

MuCell Process News

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Textron/Italia Buys Five MuCell Machines

Textron Automotive Company (TAC) /Italia is taking advantage of the MuCell™ process, and is aggressively pursuing new automotive applications. Textron Automotive, which is a major supplier of automotive components, and one of the largest injection molders in the world, is demonstrating its innovative nature by applying the MuCell process to some of its applications. Upon receipt of its first two machines, TAC's first project calls for commercialization of an under-the-dash application. TAC is investigating MuCell application possibilities in two additional projects as well.

JSW Opens the Gate for MuCell

A Japan Steel Works, Ltd. (JSW) open house in Hiroshima, Japan, on November 17, attracted nearly 1100 visitors, with JSW demonstrating the MuCell process on a 200-ton electric/hydraulic molding machine. During the demonstration, JSW molded a semi-conductor matrix chip tray. The goal was to show dimensional improvements, process advantages and material opportunities.



KHK/Japan Approves MuCell Equipment

On October 27th, the High Pressure Gas Safety Institute of Japan (KHK) certified Trexel's SCF systems. This was a significant achievement for Trexel since the KHK certification program is one of the most demanding in the world.

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Delphi Specifying MuCell

Delphi Automotive Systems (Troy, Michigan) recently sponsored a Trexel presentation, directed to 27 of their top molders. Everett Montgomery, Global Commodity Team Manager, hosted the event with the expressed purpose of exposing the Delphi supply base to a technology that holds cost reduction potential.

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Ticona Licenses MuCell

Ticona has become the first materials supplier worldwide to purchase a MuCell process license, and a MuCell process-capable machine with its acquisition of a 150-ton Krauss Maffei, 2-component, MuCell process unit. This machine will be part of a European Development Center, which Ticona is establishing to study MuCell process-related materials and applications. According to Rob Janisch, Trexel's Sales Director-Europe, "Ticona's decision to purchase a MuCell license and MuCell-capable Krauss-Maffei machine will be very beneficial to the European plastics community.

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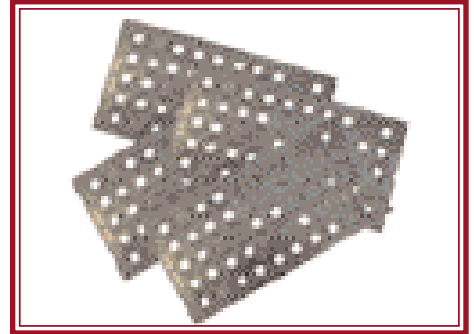
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APPLICATION PROFILES

Building a Better Matrix Tray

When considering the MuCell™ process, the tendency is to dwell on reduced cycle time and material usage while overlooking such benefits as increased dimensional stability and reduced warpage. For many, the latter two benefits are paramount.

“The MuCell process virtually eliminates molded-in stresses,” said Steve Friend, Trexel Director of Strategic Marketing. “Parts will not only be flatter as molded, but also flatter after thermal exposure. This is critical in many applications, particularly matrix trays used in fabrication processes for semiconductors.”



Friend notes, that while the industry spec today, allows for 0.8mm warpage, use of the MuCell process high temperature, trays have been molded with less than 0.2mm warpage with no changes in the mold. For example, in a recent demonstration run by Japan Steel Works, Ltd. (JSW), on a conductive polypropylene matrix tray, weight was reduced by 8%, cycle time by 25%, and warpage from 2mm to less than 0.1mm. At the same time, the surface resistivity was unaffected.

