News Release

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Two new polyamides for making foamed injection-molded parts

Excellent surface quality

Leverkusen – Despite major benefits, foaming processes in the past have been unsuccessful in gaining widespread acceptance for use in injection molding. One of the reasons for this was the poor surface quality of the resultant components. To counteract this problem, LANXESS has developed a new polyamide 6 and polyamide 66 Durethan designed specifically for physical and chemical foaming. “Both materials produce excellent molded part surfaces that in most cases are smooth and flawless with virtually no opalescent streaks or areas that appear porous. They are therefore suitable for applications that also place high demands on the visual quality of the part – such as visible components under the hood,” states Maik Schulte, a development engineer at LANXESS.

Minimal distortion, lower weight and reduced cavity pressures
There is great interest in foamed injection-molded parts because they are up to 20 percent lighter than solid molded parts and also use less material – with acceptable compromises in terms of their mechanical properties. What’s more, the foamed parts benefit from much lower distortion and exhibit virtually no sink marks. Mold cavity pressures can be reduced by up to 80 percent, which makes it possible to use smaller, less expensive injection molding machines with lower clamping forces. The mold is subjected to lower stresses, too, which means a longer, more cost-effective service life. In most cases, cycle times are noticeably shorter, which opens up further potential for savings. Foamed components are also an attractive option from an acoustic damping perspective.

Both physical and chemical foaming of thermoplastics such as polyamide is possible. The most commonly used physical foaming process is to inject a gaseous blowing agent such as nitrogen or CO_2 in a supercritical state into the plastic melt using a metering device on

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the cylinder. With chemical foaming, the blowing gas is split off from an additive that is added to the plastic. In both cases, blowing gas and melt form a homogenous solution in the plasticating unit. When injecting the solution into the mold, there is a substantial drop in pressure. A uniform cell structure is created from many finely distributed nucleation sites. This produces a component with an internal foamed structure and a solid outer skin.

Fine-cell foams with a wide range of applications

The two new polyamides reinforced with 35 percent glass fibers were optimized at each stage in respect of foam formation. As a result, popular blowing agents dissolve very easily in them and produce very homogeneous single-phase solutions when combined with the plastic melt in the plasticating unit. The rheological properties and nucleation behavior of the two thermoplastics are geared to the production of very fine-cell foams. “This is one of the main reasons for the excellent surface quality and good mechanical properties of the molded parts,” explains Schulte.

The new materials are suitable for a wide range of applications. In automotive engineering, they could be used to make components such as cylinder head covers and fan shrouds. The electrical/electronics industry could use them for plugs/connectors, lamp sockets/holders and housing components for items such as thermostats and DIY tools. There are also many possible applications in the furniture-making industry.

Customer service from concept to the start of series production

LANXESS also helps customers develop foamed parts. Its services range from material selection and filling simulations to advice on mold construction, mold proving and the start of series production. The Technical Service Center in Dormagen has an injection molding machine with a clamping force of 650 metric tons – equipped with a MuCell unit for physical foaming – which can be used for mold proving. “Customers can use it, for example, to perform feasibility studies and evaluate the production process for themselves. They

can also use the system to optimize their mold and determine the most favorable production conditions for their part," says Schulte.

LANXESS is a leading specialty chemicals company with sales of EUR 5.06 billion in 2009 and currently around 14,300 employees in 23 countries. The company is represented at 42 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of plastics, rubber, intermediates and specialty chemicals.

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Forward-Looking Statements.
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You can find further information concerning LANXESS chemistry in our WebMagazine at http://webmagazine.lanxess.com.

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