

MuCell® Process News

March 2005

Volume XII

Trexel Initiates Global Effort to Introduce MuCell® Gloss™

MuCell Gloss parts to be manufactured by Ono Sangyo in Japan, Mitac Precision Technologies (MPT) in China, or by new customers under license agreements

MuCell Gloss was introduced at K 2004 as a long-awaited breakthrough to produce high gloss MuCell products by combining the Rapid Heat Cycle Molding (RHCM) technology of Ono Sangyo and the MuCell Process technology of Trexel.


The RHCM Process uses elevated mold temperatures during the polymer injection cycle followed by rapid cooling. This process results in super high gloss, as molded products without visible weld lines and flow lines. These high gloss surfaces can even be obtained with glass fiber or mineral filled polymers.



LCD Projector Cover Produced by Mitac Precision Technologies.

The new MuCell Gloss Process is targeted specifically at the following customers:

1. Companies that would like to introduce high gloss products with exceptional dimensional stability and free of warp and sink. This includes the replacement of painting or chroming as well as the reduction in painting processes.
2. Companies that must improve dimensional stability and eliminate warpage and sink but must have excellent surfaces.

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Trexel Initiates Global Effort to Introduce MuCell® Gloss™



Gardena AG Focuses on MuCell



Yamato Industries uses MuCell to Meet Stringent Product Specification



Kongsberg Automotive in Sweden Installs First MuCell System for Production of New Gear System



Trexel and Otron Tech Have Upgraded a 1000 ton Van Dorn Sysem to Produce MuCell Prototypes for the Automotive Industry



World's Largest MuCell Part Manufactured with Engel Injection Molding Technology



Engel Installs 1500 ton MuCell Machine

GARDENA AG focuses on MuCell

GARDENA is a well known name in Europe synonymous with the development of intelligent and easy to use products for the planning, design and care of the garden. This reputation is the result of GARDENA's strong emphasis on the adoption of new technologies and commitment to innovation by its employees.


GARDENA also undertakes special production programs for industrial and automotive OEM's. The combination of these two businesses provides continual opportunities for GARDENA to expand its know how and to meet the highest standards of design and production.




GARDENA Valve Lid, Glass-filled PBT

Gardena has recently added the MuCell Process to its technology portfolio with the installation of a 65 ton MuCell Injection Molding Machine from Krauss-Maffei.

Oliver Heyne (OEM Project

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Gardena AG

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Management) underlines: "Beside special processes like the Gas Injection Technology and the Multiple Component Molding, with MuCell we expand our innovation potential and reduce costs. The first results with our new MuCell Machine applied to a Valve Lid have already shown us that we have made a solid investment


which provides exceptional technical results."

The production of the Valve Lid (using PBT GF 20) with MuCell Process resulted in dramatic improvements in dimensional stability. This is a part that has always exhibited warpage problems when molded conventionally. With MuCell the warpage was simply eliminated.

The production costs were lowered by reducing the cycle time by 20 % and the material by 16 %. When molded as a solid part, a 150 t injection molding machine was required. With the MuCell Process, a 65 t machine can be used.

MuCell Project Management Contact: Oliver Heyne, phone: +49 (0) 73 24 / 952 - 174, email: oliver.heyne@gardena-oem.de

MuCell Gloss

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The MuCell Gloss Process may be evaluated at one of three locations: Ono Sangyo in Japan; Mitac Precision Technologies in Shunde, China, and Trexel Inc. in Woburn, MA. Trexel recommends that customers first confirm the MuCell benefits with Trexel's support, through mold trials at any of these three locations. Thereafter a specially designed prototype mold will be

needed and may be procured through Trexel or directly from Ono Sangyo or Mitac to enable a full evaluation and qualification of the MuCell Gloss Process.

In order to evaluate the potential benefits of the MuCell Gloss Process, interested customers should contact a Trexel Sales Representative below.

North America	David Hyer	781-932-0202 ext.240	d.hyer@trexel.com
Detroit (automotive)	Bill Person	248-687-1353	w.person@trexel.com
Japan and Korea	Stephen Friend	781-932-0202 ext.245	s.friend@trexel.com
China and S.E. Asia	Patrick Tong	(852) 917-97015	p.tong@trexel.com
Europe	Dr. Hartmut Traut	(49) 226-1814-145	h.traut@trexel.com

Engel Installs 1500 Ton MuCell Machine in Austria for Trials on Large Parts

ENGEL is enlarging their MuCell development laboratory at their large machine facility in St. Valentin, Austria and now has a 1,500 ton MuCell machine with a 120 mm screw available for mold trials.

