News Release

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Energized: SEMIKRON manufactures power semiconductor modules from BASF's Ultradur®

- **New application for the highly stable PBT from BASF in power electronics**
- **Close cooperation between BASF and SEMIKRON in application development**

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Evelyn Naudorf
Phone: +49 621 60-42223
evelyn.naudorf@basf.com

Since the beginning of 2015, the flame-retardant polybutylene terephthalate (PBT) Ultradur® B4450 G5 (halogen-free) from BASF has been used in the mass production of the MiniSKiiP Dual power semiconductor modules from the company SEMIKRON. Application examples of power semiconductor modules (or DC/AC converters) are in industrial drive technology, solar inverters, or in the powertrain of electric vehicles. Developing heat is dissipated from the modules by metallic heat sinks. This prevents any rise in temperature and helps to ensure an optimum operating temperature. The power semiconductors are protected from external influences such as moisture, dirt, and fluctuations in temperature by a housing made from the thermoplastic Ultradur®.

The material is classified as V-0 under UL 94 from a wall thickness of 1.5 millimeters and in combination with an excellent temperature performance (RTI = 140 °C) it is therefore particularly well suited to applications in electric power modules which are subject to a high amount of heat generation. The thermoplastic also has good mechanical properties and can be light-colored. With a CTI value of 600, the material offers a very sound choice thanks to its exceptionally good electrical insulation capacity and therefore offers great freedom

BASF SE
67056 Ludwigshafen
Phone: +49 621 60-0
http://www.basf.com
Communications Performance Materials
Phone: +49 621 60-42223
www.plasticsportal.eu
www.pu.basf.eu

of design even for small and detailed components such as the MiniSKiiP Dual. Ultradur B4450 G5 is reinforced with 25 percent glass fibers, which gives the components additional stability.

“Thanks to the positive cooperation and the professional support we have received from BASF in respect of application development and simulation, we have managed to manufacture components which are not just extremely stable, but also display a very low level of wear for a material that is reinforced with glass fibers,” says Dr.-Ing. Jörn Grossmann, new technologies material expert at SEMIKRON, in explaining the approach adopted in the trial phase. The company is now examining other possible uses for Ultradur B4450 G5.

Ultradur B4450 G5 is noted for the fact that it is very effective in helping to prevent electrolytic corrosion: metal contacts which are installed are only affected to a minimal extent even under highly humid and warm conditions. This means that short-circuits and the damage resulting from this can be avoided. Previously SEMIKRON and BASF have successfully worked together in the area of characterizing electrolytic corrosion. This resulted in a new kind of test method which can be used to test BASF’s thermoplastics for their resistance to electrolytic corrosion. [Plastverarbeiter (German plastics journal), 12/2014 issue, pages 52-54, author: Jochen Seubert, BASF SE]

More information can be found at: www.ultradur.de

About SEMIKRON:

SEMIKRON is one of the world's leading manufacturers of power modules and systems primarily in the medium output range (approx. 2 kW up to 10 MW). The products are at the heart of modern energy efficient motor drives and industrial automation systems. Further application areas include power supplies, renewable energies (wind and solar power) and utility vehicles. SEMIKRON's innovative power electronic products enable our customers to develop smaller, more energy efficient power electronic systems. These systems in turn reduce the global energy demand. SEMIKRON is a family owned business founded in 1951, headquartered in Nuremberg, Germany. Today it has more than 2,800 employees in 30 subsidiaries world-wide.

About BASF's Performance Materials Division

BASF's Performance Materials division encompasses the entire materials know-how of BASF regarding innovative, customized plastics under one roof. Globally active in four major industry sectors - transportation, construction, industrial applications and consumer goods – the division has a strong portfolio of products and services combined with a deep understanding of application-oriented system solutions. Key drivers of profitability and growth are our close collaboration with customers and a clear focus on solutions. Strong capabilities in R&D provide the basis to develop innovative products and applications. In 2014, the Performance Materials division achieved global sales of € 6.5 bn. More information online: www.performance-materials.basf.com

About BASF

At BASF, we create chemistry – and have been doing so for 150 years. Our portfolio ranges from chemicals, plastics, performance products and crop protection products to oil and gas. As the world's leading chemical company, we combine economic success with environmental protection and social responsibility. Through science and innovation, we enable our customers in nearly every industry to meet the current and future needs of society. Our products and solutions contribute to conserving resources, ensuring nutrition and improving quality of life. We have summed up this contribution in our corporate purpose: We create chemistry for a sustainable future. BASF had sales of over €74 billion in 2014 and around 113,000 employees as of the end of the year. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (AN). Further information on BASF is available on the Internet at www.basf.com.