

# News Release



## **BASF develops innovative structural technology for automotive seating**

WYANDOTTE, MI, October 26, 2010 –Combine innovative materials, development processes and partners—and a healthy dose of hard work—and you might just end up with an innovative application. That is precisely what happened when BASF turned its focus to automotive seating. Result: the first highly styled seating to incorporate a material-saving, weight-saving thermoplastic seat back frame.

BASF, an experienced automotive supplier, saw the potential to simplify the back frame assembly by converting the structure to thermoplastic materials. By doing so, we were able to develop a seat back that is very thin, and contoured to the shape of the human form. The new seat back would integrate the seat frame and back panel into one thermoplastic structure. It would enable the reduction of foam, and simplify the trimming process. Further integration potential exists with other seating components such as lumbar support, and heating and cooling modules. BASF foresaw other innovative styling opportunities in view of textures, colors and surface appearance made possible by thermoplastics to complement the interior design. Easy and cost-efficient contouring, another benefit of designing with thermoplastics, also facilitated the providing of ergonomic support for the human form, while using thinner frames that would contribute to the reduction of overall vehicle mass.

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Undertaking an exhaustive process of conversations with automakers, examination of industry trends, and reviews of concept vehicles from around the globe, BASF provided itself with a reality-check on the idea of the plastic seat back frame. One considerable challenge was that the thinner, lighter back frame would have to be able to withstand the high crash energy demands required of automotive seats.

### **Innovative material choice**

Continuous fiber reinforced thermoplastics (CFRTs) represent the next step in the advance of thermoplastics' structural capabilities. Although the use of CFRTs had been established in aerospace and defense applications by the time BASF began its own research on the materials, CFRTs had rarely been used in automotive applications. But, with serious development efforts, the benefits were there for the reaping. CFRTs can produce a very stiff, strong, lightweight end product that can be efficiently manufactured. They have higher modulus, impact strength and overall durability than that available from traditional filled thermoplastics. At the end of a months-long technical review and brainstorming of different concepts, BASF decided to pursue development of a thermoplastic seat back comprised of continuous fiber reinforcements overmolded with Ultramid Polyamid 6 resin... .The inserts would provide the necessary structural integrity when reinforced with PA 6 resin, while injection-molding the back would allow for the necessary feature integration, contours, and styling.

### **Innovative development process**

"In order to design effectively with any material, accurate CAE tools are required," said Peter A. Zorney, Advanced Development, BASF Corporation. "Unfortunately, the industry did not seem to have the experience in utilizing FEA tools like LS-Dyna for continuous fiber materials, let alone for a combination construction of injection-molded PA resin and continuous fiber materials."

BASF spent almost two years gathering data on continuous fiber materials through extensive testing and employment of its Ultrasim™ numerical material model, a versatile and flexible CAE tool developed for the demands of innovative applications. The Ultrasim technology—referred to as an integrative simulation—combines traditional tooling and process data with experimental data obtained from a special high-speed measuring device, itself developed by BASF. The technology thereby yields optimum part and process design.

"We took state-of-the art characterization of our materials and added state-of-the-art characterization of continuous fiber materials in order to accurately simulate dynamic crash events. We are now able to

design automotive seat structures, and other structures, using our computer tools. This allows us to efficiently design complex, CFRT reinforced structures to withstand the very demanding requirements of automotive seating.”

### **Innovative partners**

BASF partnered with Performance Materials Corporation, Camarillo, Calif., a forerunner in the development and manufacture of CFRT products. The continuous fiber materials were tested and retested and the results were compared to FEA predictions.

Thomas Smith, CEO of Performance Materials, stated, “Using these leading edge analysis techniques, we have worked closely with BASF to develop both a CFRT material and a part design which not only is compatible in the injection over-molding process, but can provide the necessary structural performance in a cost effective thin and lightweight seat application as demonstrated in actual crash tests.”

During the development of the injection-molded Ultramid® polyamide 6 resin technology, BASF also sought out a seating supplier with both the technical capability to integrate the back frame into a seat and the innovative spirit to invest in the new technology. Faurecia Automotive Seating was that supplier. The end result was the SUSCO 1.5 seat, which will be displayed at the October K 2010 show in Düsseldorf, Germany. BASF and Faurecia are in the process of executing development contracts with key automakers to ready the technology for series production expected in 2014.

“BASF’s new technology has helped Faurecia push our seat technology into the next generation of automotive seating,” said Thilo Ludewig, Faurecia Vice President Research & Development. “BASF is an excellent partner to work with—innovative, technically astute, and themselves willing to invest in game-changing technologies.”

The technology has already yielded a significant advance in automotive seating, and BASF plans to apply its new predictive technology for CFRT both in additional automotive applications, as well as other industries.

### **About Faurecia**

Faurecia is one of the world's leading (#6 worldwide) automotive equipment suppliers with four key Business Groups: Automotive Seating, Emissions Control Technologies, Interior Systems and Automotive Exteriors. In

2009, the Group posted pro-forma sales of 11.3 billion euros, including Emcon Technologies and Plastal Germany. It employs 62,000 people in 32 countries at 200 sites and 33 R&D centers. Faurecia is listed on the NYSE Euronext Paris stock exchange. For more information, visit: [www.faurecia.com](http://www.faurecia.com)

#### **About Performance Materials Corporation**

Performance Materials Corporation (PMC) is an innovative developer and manufacturer of continuous Fiber Reinforced Thermoplastic (CFRT<sup>®</sup>) materials, components and sub-assemblies. These compounded materials offer high strength and stiffness to weight ratios and can be used to improve structural performance in various applications. PMC has business units which focus on basic materials, industrial, medical, recreation, computing and automotive applications. PMC is privately held.

To get “the Material Edge,” visit [www.performancematerials.com](http://www.performancematerials.com).

#### **BASF - The Chemical Company.**

BASF Corporation, headquartered in Florham Park, New Jersey, is the North American affiliate of BASF SE, Ludwigshafen, Germany. BASF has approximately 16,000 employees in North America, and had sales of \$13 billion in 2009. For more information about BASF’s North American operations, or to sign up to receive news releases by e-mail, visit [www.basf.us](http://www.basf.us).

BASF is the world’s leading chemical company: The Chemical Company. Its portfolio ranges from chemicals, plastics and performance products to agricultural products, fine chemicals and oil and gas. As a reliable partner, BASF creates chemistry to help its customers in virtually all industries to be more successful. With its high-value products and intelligent solutions, BASF plays an important role in finding answers to global challenges, such as climate protection, energy efficiency, nutrition and mobility. BASF posted sales of more than €50 billion in 2009 and had approximately 105,000 employees as of the end of the year. Further information on BASF is available on the Internet at [www.basf.com](http://www.basf.com).

CFRT is a registered trademark of Performance Materials Corporation