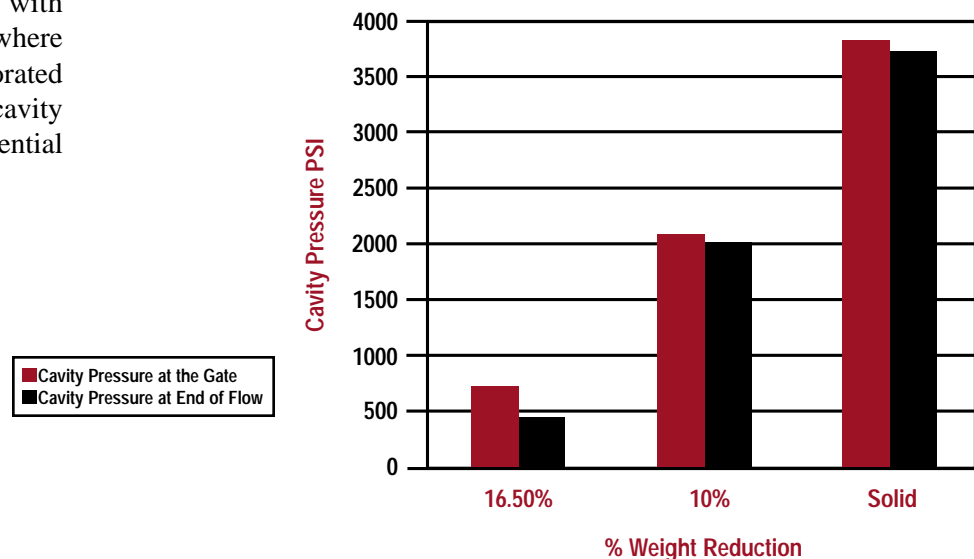
Successes in Cavity Pressure Reduction

A frequently overlooked benefit provided by the MuCell process is reduced cavity pressure. The MuCell process allows for the elimination of pack and hold pressure by using the pressure in the cells to packout the part. The pressure in the cells generates much lower pressures than the hydraulic pressures typically used for the packing of a solid part. Because of this, the cavity pressures generated with the MuCell process are significantly lower than those for solid molding.

The graph below illustrates the reduction in cavity pressure for a test plaque mold 2mm thick, both at the gate and at the end of flow as a function of weight reduction. Results show that with weight reductions of as little as 10%, the cavity pressure can be reduced by 50% as compared to the solid part. This translates into lower molded-in-stresses in the part, and reduction in clamp tonnage requirements.

Another area of benefit is with in-mold decorated applications, where plastic is injected behind a decorated film or textile. The reduced cavity pressure greatly minimizes potential damage to the applique.

MuCell Data - Supplied by Trexel

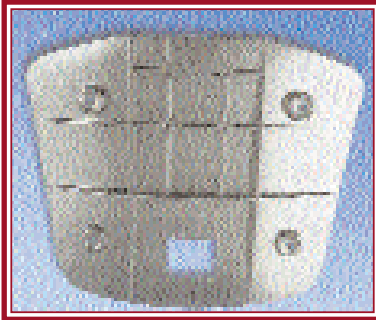


Ferromatik Open House Shows MuCell Mono-Sandwich Capability

At Ferromatik Milacron's annual open house held in Malterdingen, Germany, September 27 - 29, Trexel's MuCell™ process was coupled with Ferromatik's Mono-Sandwich process and run on a Ferromatik Milacron K-TEC 275 press. For



Trexel OEM Manager, Himanshu Sheth (left), and Ferromatik Milacron Applications Engineer, Norbert Iber, demonstrate the MuCell-equipped K-TEC 275.



MuCell process molded chair seat back shows perfect skin with foamed core. 7% weight reduction, 15% cycle time reduction, 80% clamp tonnage reduction, accompany its benefits.

the demonstration, Ferromatik molded a chair seat back used in office furniture. Typically, these parts are produced with an ASA exterior skin and a lower cost ABS resin for the core, and sink marks are a common occurrence.

Using this Mono-Sandwich process/MuCell, Ferromatik was able to produce products with a perfect outer skin and a MuCell foamed core. Sink marks and warpage were completely eliminated, and cost savings were achieved on the core material through weight reduction.

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He proposed the MuCell process as a technology that molders should utilize to help control costs and improve product quality. According to Montgomery, "The technology is a valuable process enabler for molders, and Delphi purchasing and engineering will work with molders to implement MuCell process products."

Bob Alvarez, VP Technology at United Plastics Group (UPG), also spoke about how the MuCell process is redefining plastic processing, and how it has already been approved in medical applications for Johnson & Johnson. UPG currently has three MuCell-capable presses -- 66-ton, 400-ton and 500-ton.

Jonathan Soucy, R&D Manager at Pixley Richards, demonstrated a MuCell-processed component, which Pixley had been previously unable to produce within tolerance via standard molding. Using the MuCell process, the component far exceeded tolerance specifications, once again demonstrating this major technological advantage.

