MuCell Processes
TREXEL INC.

MuCell Molding Processes

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Milacron and Ferromatik Milacron - Licensed to Sell

Milacron and Ferromatik Milacron are licensed to sell the MuCell™ process technology. Injection molders can now purchase MuCell capable machines directly from Milacron and Ferromatik Milacron while taking an end user MuCell license from Trexel. The entire Milacron family of horizontal injection molding equipment worldwide, including Ferromatik, Autojectors, Roboshot and Ohio-built machines, are covered under this agreement. Taking its place among the breakthrough technologies of the early 21st century, the MuCell process enables Milacron injection molding equipment to offer dramatic cost savings through reduced cycle time, lighter part weight and lower tonnage requirements per machine

Milacron 400-ton Magna Hydraulic MuCell-equipped machine

Those savings are a major reason a Tier One automotive molder has ordered a new 500-ton Magna Hydraulic press equipped with the new process," says Bob Strickley, Milacron Director of Sales, N. America. It's one of several MuCell-equipped machines sold by Milacron since this company licensed the process from Trexel in September of last year. Strickley points out that, "The tremendous cost-savings potential, plus the chance to get a big jump on the competition, has the customer very excited and, in fact, they have already inquired about a 1500-ton MuCell-equipped machine."

"Manufacturers from a broad range of industries, including automotive, construction, housewares, electrical, consumer goods, and packaging will now be able to use Milacron equipment to address the tremendous cost-reduction potential of this new processing technology", says Jim Moore, VP of Sales for Milacron's Injection Molding Business. "As innovators of new technologies for injection molding applications, we are well aware of the many processing improvements that MuCell offers," states Hermann Plank, Sales and Marketing Director for Ferromatik.

continued on page 4

Mar-Lee Open House Showcases MuCell

Mar-Lee Companies of Leominster, MA proudly held an Open House on November 4th and 5th, showcasing their state-of-the-art development center, which portrays the MuCell process on an Engel 200-ton tiebarless Engel machine. "We are very excited about the advanced technology options which we will offer to our customers through the Mar-Lee Development Center," stated John Gravelle, President of Mar-Lee Companies. "Our customers will be able to eliminate the headaches, risks and delays associated with developing molding systems in-house, and at the same time realize the efficiencies offered by the MuCell process."

John Gravelle, Mar Lee President (left) and Stan Bowker, Program Manager (right) with 200-ton tiebarless machine.

Mar-Lee consults with customers on product design early within the development process, to address such issues as product moldability and manufacturability. Once the initial process has been approved, Mar-Lee begins development of mold concepts, so that product finalization and mold design take place concurrently. A key advantage of this approach is that all aspects of the

continued on page 2

Hanson Installs Premier MuCell Machine

The Hanson Group, LTD., a UPG Company located in Ludlow, Massachusetts took delivery of an Engel 400-ton MuCell™ capable molding machine in December. The Hanson Group's desire to be a leader in new technologies has led them to license the MuCell process from Trexel. Depending on the application, advantages of the MuCell process in injection molding will allow Hanson's customers to benefit from weight reduction, faster cycles and less clamp tonnage. The low pressures developed in the cavity will make the MuCell process attractive for in-mold decorating as well.

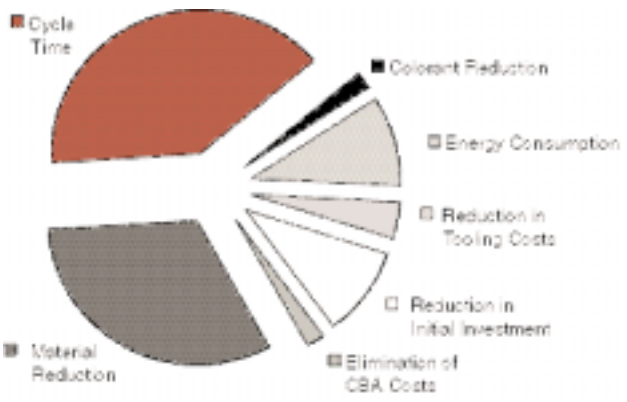
Brian Worthington, Director of R&D at The Hanson Group, adjusts the SCF level on his new MuCell-capable, 400-ton Engel machine.

The MuCell technology is still brand new and many potential uses in injection molding are still to be discovered and investigated. The Hanson Group wants to be a leader in this development. Brian Worthington, Director of R&D, plans to work with the MuCell process, including utilizing other technologies to broaden applications for MuCell-molded parts.