This machine will make it possible to run mold trials for big flat microcellular parts for automotive and other

industries. Examples for such parts are instrument panels, door modules and under-floor panels as well as pallet lids and containers.

The injection unit will be able to run an injection speed of 175 mm/sec. The clamping unit has an inner wide dimension of 1530 mm horizontal and

1275 mm vertical. With a linear robot handling system it is also possible to automatically eject the parts.

For more information you may contact the local Engel Sales Offices or directly Michael Fischer, Product and Technology Manager (michael.fischer@engel.at).



1500 Ton MuCell Machine at St. Valentin, Austria



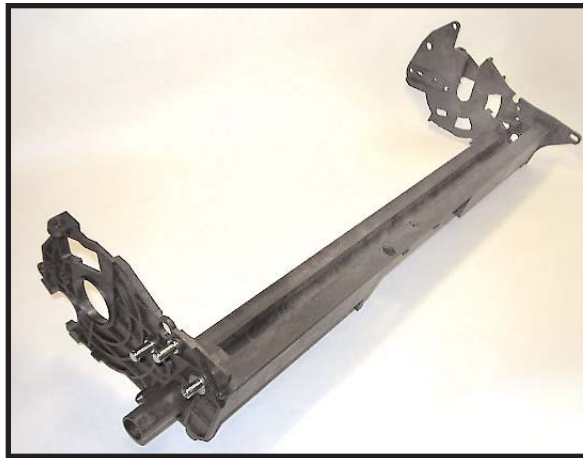
Engel Plans to Mold MuCell Door Panels on its new 1500 Ton MuCell Machine

Yamato Industries Uses MuCell to Meet Stringent Product Specifications

Yamato Industry Company Ltd. of Tokyo, Japan has announced that it has expanded the use of its MuCell Microcellular Molding Technology to produce a paper control unit for Ricoh's latest line of Imagio Neo W400 Series copiers.

This critical part is 600 mm (about 24 inches) long with a flatness specification of less than 0.4 mm warpage. It was, according to Hiroyuki Kanno, Director of R&D for Yamato, extremely difficult to meet the quality requirement with conventional, solid molding.

Yamato, one of the first precision molders in Japan to adopt MuCell Processing, has reported that this critical part, molded in glass-filled, flame retardant PPE-PS was easily produced to meet the flatness specification with



Paper Control Unit Produced by Yamato Industries

MuCell Processing. Without any modifications to the part design and only a minor modification to the mold, Yamato was able to improve the warpage specification by delivering products with 0.3 mm of warpage.

In addition to the improved flatness

quality MuCell also eliminated sink marks and easily filled the mold at the far end of flow without having to increase injection or packing pressures.

The lower cavity pressures (50-80%) compared to conventional solid molding have eliminated flash and increased the life of the mold.

Yamato installed its first MuCell machine, a 350 ton machine manufactured by JSW, in 2001 in its Saitama plant. Yamato has since been a leader in offering MuCell Processing to leading companies in the Automotive and Electronics industries in Japan.

Trexel and Otron Tech Have Upgraded a 1000 ton Van Dorn System to Produce MuCell Prototypes for the Automotive Industry

Otron, a division of Aar-Kel Moulds Ltd. (in Ontario, Canada) is a member of the ARRK Product Development Group of Japan, a global supplier of product development services.

The installation at Otron of a 1000 ton MuCell Modular Upgrade on one of Otron's Van Dorn machines enables Otron to take a lead in supporting the increasing demand to test and qualify large automotive parts as MuCell applications. These include fan shrouds, fans, door carriers, air intake manifolds, fuel canisters, HVAC cases, front end carriers, and wiper tubs.

Bill Person, Trexel Sales Manager in Detroit notes that, "the system has been booked solid since it was



Mike Dunlop, Otron GM, with Fan Shroud Targeted for MuCell Prototyping

installed." He further adds, "easy access to the system allows automotive suppliers to qualify their molds and their MuCell parts together and avoiding the pitfalls of trying to qualify parts sequentially, first as solid and then as MuCell."