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Trexel SCF systems have been designed to pressurize supercritical fluids (SCF) used in the MuCell process and to meter the mass flow of those fluids to injection molding, extrusion, and blow molding machines. SCF systems work in consort with MuCell machines provided by Trexel-licensed equipment manufacturers, or may be included as part of retrofits to qualified existing equipment. David Bernstein, President and CEO of Trexel, stated, "Obtaining KHK certification on our SCF systems is a significant step forward for Trexel since it makes our MuCell technology available to Japanese licensees in extrusion and injection molding."

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As a solutions-driven company that uses advanced polymer technology to produce materials for a wide spectrum of applications, Ticona will use its new machine to support customer activities and materials testing. Its goal will be to develop a database of resins for use with the MuCell process. Included in the materials to be tested are POM, PBT, and long glass fiber-filled materials, such as PP.

UPCOMING EVENTS

Arburg Open House <i>Germany</i>	Mar 29
SAE World Congress <i>Detroit</i>	Mar 5 - 8
Husky Symposium <i>Atlanta</i>	Apr 26
Husky Open House <i>Detroit</i>	May 9
K Show <i>Germany</i>	Oct 25 - Nov 1

Plastec West 2001 Demonstrates the MuCell Process in Motion

The Plastec West / Medical Device and Manufacturing show took place in Anaheim, California, January 8-10, and once again Trexel's MuCell™ process played a prominent role. Throughout the show, in collaboration with DuPont and Trexel, Arburg demonstrated the MuCell process on an 88-ton Arburg machine, molding commercial glass-reinforced nylon vibration isolators. These isolators are used on piping to combat vibration.



Trexel Injection Molding Engineer, Bill Netolicky demonstrates the MuCell process to prospective customers on Arburg's 88-ton machine.

Arburg's plan was to show a noticeable improvement in the quality of the vibration isolator by applying the MuCell process to DuPont materials fed through the Arburg machine. In fact, Arburg measured a 75% reduction in warpage and a 90% reduction in cavity pressure over solid parts. Arburg Engineering Manager, John Adamowicz noted, "Flutter housings achieve a more reliable seal against the steel wall of the machine's reservoir for hydraulic oil. This reduces the potential for oil leakage." Arburg also hoped to demonstrate lower manufacturing costs. Measurements showed reductions of 30% in cycle time and 25% in part weight. Together, these figures translated into overall substantial cost savings.

Another show exhibitor, United Plastics Group (UPG), spoke on MuCell process-related business practices. Bob Alvarez, UPG Vice President of Technology, stated, "MuCell is an engineering concept that is changing the way the plastics business works. We've invested close to \$1.5 million in the MuCell technology over the past eighteen months, and have been very pleased with the results."

In fact, UPG has gained commercial acceptance of a polycarbonate surgical skin stapler handle for the medical market. "We were able to show a 37% reduction in cycle time with no impact on dimensional or mechanical properties" said Alvarez.

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In solid form, the chip tray is made of conductive PPE. Solid parts have a 2.6mm warpage factor against a product specification of .8mm. With the MuCell process, the chip tray was run with conductive polypropylene. While the cycle time remained unchanged, the warpage was reduced to .07mm - well below the product specification. In addition, JSW achieved an 8% weight reduction.

NEW TO TREXEL TEAM

Trexel continues to grow rapidly, acquiring some of the industry's finest talent.



Francis Tacq
Director European Licensee Support

Mr. Tacq comes from Newell-Rubbermaid, where he served as Vice President, R&D for Home Products. Prior to that, Mr. Tacq held positions of Director, R&D for Valeo and for Tupperware in Europe. He has also founded a mold design and product development company in Belgium. Mr. Tacq speaks Flemish/Dutch, French, German and English. Based in Belgium, he is responsible for the technical success of Trexel's licensees in Europe. Mr. Tacq has a degree in MS, Aerospace Engineering, University of Delft, Business Admin., University of Leuven.



Mark Berry
Director of Licensee Support

Mr. Berry has 25 years' experience in the plastics industry, focusing on product development, injection molding, and industrial automation. He has held key engineering and GM positions with several injection molding companies including Tessy Plastics, where he served as Vice President and General Manager for 10 years. Most recently, Mr. Berry was President of PPD Technology, a systems integrator specializing in process development technology. Mr. Berry is responsible for developing systems to facilitate the successful commercialization of Trexel's technology by its licensees. Mr. Berry has a degree in BS/MS Plastics Technology, University of Massachusetts.