MuCell Processes
TREXEL INC.

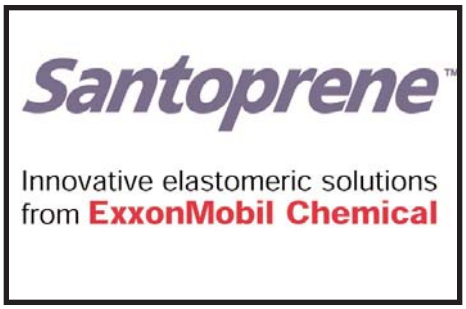
MuCell® Process News

June 2004 *Volume XI*

Advanced Elastomer Systems and Trexel Announce Partnership to Develop TPV Automotive Dynamic Weatherseal Systems

Advanced Elastomer Systems, an Akron, Ohio-based affiliate of ExxonMobil Chemical, and Trexel have announced a long-term exclusive license agreement to develop dynamic sponge/foam automotive weatherseal systems. Under the agreement, AES will focus on the development of Santoprene™ thermoplastic vulcanizate (TPV) products designed to take full advantage of Trexel's MuCell® microcellular foam process.

This agreement is intended to propel the use, and help meet the industry



demand, for innovative dynamic weatherseals that perform comparably to traditional EPDM seals in the areas of compression load deflection, compression set, water absorption, surface aesthetics, and economics. TPVs also are used for static and semi-dynamic weatherseals due to the material's processing advantages, excellent sealability, design flexibility, UV-resistance, weatherability, and recyclability. AES invented, patented and introduced the first foamed TPV commercialized for automotive weatherseal applications more than a decade ago.

Automotive weatherseals are a growth segment for both AES' automotive business and Trexel.

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Hunjan to Produce MuCell Parts in Canada

Hunjan Moulded Products has purchased Trexel's MuCell Modular Upgrades for two Nissei 1000-ton presses. The upgrades will enable them to mold large automotive applications utilizing the advantages of the MuCell technology. A large scale production contract has already been awarded to Hunjan and commercial production will begin this year.

According to Hunjan, they will be the only North American molder in the automotive market with MuCell capacity and production expertise on 1000-ton machines. “We see the MuCell process as a strategic technology and are working with Trexel to add new applications and customers".

Trexel President and CEO David Bernstein stated, "MuCell automotive parts are currently being produced on large machines in other regions, but Hunjan is the first North American automotive supplier to develop full MuCell production capability on 1000-ton machines. We believe this will begin to address the enormous market need for the value and quality benefits of microcellular molding in larger automotive parts like engine cooling modules, HVAC cases, interior support brackets and panels. The decision to deploy MuCell will provide Hunjan with a significant current technology lead.”

Nypro and Trexel Undertake Joint MuCell Development Activity

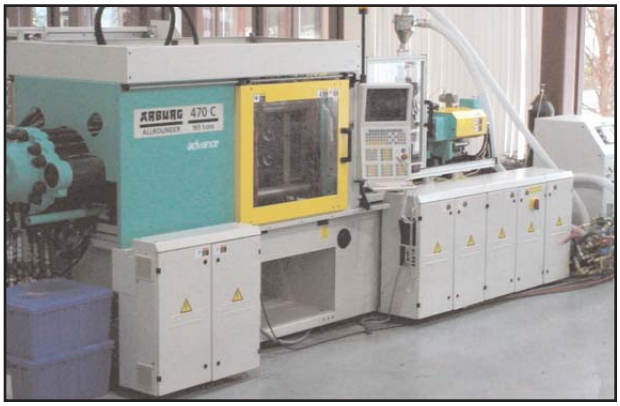
Nypro Inc. is working with a number of customers in North America and Asia to cut costs, improve plastic part integrity and reduce production time through the use of the MuCell process.

Nypro has initiated a joint development effort with Trexel, owners of the MuCell technology, to establish a MuCell product design methodology for precision plastics parts, which are Nypro's forte.

Brian Jones, Nypro president and CEO, stated, "We believe that advantages can be realized during the product design and ramp phase of product development by including MuCell product design methodology."

Nypro is a full-service injection-molding contractor with product design shops in Clinton, MA; Chicago, IL; Copenhagen, Denmark and Hong Kong.

"We believe there is an unprecedented potential to mold stress-free parts with uniform shrinkage, leading to fewer delays and achieving parts conformance," he added.



MuCell equipment has been installed at Nypro's Oregon Advanced Technology Center, where most of the development is being done. Expanded development is planned for Nypro's new Technology Center in Clinton, MA. and Nypro's Development Campus in Shanghai, China. Nypro also has full-service MuCell-aided manufacturing facilities at the Nypro/Avaplas JV in Thailand and Puerto Rico.

