News Release

New polyamide for the thermal management of LEDs and electrical devices

Thermally conductive, flame-retardant and highly reflective

- **Unusual combination of properties**
- **Alternative to die-cast aluminum in heat dissipation applications**

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Cologne – LANXESS continues to expand its range of polyamides for components used in the thermal management of LEDs and electrical devices. The newest member of the product family, with high mineral reinforcement, is Durethan TP 723-620. “The special feature behind this polyamide 6 is its outstanding thermal conductivity combined with high light reflection and excellent flame retardance. As far as we know, this premium combination of properties makes it absolutely unique in this material class,” says Thomas Malek, New Business Development Manager for lighting technology in LANXESS’s High Performance Materials business unit. Major application potential exists in lighting and electrical devices, and in the field of electronics.

Because of the shape of the filler particles, the thermal conductivity of the new compound is directionally dependent, reaching 2.5 W/mK along the flow trajectory (determined by the NanoFlash test). It is about 10 times higher than that of the standard polyamide 6, Durethan BKV 30 H2.0, which is reinforced with 30 percent glass fibers. “We have calculation tools with which we can determine the local orientation of the particles in an injection-molded component. This information is critical for incorporating the directional dependency of the thermal conductivity, and then making the most realistic predictions possible,” adds Malek.

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Outstanding results in UL 94 flame retardance testing

The high flame retardance is attributable to a halogen-free flame retardance package. The compound passes the flame retardance test prescribed under the strict standards of US UL 94 V (Underwriter Laboratories), achieving the best classification of V-0 at a test specimen thickness of 0.75 millimeters. The product also demonstrates its good fire resistance in the glow wire tests to IEC 60695-2-12/13 (household appliances standard IEC 60335-1): in the Glow Wire Flammability Index (GWFI) test, the material achieved the best possible value for plastics at 960 °C and a wall thickness of 0.75 millimeters. It fulfills the requirements of the Glow Wire Ignition Temperature test (GWIT) at the same wall thickness and 775 °C.

High tracking resistance, low density

Another advantage of the material is its high tracking resistance, demonstrated by a CTI A value of 600 volts (Comparative Tracking Index, IEC 60112). “Electrical assemblies can therefore be positioned closer together without resulting in shorts or device defects caused by leakage current,” says Malek. Despite the high mineral content the density of 1.7 g/cm^3 is comparatively low for the polyamide 6, meaning it supports cost-efficient, lightweight component solutions.

Highly versatile

Potential applications include heat sinks, light-emitting diode (LED) carriers and electronic devices that require thermally conductive housings and covers due to their high power output. In the case of heat sinks, the new material is a good substitute for die-cast aluminum, especially when the metal's very high thermal conductivity is not required. “That's when our thermoplastic can really demonstrate the advantages of its shape versatility. In addition, costs can be reduced in injection molding if production volumes are fairly high,” says Malek.

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The new compound expands the range of polyamides already introduced to the market: Durethan BTC 65 H3.0 EF and BTC 75 H3.0 EF. They likewise have high mineral reinforcement. Their thermal conductivities are 1.0 and 1.4 W/mK through the wall thickness, meaning they are on par with polyamides containing boron nitride and aluminum oxide as thermally conductive fillers. Compared to boron nitride systems, our materials have better mechanical properties and are significantly more cost-efficient. Furthermore, their thermal conductivity is nearly isotropic, i.e. virtually the same in all directions.

LANXESS is a leading specialty chemicals company with sales of EUR 8.0 billion in 2014 and about 16,300 employees in 29 countries. The company is currently represented at 52 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of plastics, rubber, intermediates and specialty chemicals. LANXESS is a member of the leading sustainability indices Dow Jones Sustainability Index (DJSI World) and FTSE4Good.

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Forward-Looking Statements.
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