one shot process, and meets the high load requirements thanks to the multi-axial fiber layer construction of the Tepex insert,” explains Ulrich Jecmeniza, an expert in lightweight construction with Bond-Laminates GmbH. The LANXESS subsidiary develops and manufactures the Tepex brand of continuous-fiber-reinforced thermoplastic composites.

High tensile, flexural and torsional strength

Tepex dynalite is a fully consolidated semi-finished product with a thermoplastic matrix that is generally reinforced with layers of

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continuous glass fiber fabric. A composite construction with a polyamide 6 matrix was selected for the brake pedal. This is reinforced with fiber overlays aligned in the same direction and several woven inner layers with fibers aligned at +45° or -45°. The overlays provide the excellent tensile and flexural strength of the brake pedal, while the inner layers deliver the high torsional strength. “Thanks to this laminate, it was possible to meet the very high technical requirements for the mechanical performance of the safety component while at the same time exploiting the full potential for lightweight construction,” says Burkhard Tiemann, head of the plastics product line at BOGE Elastmetall. Four versions of the brake pedal have been constructed – one each for left- and right-hand drive cars and drivers who brake with the left or right foot. In each case, the load paths were optimized to account for the different torsional directions.

Efficient one shot process with numerous integrated functions

The component is manufactured using a one shot hybrid molding process with short cycle times that are perfect for large-scale series production. The process integrates the shaping of the Tepex insert into the injection molding. The injection molding material is Durethan BKV 60 H2.0, a polyamide 6 from LANXESS highly reinforced with 60 percent short glass fibers. “Thanks to the injection molding process, numerous functions such as guides and contact surfaces for the pedal bracket can be integrated into the component, which cuts costs. The component is also reinforced with ribs in areas subjected to high stress,” explains Jecmeniza.

Attractive component look

The brake pedal is also a feast for the eyes. For example, the flawless, regular pattern of the continuous glass fibers is easily visible on the surface of the component. Jecmeniza: “They give the pedal an attractive technical look that is reminiscent of motorsport or aerospace technology.”

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Prestigious award

The SPE Awards are among the most prestigious awards for innovation for the automotive industry and its suppliers. They have been awarded every 18 months since 1992. This year's awards were presented in Düsseldorf on October 17. Ulrich Jecmeniza joined the development partners from BOGE Elastmetall to receive the Grand Award for the all-plastic brake pedal on behalf of LANXESS.

For more detailed information on Tepex properties, applications and processing technologies, go to www.bond-laminates.com.

LANXESS is a leading specialty chemicals company with sales of EUR 7.9 billion in 2015 and about 16,700 employees in 29 countries. The company is currently represented at 55 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, specialty chemicals and plastics. Through ARLANXEO, the joint venture with Saudi Aramco, LANXESS is also a leading supplier of synthetic rubber. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World) and FTSE4Good.

The BOGE Rubber & Plastics Group is a top player among the leading worldwide automotive suppliers in the field of rubber-metal parts, chassis and powertrain suspension mounts and precision-manufactured plastic components. The group of companies employs about 4,000 people generating an annual turnover of approx. EUR 740 million (consolidated) at ten locations. The company headquartered in Damme (Germany) is represented internationally at ten locations in seven countries. BOGE Rubber & Plastics is a division of Zhuzhou Times New Material Technology Co, Ltd, which employs about 180.000 people. More information can be found at www.boge-rubber-plastics.com.

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News Release

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