

# MuCell Process News


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## Van Dorn, Krauss Maffei Sign License Agreements with Trexel; Announced at NPE Show

NPE 2000 served as the launching pad for both Van Dorn Demag and Krauss Maffei Kunststofftechnik, as both announced new licensing agreements with Trexel. They both now join Arburg, Battenfeld, Engel, Ferromatik-Milacron, Husky and JSW as MuCell™ equipment supplier licensees.

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## Trexel Announces Consumer Packaging Soon on Route to Commercial Production

As NPE 2000 opened its doors, Trexel's press conference was simultaneously revealing Uniloy Milacron's successful completion of the first MuCell-capable, reciprocating-screw blow molding machine. Until now, foam blow molding has not been successfully achieved due to deficiencies in properties and appearance. MuCell technology has met this challenge.

At NPE, Trexel displayed samples of foamed one-liter milk bottles which were molded straight off of Uniloy Milacron's new machine. The bottles were opaque white, with an excellent surface appearance. This early success is a clear indication that extrusion blow molding might be ready for commercialization as soon as year's end.



*MuCell-foamed one liter milk bottles showing excellent surface appearance*

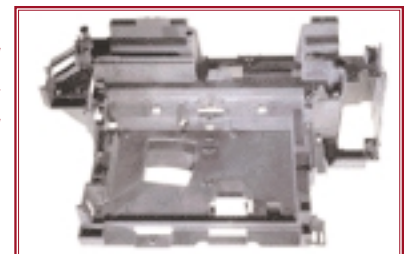
## Trexel Focused Injection Molding Markets

Trexel is focusing sales, marketing and engineering resources on three key markets: business equipment, electrical/electronic, and chip trays. Trexel has found markets that are driven by solving molding problems, in addition to providing a significant cost reduction advantage. According to Trexel, "We see unique end user demand for MuCell products in these markets and we have committed teams to launch these focused business opportunities."


Historically, the injection molding process has been limited by two competing forces: the need to reduce cycle time versus the need to mold flat, warp-free parts. This is particularly true for both office equipment and semi-conductor handling applications.

### *Business Equipment*

*Major end use customers have now approved MuCell parts in the prototype stages. Molders for these companies have licensed the MuCell technology and have made machine purchases. "We are very interested in the MuCell technology, as we need flatter molded handling and cleaning trays for our recording heads", said Brad Steinhoff, Senior Advisory Development Engineer for Seagate Technology. "The MuCell data and*



*Business Equipment: Significant improvements in flatness; reduced molded in stress; 20% cycle time reduction*

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 VAN DORN, KRAUSS MAFFEI SIGN WITH TREXEL

 CONSUMER PACKAGING TO COMMERCIAL PRODUCTION

 TREXEL FOCUSED INJECTION MOLDING MARKETS

 MAJOR AUTO SUPPLIERS JUMP ON BOARD

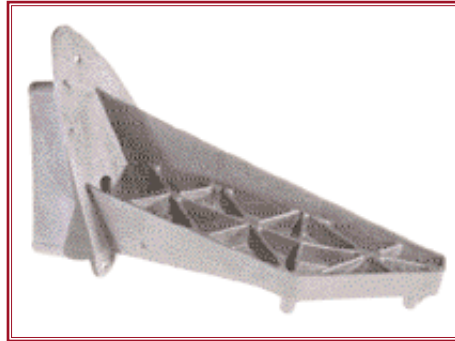
 MUCELL EXPANDS MARKETS

 TREXEL FOCUSED EXTRUSION MARKETS

 ANNUAL TECHNOLOGY INNOVATION AWARD

## Major Automotive Suppliers Jump on Board MuCell Process

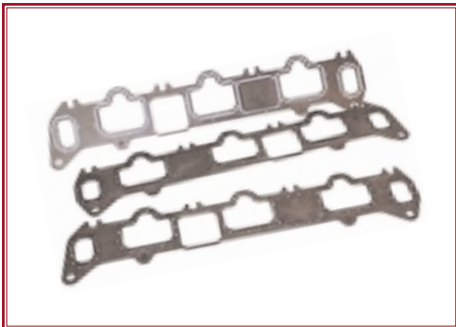
Just prior to NPE 2000, five major automotive suppliers entered into licensing agreements with Trexel, eager to begin using the MuCell™ process. Under the terms of these agreements, JCI (Europe); MAGNA EYBL (Europe); MIG Plastics (U.S.); INOAC (Japan); and Takagi Seiko (Japan), are all licensed to produce injection molded parts using MuCell Technology. Trexel, along with various OEM's, will continue to provide licensing and technical support, helping these companies bring MuCell technology more into the automotive market. Because of the benefits MuCell provides, both in cost and process, customers



*Automotive Mirror Bracket:  
30% weight reduction; retains 96% of stiffness*

are looking to MuCell for automotive applications such as in-mold decorating, HVAC under-dash components and assorted under-hood components.

