Press release

PEEK, polyimide and polyamides for high-performance gears

September 20, 2018

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Whether in AdBlue or oil pumps, mass-balancing differentials, electric engines or sensor systems for car interiors—the expected performance levels for gears made of synthetic materials are continually on the rise. This calls for the development of gear systems that can operate in dry and lubricated conditions, not just in vehicles, but also in machinery and equipment. Evonik offers suitable materials such as VESTAKEEP® PEEK, P84®NT and various VESTAMID® polyamide molding compounds, which already feature a high level of performance. The plastic gear test stand established in the Friction and Motion Competence Center in Darmstadt in September 2018 drives further developments, working in close partnership with customers to coordinate specific applications.

Less friction, reduced energy consumption, lower costs

Because studies have shown that up to 20 percent of a car's energy is lost to "under the hood" friction, gears installed in engines and transmissions play a particularly important role. They must function with high precision, while withstanding greater tolerance deviations caused by external influence factors such as humidity, lubrication and temperature fluctuations. Since high-tech plastic gears are associated with lower friction losses than conventional metal gears, they can reduce fuel and energy consumption as well as the cost associated with the intensive re-work of metal. As an added benefit, plastic gears are also much quieter.

Evonik offers a number of molding compounds that have been used for high-performance gears for years, including the reinforced and unreinforced PEEK molding compounds VESTAKEEP®, in part with specific additives to meet various customer requirements. Additional products are based on polyimide P84® NT as well as modified polyamide 12 VESTAMID® molding compounds and the VESTAMID® HT*plus* polyphthalamide molding compounds.

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Newly designed test stand for plastic gears

The newly established gear test stand in the Friction and Motion Competence Center in Darmstadt can be operated at temperatures ranging from -20°C to 260°C, depending on the lubrication, or in dry-run conditions. “The results provide us with important gear characteristics such as tooth root or tooth flank strength along with data on abrasion. We can even set up different process conditions and simulate lubrication conditions,” say David Schmitz and Volker Strohm about the new options for developing custom-tailored compounds for future applications. Both are involved in application development at Evonik’s High Performance Polymers Business Line at Evonik and will report on their first experiences with “Reduction of Friction and Abrasion with High-Performance Polymers” at the FAKUMA Forum on Thursday, October 18, 2018 at 9:40 am.

To learn more about Evonik’s high-performance polymers, visit Stand 4117 in Hall A4 at the 26th FAKUMA tradeshow from October 16 to 20 in Friedrichshafen. Visitors can see live demonstrations for finding suitable materials for their applications in the new Evonik Plastics Database.

Attend the presentation “Reduction of Friction and Abrasion with High-Performance Polymers,” FAKUMA Forum”, October 18, 2018, 9:40 am.

Caption: This gear, made from VESTAKEEP® PEEK, is ready for Evonik's gear test stand at the Friction and Motion Competence Center in Darmstadt. The stand allows for testing at temperatures ranging from -20°C to 260°C, depending on lubrication, or in dry-run conditions.

About Evonik
Evonik is one of the world leaders in specialty chemicals. The focus on more specialty businesses, customer-orientated innovative prowess and a trustful and performance-oriented corporate culture form the heart of Evonik's corporate strategy. They are the lever for profitable growth and a sustained increase in the value of the company. Evonik benefits specifically from its customer proximity and leading market positions. Evonik is active in over 100 countries around the world with more than 36,000 employees. In fiscal 2017, the enterprise generated sales of €14.4 billion and an operating profit (adjusted EBITDA) of €2.36 billion.

About Resource Efficiency
The Resource Efficiency segment is led by Evonik Resource Efficiency GmbH and produces high performance materials and specialty additives for environmentally friendly as well as energy-efficient systems to the automotive, paints & coatings, adhesives, construction, and many other industries. This segment employed about 10,000 employees, and generated sales of around €5.4 billion in 2017.

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