David Bernstein, president & CEO of Trexel, noted, "With Nypro's exceptional reputation for complex, high-quality molding and deep customer involvement, we look forward to their support in validating the exceptional design and time-to-market advantages that MuCell offers. We are convinced that Nypro's success in this effort will allow them to offer an improved value proposition to their customers, including higher quality, faster time-to-market, and lower costs."

Trexel will Provide MuCell® Moldflow® Simulations to Licensees

The introduction last year of the MuCell simulation module to the Moldflow Plastics Insight (MPI) product line has generated considerable interest among Trexel licensees. Project engineers are familiar with the many benefits a Moldflow analysis can bring to any injection molded part and tool. Now these benefits are available for the MuCell process.

There are two paths to implementing the MuCell process: conversion of an existing tool, or designing the part and tool for MuCell from the start. The analysis can provide valuable benefits for both scenarios.

The most basic MuCell Moldflow benefit derives from the ability to predict fill patterns and pressure drops. In an existing design, it is possible to evaluate potential gas trap locations and areas that may require additional venting, features critical to optimizing the cost reductions and quality improvements from the MuCell process. It also allows for accurate predictions for changes in runner sizes. In a new design, proper gate locations, runner size and vent locations can be evaluated to optimize the benefits of the MuCell process. This is particularly valuable in parts with significant wall thickness changes as the optimum gate locations will be different between a mold designed for conventional injection molding and one designed for the MuCell process.

The technology can also be used to determine melt front advancement to aid in the profiling of injection speed for optimum surface appearance. The cooling analysis will predict cycle limiting hot spots in the mold.

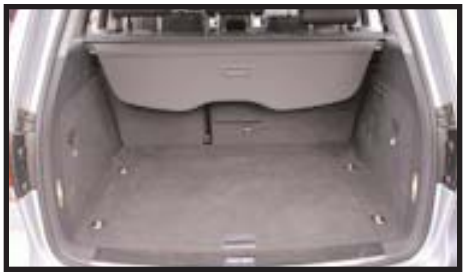
Any Moldflow customer interested in adding the MuCell module is encouraged to contact their local Moldflow sales office.

For those customers who would like to experience the benefits of the software package before purchasing their own module, Trexel will work with a Certified Moldflow Consultant to produce an analysis.

For quotes and information, please contact Levi Kishbaugh (l.kishbaugh@trexel.com); (781) 932-0202 Ext. 258.

MuCell Expectations Exceeded at Polytec Riesselmann

Polytec Riesselmann is producing interior trim sections on a Krauss Maffei KM650-3500CZ injection molding machine. The covered trim parts for the trunk of the Porsche Cayenne and the VW Touareg are molded in Polypropylene with 30% glass fibers.



Josef Krnak, Production Manager in Lohne, said, “We receive parts particularly free of warpage and stress, along with savings in material and weight. In addition, the faster cycle times have greatly increased productivity." Riesselmann notes that the savings results have exceeded expectations.

According to Krnak, Riesselmann intends to acquire new licenses and equip additional injection molding machines for the MuCell process. He expects continued quality and cost gains for his company.

Ricoh Begins Mass Production of Copier Component using MuCell

Ricoh Company, Ltd. of Tokyo, Japan recently began mass commercial production of a key component for their latest imagio Neo line of copiers using the MuCell microcellular process.

This internal component, molded in 15% glass-filled PET, experienced very high warpage, both as molded and in-use. This caused poor yields during molding, and operational problems when exposed to the high operating temperatures of the copier.

MuCell's lower melt viscosity and the very low cavity pressures significantly reduce molded-in-stresses because filling of the part is completed by the cell expansion associated with homogeneous nucleation as the polymer enters the mold cavity. The cavity pressures from MuCell are typically 50-80% lower than the cavity pressures used in conventional injection molding. Reduction of molded-in-stresses means less warpage and more dimensionally accurate parts.

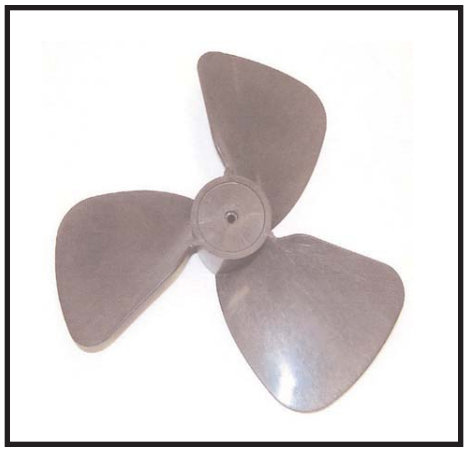
Consequently, Ricoh has eliminated warpage problems caused by molding and operational problems from parts in use. There were also significant reductions in weight and molding cycle times. This resulted in better parts at lower cost according to Shunichi Ogawa Procurement Engineer, Strategic Procurement Department at Ricoh's Tokyo Headquarters.