**MAGNA EYBL**, recognized as a leading global supplier of technologically-advanced automotive systems, will be concentrating on a new generation of interior trim parts with the focus on reduced weight and high surface quality.



*Automotive Air Intake Manifold Gasket:  
PA 6/6 - 33% glass-filled; 66% cooling reduction;  
controlled weight reductions of 5 - 20%;  
clamp tonnage reduction from 40 - 150-tons*

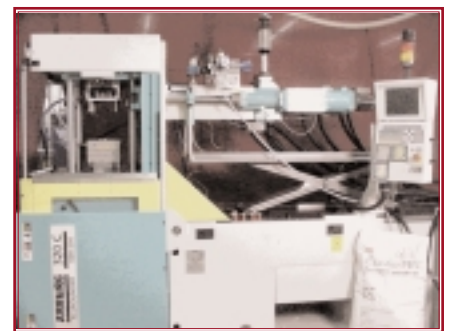
**Takagi Seiko** plans to use the MuCell technology in its quest to pursue new challenges, while improving skills and product through cost reduction. Takagi Seiko's primary customers include Mitsubishi, Kawasaki, Suzuki, Honda, Yamaha, Toyota, Casio, Canon, Seiko, Sony and Fujitsu.

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## MuCell Technology Expands Markets at NPE Show

One of Trexel's highlights at the recent NPE show in Chicago, was having had three major equipment manufacturers demonstrating the MuCell™ process within their booths. Arburg, Engel, and Milacron each had MuCell-equipped machines in operation, each running a different application throughout the week.

Arburg ran an overmolded bobbin application on its 66-ton 320C utilizing the vertical clamp feature. The bobbin was overmolded with a DuPont Crastin® PBT 30% glass filled material. Each day the NPE crowds gathered around the machine witnessing the MuCell processes production encapsulated bobbins with visible product improvements. MuCell molding provides lower viscosity, reduced cycle time, lower melt and mold temperature, reduced tonnage and reduced weight reduction.



*Arburg's 66-ton 320C featured at NPE 2000*

On the opposite side of the hall, Engel's 1000-ton MuCell-equipped machine was also running throughout the show, molding 14" domes used for high bay lighting applications. The mold was supplied by Lexalite International.

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## UPCOMING

## EVENTS

**SME**  
Detroit, MI  
September 14-15, 2000

**SPE Presentation**  
Westfield, NJ  
September 14, 2000

**SPE Presentation**  
Cleveland, OH  
October 16, 2000

**Plastec West**  
Anaheim, CA  
January 8-10, 2001

## Trexel Focused Extrusion Markets

MuCell™ extrusion technology has produced significant results in material cost reduction, weight reduction, part performance, and productivity using N<sub>2</sub> and CO<sub>2</sub> non-hazardous, non-flammable blowing agents. These results are visible in several focused application areas, including PVC profiles and trim, HDPE and PP sheets for packaging, HDPE tubing and conduit, and TPE seals and gaskets.



Eclipse Blind Systems, Inc., a leading maker of vertical vinyl window vanes, has expanded its markets by introducing a premium performance vane using the MuCell technology. The new vane is thicker and lighter, with improved opacity and less warpage.

Alusuisse Composites, Inc. (ACI) has recently begun using the MuCell process to manufacture microcellular products for its line of FOAM-X material laminated foam-centered boards. ACI is a leading manufacturer of foam boards for graphic arts, mounting, and three-dimensional modeling.



Dumaplast continues to produce extruded rigid PVC interior cladding for major commercial markets in Europe. Dumaplast is an exclusive licensee of Trexel for these applications.