Scott Powers, Trexel Technical Support Manager, emphasizes that,

"the improved dimensional stability and reduced stress associated with the MuCell Process often results in parts that conform to specifications right out of the mold, eliminating costly retooling and re-sampling

iterations. The ability to confirm weight reduction, clamp tonnage reduction and cycle time savings helps to establish realistic operating expectations upfront."

For more information on MuCell, contact Bill Person at w.person@trexel.com and to inquire about Otron's press availability email Mike Freeman at mikef@otron.com.

Kongsberg Automotive in Sweden Installs First MuCell System for Production of New Gear System

Kongsberg Automotive, based in Sweden, develops, manufactures and markets systems for gearshift, clutch actuation, seat comfort, stabilising rods, couplings and components. Key customers include DAF, Mercedes-Benz, Opel, Peugeot/Citröen, Renault, Saab, Scania, Toyota and Volvo. The Group has almost 2,300 employees.

A new gear shift system destined for a European OEM will move into production in May, 2005. Several of the critical components of this system have been specified for MuCell production due to the exceptional improvement on warpage and the ability of MuCell parts to meet the long cycle durability tests under both ambi-

ent and extreme temperature conditions.

Uwe Kolshorn, Trexel Technical Manager explained that Kongsberg's decision to begin the MuCell evaluation before the final tool had been built facilitated optimization of the components not only to meet stringent quality requirements, but for maximum acceptable weight reduction and cycle time improvement. By prototyping and releasing the part as MuCell, smaller molding machines could be purchased as well. The components will run on a 200 ton MuCell capable Krauss-Maffei system

Dräxlmaier starts with MuCell® development

The Dräxlmaier Group producing wiring harnesses and interior parts for the automobile industry, has proven to be one of Bavaria's most successful mid-sized corporations because of its fixed focus on fundamentals.

Dräxlmaier will soon be installing a 500t MuCell Injection Molding Machine ordered from Krauss-Maffei at their production site in Braunau (Austria). In order to take advantage of the reduced clamp pressure associated with the MuCell Process, the machine will have a 1000 ton wide platen option.

This feature will enable Dräxlmaier to test new and less costly design approaches during their development phase.

World's Largest MuCell Part Manufactured with Engel Injection Molding Technology

Currently the world's largest machine equipped for MuCell® microcellular foam injection molding, an ENGEL DUO 11050/1700 with a clamping force 1700 metric tons and a 150 mm diameter screw, is now in service in Sheffield, UK. It is being used by the firm of Loadhog Ltd for the injection molding of the 1,200 mm x 1,000 mm polypropylene (PP) base for its innovative reusable pallet lid ("The Loadhog Lid") for the securing and stacking of palletted goods for transport and distribution.

One of the principal advantages of MuCell parts is their extremely high dimensional stability without warping or sink marks. Contributing to the relative strength retention of this large part with thicknesses of only 2.5 mm, is the extremely regular microcellular foam structure throughout the entire



Loadhog Lid

molded part. A supercritical fluid (SCF) from an atmospheric gas (this is usually nitrogen) is injected directly into the plasticizing cylinder where it rapidly dissolves in the melt, creating a single phase solution. During and after injection of the melt, the gas expands in the mould cavity and forms a microcellular foam with cells measuring on average 50 µm in diameter.



Engel was closely involved in the development of this innovative system in collaboration with LoadHog and Trexel. Since commencing its MuCell activities in 1999, Engel has delivered about 25% of the world's MuCell machines to a wide range of applications from 100 tons to 1,700 tons.

UPCOMING EVENTS

Rapra Technology Limited Blowing Agents and Foaming Processes

10-11 May 2005, Stuttgart, Germany

May 10th: 12:00, Repeatable processing and quality control systems for production of microcellular parts (Dr. Hartmut Traut, Trexel, GmbH & Levi Kishbaugh, Trexel, Inc.)

May 11th: 15:00, High frequency coaxial cable - an application for microcellular foaming technology in extrusion (Prof Karl Audenaerde & Dr. Johannes Lorenz, Kabelwerk Eupen AG Belgium)

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