The Hanson Group, with locations in Massachusetts and Kentucky, offers complete engineering services that enable companies to quickly take ideas from the design stage through prototyping and into production. The Hanson Group provides full service capability with extensive product design and development in 2D or 3D, detailed mold design, rapid deployment tooling for prototyping, mold filling and cooling analysis, high cavitation mold construction, injection molding and secondary operations such as assembly, heat staking, hot stamping, pad printing and sonic welding. Custom and proprietary molders, as well as end users, value the combination of services that The Hanson Group provides.

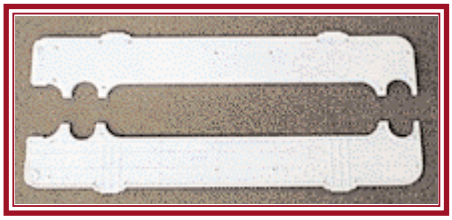
Areas of Potential Savings with MuCell

The pie chart below illustrates the areas of potential savings from MuCell process implementation. The majority of these savings are derived from cycle time and weight reductions; however, there are additional factors which also contribute to total savings. The total savings will vary with each application, and not all factors are part of the equation.



...MarLee Open House
continued from page 1

system - the mold, machine, MuCell process and automation are completed within the same timeframe. All components of the MuCell system are assembled at Mar-Lee and are fully-tested. Once process development is completed and optimized, the entire system is shipped to the customer location. Since the Open House in November, Mar-Lee has run several different MuCell applications for customers, with great success. John Gravelle states, "the demand for the MuCell process has exceeded our expectations. Our customers are so enthusiastic about this breakthrough technology, that Mar-Lee is looking to expand the tonnage range available in our Development Center to take full advantage of the MuCell process capabilities, specifically the significant reduction in clamp tonnage." For more information about the Mar-Lee Companies, contact Stan Bowker, Program Manager at 978 343-9600.



MuCell product molded during November Open House

SPE Meetings

March 20	**St. Louis, MS**	**April 18**	**Lehigh Valley, PA**
March 22	**Chicago, IL**	**April 19**	**E. New England**
April 11	**El Paso, TX**	**April 28**	**Indianapolis, IN**
April 13	**Binghamton-Scranton**		

Upcoming Conferences

Trexel will be presenting a paper at the following conference:

February 28 - March 1 **Molding 2000, New Orleans, LA**

Applications Update

MuCell Acetal Application A Big Plus In Cost Reduction

Do you have any customers molding with Acetal? Trade names include Delrinâ, Acetron GPâ, Pomaluxâ and Celconâ. Now MuCell™ licensed equipment suppliers can propose the MuCell processing option to processors to lower acetal processing costs and material consumption.

Acetal HighWear Component

Acetal features low moisture absorption and low coefficients of friction. This versatile engineering grade material is ideal for wear applications in high humidity or moisture conditions. It is a preferred material for bushings and bearings in marine or food processing applications. It is widely used in automotive, appliance, construction, electronic and consumer goods due to its excellent dimensional stability, high mechanical performance and good solvent resistance. Processing of acetal grades requires temperatures in the 375 to 440 degrees fahrenheit and processors must pay attention to potential degradation and formaldehyde production in extended periods of exposure exceeding 375 degrees fahrenheit. In a recent processing trial, the MuCell process was applied to acetal application of a high wear component.

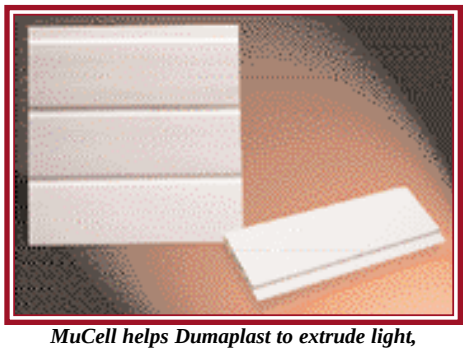
A multi-cavity cold sprue, cold runner mold was used. The tool was run on a MuCell equipped press with nitrogen SCF. The mold cycle time was reduced from 32.0 seconds to 22.3 seconds, a reduction of 30%. The required clamp tonnage was reduced by over 75%, from 150 tons to less than 35 tons. The density (weight) was reduced by 15% resulting in a micro-cellular structure having cell sizes less than 25 microns. Finally, all visual sink marks and warpage were eliminated.

In summary, the MuCell process successfully solved processing problems and reduced part costs by more than 25%. If you have customers that mold these materials, be sure to let them know that the MuCell process will increase their competitiveness.