Takagi Seiko Corporation of Takaoka City, Japan is continuing to work closely with Ricoh to qualify additional copier components in MuCell while also pursuing other applications including automotive.

Schneider Produces 1,000,000th MuCell Part

Schneider Electric recently acquired Clipsal Australia Pty. Ltd., an Australian based manufacturer of electrical accessories doing business in over twenty-five countries on five continents. Clipsal has successfully deployed the MuCell technology in a wide range of products and materials such as glass-filled polyamide and unfilled polypropylene.

One example is the production of a 20% lighter fan that exhibits quieter operation due to better fan blade balance. The part is also showing a a 22% improvement in cycle time.



The milestone of the 1,000,000th. MuCell part has recently been achieved. Trexel congratulates the effort and commitment that the staff at Clipsal Australia have made to the MuCell process technology.

Bayer Installs Development Units

Bayer Polymers has concluded a series of studies of physical and chemical foaming technologies. As a result, Bayer has installed its first 200-ton MuCell machine from Arburg in its laboratory at Leverkusen, Germany. Bayer will use this machine to assist their customers in mold trials.

Bayer intends to install a 650-ton MuCell Machine from Engel by mid-year to extend the range of applications for its customers.

Contact Thorsten Just, Tel: +49 214-30 31 287, e-mail: thorsten.just@bayer-materialscience.com.

New Applications Spec'd for MuCell in Asia
20 Million Parts to Be Produced Annually

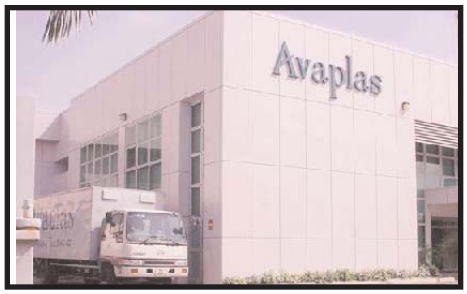
During the past three months there has been a stunning increase in approved MuCell production programs in Asia, including Japan, Singapore, Malaysia and Thailand.

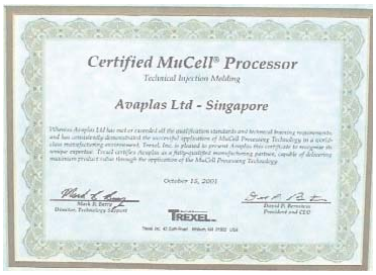
Two of the world's leading business equipment suppliers have recently specified a series of new components directly to MuCell production. All of these components share the common characteristics of requiring very tight specifications for dimensional compliance while needing the lowest possible production costs. These programs involve at least fifteen MuCell Molding Machines and five different injection molders. Trexel has designed special training programs for each supplier and has recently opened a Singapore branch office in order to meet the support needs of the rapidly expanding production machine base in this region.

MuCell Production Capability Expands in Asia

Molder	Tons	Singapore	Thailand	China	Korea	Malaysia
Avaplas	20-79	X				
Avaplas	80-124	X	X			
Avaplas	125-179	X	X	X		X
Others	125-179	X				
Avaplas	180-299		X	X		X
Others	180-299	X	X	X	X	X
Avaplas	300-449	X	X	X		
Avaplas	>450	X				
Others	>450				X	

With Avaplas of Singapore leading the way, there are now several qualified molders in Asia capable of quoting and accepting MuCell production jobs. There are now 27 MuCell machines installed or on order and available for MuCell production. These machines are supported by a skilled and certified MuCell process engineers at each installation site. For quotes from Avaplas, please contact Tony Wong in Singapore. Tel: 65-65462655, e-mail tony@avaplas.com.sg.




Certified MuCell® Processor
Technical Injection Molding
Avaplas Ltd - Singapore
TREXEL

For quotes for other molders, please contact Stephen Friend, Trexel, s.friend@trexel.com Telephone USA, (781) 932-0202.

Advanced Elastomer Systems

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"AES has been leading in the transition from EPDM to TPV weatherseal systems for many years, and we now see a very real innovation potential for overcoming some of the final barriers to broad adoption in dynamic applications," said Zev Gurion, Global Automotive Marketing Manager, AES.

"Trexel and AES bring together exceptional capabilities to support customer adoption decisions. We anticipate a standard repeatable system that can be broadly implemented and supported."

Trexel will specify a full turnkey process optimized for Santoprene TPV, and will make available standard equipment packages under its worldwide manufacturing and product support systems.

With its closed cell structure, MuCell already demonstrates many of the desired properties, but according to Trexel technical director Jere Anderson, the ability of AES to customize its material formulation to take advantage of the unique processing characteristics of MuCell will move performance into a whole new range.

Trexel President & CEO David Bernstein said, "In addition to the extraordinary support that will be available from AES and Trexel, AES customers who use the MuCell technology will have the added incentive of license rights bundled into their purchase contracts with AES. This should help considerably in simplifying their decision."

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