...*Focused Injection Molding Markets...*continued from page 1

*technology looks very promising and we are recommending it to our molders who traditionally have had a hard time achieving flat molded parts. It looks like a win-win situation: the molders get higher yields, use less material, with shorter cycle times and we get better quality parts."*

### Chip Trays

*The single biggest problem for molders of semi-conductor chip trays is maintaining flatness. With MuCell, flatness has been significantly improved, yielding trays never thought possible.*

### Electrical / Electronic

*MuCell is providing breakthrough opportunities in connector and overmolding applications. Industry leaders have acknowledged that MuCell can bring significant process advantages to eliminate flash, improve dimensional stability and reduce molded in stress. Lower viscosity is a huge processing aid for all of these thin wall applications.*



*Electrical Connector:  
25% weight reduction; improved  
dimensional compliance*

In an effort to minimize warpage, parts are often held within the mold until cooled to a point where the stresses are "solidified". For applications with thick wall designs, holding within the mold is prohibitive. The held parts are removed from the mold and then placed in fixtures, cooling until solidification.

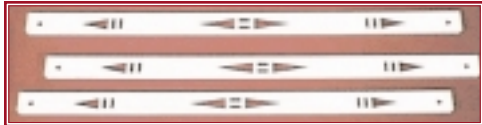
The cooling of parts in either of these two methods may result in relatively warp-free parts "as-molded"; however, as soon as these parts reach elevated temperatures (during storage, shipping or in-use), these stresses may relax, causing warpage and/or poor performance.

The MuCell Molding Process eliminates virtually all of these molded-in stresses. Consequently, office equipment and semi-conductor applications can be molded with much faster cycles, and at lower temperatures. Typically these parts have been molded with 25% to 40% faster cycle times and often at mold temperatures as much as 75-100 (degrees) F lower than the solid molded parts.

...*MuCell Expands Markets...*continued from page 2

The benefits of the MuCell-molded dome include significant reductions in weight, clamp tonnage and cycle time as well as opacity without color concentrate. The opacity is a key "new market" opportunity for reflective lighting domes.

Milacron was showcasing a Magna T 310-ton wide platen MuCell-equipped machine running a four-foot long level in a mold supplied by United Plastics Group. The unique aspect of this application was



*MuCell-molded 4 ft level, supplied by United Plastics Group*

the dimensional improvements of the product in MuCell and the physical mold size. The PP level, molded in solid, had excessive warp and sink marks. With the MuCell process, warp and sink marks were eliminated. Additionally, MuCell provided reductions in cycle time and a controlled weight reduction. The mold overhung each side of the platen and was run at 186- tons of clamp force.



*MuCell-molded dome, supplied by Lexalite International*

...*Major Automotive Suppliers...*continued from page 1

**MIG Plastics** will integrate its newly purchased 2700-Ton Husky press (the largest MuCell™-equipped machine to date) through mold trials and testing in Husky's Detroit facility. The machine will then be shipped to Morenci, MI, where it, in conjunction with process optimization, will lower part cost through faster cycle times, weight reduction and higher output.

**Johnson Controls Interior GmbH (JCI)**, a fully-owned subsidiary of Johnson Controls, and the world's leading supplier of automotive seating and interior systems, plans to demonstrate its commitment to the industry through ongoing improvements in cost, quality and technology. Johnson's feels that the MuCell-equipped machine will eliminate stress, warpage and sink marked parts, which are the primary focus areas of its customers. JCI's customers include nearly every major automaker in the world.

**INOAC**, one of the leading automotive suppliers in the Japanese automobile industry, is focusing its product line on moldings, air bag gaskets, instrument panels, seats and headliners.

## Franz Strohmaier Receives Annual Technology Innovation Award from Trexel



*Trexel President and CEO, David Bernstein (right) and Trexel VP Injection Molding, David Peirick (left) stand proudly beside Technology Innovation Award recipient Franz Strohmaier (center)*

Franz Strohmaier, former Vice President, Engel Canada, was presented with Trexel's Annual Technology Innovation Award on August 4th. In an effort to recognize individuals who have demonstrated superior vision in recognizing the potential impact of the MuCell technology, Trexel continuously honors individuals by presenting an award at each annual meeting. Congratulations to Franz for furthering the cause of making MuCell commercially available today.

...*Van Dorn, Krauss Maffei...*

...continued from page 1

Krauss Maffei Kunststofftechnik, a global supplier of injection molding systems, and Van Dorn Demag, one of the largest U.S. suppliers of injection molding machines, are now fully licensed to sell new and retrofitted machines equipped with MuCell process technology.



According to Scott Kroeger, Van Dorn's Director of Marketing, "The MuCell technology is very significant for injection molders because it offers savings and improved product quality using a wide range of materials while providing a very short payback period."



Guido Radig, Krauss Maffei's Marketing Manager agrees. "Using the MuCell technology will bring many advantages for a wide range of products."