Focus on Extrusion

Dumaplast is First in Europe to Use MuCell Technology

Dumaplast (Maldegem, Belgium), a division of Immadco NV, producer of extruded rigid PVC interior cladding and decorating systems for major commercial markets worldwide, is the exclusive license holder of the MuCell process for production of PVC claddings, sidings, and roller shutters throughout Europe, including Turkey and the republics of the former Soviet Union. Dumaplast distributes its products primarily through do-it-yourself retail outlets. Targeted end-users include both professional builders/contractors, as well as do-it-yourself consumers. Dumaplast is using the MuCell technology to produce PVC extrusion profiles for interior wall claddings and ceilings. By using the MuCell technology, Dumaplast has achieved significant material savings with the same rigid PVC material composition used in the company's current product line. Dumaplast implemented the MuCell technology with a low-cost retrofit of their existing twin-screw extrusion equipment. This process permits them to foam thin product cross-sections (less than 0.5 mm/0.020 in), while maintaining desirable surface qualities and physical properties. As an added benefit, productivity was increased by more than 25%. In the Dumaplast application, Trexel and Dumaplast first added a MuCell-capable single-screw to an existing twin-screw machine to demonstrate feasibility. After feasibility demonstration, the single-screw was removed and the standard twin-screw extruder was retrofitted with MuCell designed screws and a modified barrel. This modification of the existing twin-screw extruder reduced the implementation cost of the technology by 45% while improving the thermal stability of the product quite significantly.



MuCell helps Dumaplast to extrude light, strong PVC profiles.

Arburg Shipping MuCell-capable Machines

The first Arburg MuCell™-capable machine, a 55-ton unit, was shipped to an end user customer in late August 1999. The 55-ton machine is currently being used by the end user to apply the MuCell process technology on a number of its products.

Arburg 88-ton MuCell-equipped machine

The Arburg machine platform is particularly attractive for the MuCell option as there are literally no major software or hydraulic modifications needed for start-up. The machine does require the addition of a proprietary MuCell screw and SCF Interface hardware for MuCell capability. In Trexel's development laboratory a MuCell capable Arburg 88-ton machine is available for customer mold trials. A recently conducted trial, using a thin-wall container to stimulate a high-speed packaging process, resulted in excellent part repeatability with a 10% weight reduction. Trexel plans to begin at least two customer trials within the next 30 days.

New Faces at Trexel

Rob Janisch
European Sales Manager

Mr. Janisch has over 4 years of experience in capital equipment sales, most recently with GE Power Systems as a Sales Manager responsible for southern South America. While at Thermedics Detection, a Thermo Electron Company, Mr. Janisch helped establish a sales presence for the company in Europe, the Middle East, and Africa. He also has experience in areas such as field service, customer service, and quality control. Mr. Janisch has been internationally active most of his career, primarily due to his diverse cultural background and his language abilities (English, German, Spanish, and Portuguese). Mr. Janisch received a B.S. in Electrical Engineering from TUFTS University and an M.B.A. from the American Graduate School of International Management.

Stephen Friend
Director of Strategic Marketing

Mr. Friend has over 25 years experience in strategic sales and marketing, most recently as General Manager of Hyperion Catalysis International, where he managed Product Development and Marketing of nano-fiber based plastic products for the manufacturing operations and patenting applications in plastics, coatings and batteries. Mr. Friend has held various marketing Management positions with GE's Plastic Business Operation, including Market Development of its Structural Foam Resins. Mr. Friend received a BA in Chemistry from Immaculate Heart College and an M.B.A. from California State University. He is presently a member of the MIT Enterprise Forum.

...Milacron-Ferromatik
continued from page 1

Construction of several new Milacron MuCell capable machines is currently underway. A 400-ton machine will be available for a planned **Milacron Open House in Batavia on February 21-23, 2000**. This machine will then be shipped to Trexel for customer mold trials.

In addition to offering MuCell technology on all of its new injection molding machines, Milacron can also provide the process for its existing machines or those of its competitors through its Rebuild, Retrofit, Remanufacture Business.

Trexel Introduces New Licensee Training Program

Trexel is proud to introduce its new, customer training and support program. The new program, designed to educate Trexel's licensee's on MuCell-capable machine operation, is made up of a 3-day course, commencing 4 weeks prior to all new machine start-ups. Each training program will consist of an initial 2.5 day seminar at Trexel, Inc., running customer-oriented mold trials and the balance of the training will be held at the customer's site at the time of machine delivery. The Trexel-based portion of the training will include hands-on laboratory operation of the MuCell machine, as well as classroom-style orientation of the MuCell process, coupled with customer-specific application suggestions and modifications. By obtaining the licensee's mold and material in advance of the training, the molds used in the training will parallel those developed for actual licensee use with new machine implementation.