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MuCell® Process Combined With Core Back Expansion Molding Process Produces Parts With Outstanding Weight To Strength Relationships for Automotive Components

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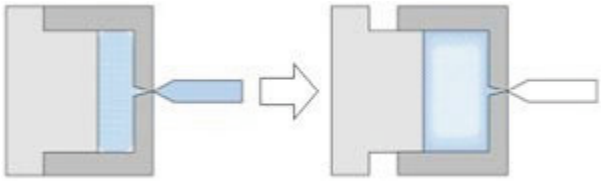
WOBURN, Mass. -- Automakers are on a quest to realize the significant weight reductions they need to improve fuel economy, As one potential solution, machinery manufacturer ENGEL, through their North American operation and Trexel, inventor of the MuCell® microcellular foaming process, are working together in North America to develop and commercialize the injection/expansion molding process, also known as the "Core back" expansion molding process. "Core back" molding has shown the potential to produce structural applications that feature dramatic weight savings. The weight savings derive from the ability to redesign parts based on high density reductions (expansion of 50% or more) and resulting increased stiffness to weight ratios.

As one example, recent industrial trials announced by Mazda using the MuCell system have demonstrated the capability to mold parts with weight reductions of up to 30%, and they have announced they will begin using the technology on 2011 model year cars.



Molten resin infused with the supercritical fluid foaming agent via the MuCell process is injected into a thin mold where it expands quickly to fill the mold (left). After a certain period of time, the back of the mold is partially extracted (core back) to form the multi-layer structure that can be much thicker, but less dense (right)

"Core back" expansion molding varies from the traditional injection molding process as, once the foamed resin has filled up the mold, the volume of the mold is increased, causing the foam to expand (see Figure 1). This means stiffer plastic parts, with low density and good rigidity, can be made with lower volumes of plastic resin. Thus far the combination of these two processes has demonstrated the possibility to redesign parts in order to achieve dramatic weight savings in a series of industrial trials on structural applications like IP retainers and door panel liners, but Trexel and ENGEL officials say the process combination is potentially applicable to a wide range of automotive applications.

"When you combine Core back and the MuCell Process," said David Bernstein, President of Trexel, "you can essentially saturate the polymer with SCF, or gas in its supercritical state, while keeping the mold closed under pressure, and then precisely open the mold to get maximum expansion. You get a much thicker part, but one that is much less dense, in fact as much as 75% less dense."

Steve Braig, President of ENGEL's North America operations noted, "This process combination has excellent potential for applications like door panels, or really any applications that have a flat surface. Design engineers can now rethink the mechanics on some existing applications in plastic, because dramatic weight reductions are now realistic and achievable using Core back with the MuCell process," he added.

Bernstein and Braig said that customers in North America can conduct trials at ENGEL's facility in York, PA where their duo 7050\1000 machine is already equipped with a full MuCell system for trials and development work.

"To succeed with 'Core back', you also need precision machine technology to go along with the MuCell process," said Braig. "Our duo 1000-ton machine gives our customers the ability to precisely control both position and clamp force utilizing ENGEL's patented design concept for two platen machines. We offer the only two platen injection molding machine (see Picture 1) that has no contact with the tie bars, allowing frictionless movement to better control speed and precision," he said.

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ENGEL's duo machines also feature a patented 'Platen Parallelism Control' system, which is unique in the industry. Users can control all four corners of the mold's positioning individually which, when using the "Core-back" process, allows the tool to be opened for the material expansion part of the process with complete precision. "As a result, we can achieve the necessary precision for running the combined process and achieving dimensionally accurate results, added Braig."

"Core back technology is being given an entirely new purpose with the MuCell process, and we see a major quality and cost-savings opportunity for our customers," said Bernstein. Braig noted that, "Between Trexel and ENGEL, we bring a very strong technology combination to the market.

Bernstein and Braig also announced that plans are now in place to demonstrate "Core back" molding as part of the ENGEL exhibit at the 2009 National Plastics Exposition (NPE) to be held this coming June in Chicago, IL.

More About MuCell Technology

The MuCell Microcellular Foam technology is a complete process and equipment technology that enables the production of extremely high quality plastic parts. MuCell Technology involves the use of precisely metered quantities of atmospheric gases (nitrogen or carbon dioxide) in any of the three most common thermoplastic conversion processes (injection molding, extrusion, blow molding) to create millions of nearly invisible microcells in the end product. The creation of these microcellular structures brings a wide array of benefits including reduced weight, reduced material usage and reduced production costs.

The MuCell process is primarily employed in the injection molding process to produce lower cost precision parts with a consistently high quality and exceptional dimensional stability, where foaming has not historically been deployed.

Microcellular foaming technology was originally conceptualized and invented at the Massachusetts Institute of Technology (MIT) and in 1995 Trexel was granted an exclusive worldwide license for the further development and commercialization of the technology. Today there are hundreds of MuCell parts, both molded and extruded in commercial production today around the world and in excess of 300 machines in operation. Examples of MuCell products include electrical components, electronics connectors, internal business equipment and printer components, a variety of packaging applications and a broad array of automotive products including HVAC components and door trim and panels.

About Trexel

Trexel is the exclusive developer of the MuCell microcellular foam technology and has an extensive portfolio of patents in the U.S., Canada, Europe, Japan, Korea, and Asia. Trexel's primary business is the supply of MuCell Systems for the production of foamed injection molded and extruded articles. It also provides world-class engineering support, training and other services, and the equipment and components integral to the MuCell process. In support of these activities, Trexel operates a foamed plastics development laboratory in its Woburn, MA facility, and has established a global network of exclusive manufacturing relationships to produce the company's proprietary precision engineering equipment. MuCell support centers are located in the U.S., Germany, Japan, Hong Kong, China, Singapore, Australia and Korea.

About ENGEL North America

From facilities in the United States, Canada and Mexico, ENGEL North America provides its customers a single source for design and manufacture of injection molding machines for thermoplastics and elastomers, a full range of plastics processing technology modules and a full scope of automation solutions. With eight production plants in Europe, North America and Asia (China, Korea), subsidiaries in 17 countries and representatives in over 70 countries, ENGEL North America provides is customers the global support they need to compete and succeed with new technologies and leading-edge production systems.

Source: *Trexel* Inc.