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**Trexel and Ono Sangyo will offer technology to produce  
high gloss MuCell® parts**

*Trexel will introduce "MuCell Gloss™" in the USA and Europe;  
Ono Sangyo will promote the technology in Asia and Japan*

*October 21, 2004, Düsseldorf, Germany, Woburn, MA., and Tokyo, Japan.*

Trexel, Inc. and Ono Sangyo Co. Ltd. have announced a joint agreement and plan to introduce high gloss MuCell products with excellent surfaces worldwide. This long awaited breakthrough is based on the combination of the MuCell microcellular molding process with the Rapid Heat Cycle Molding (RHCM®) technology of Ono Sangyo.

Both companies believe that by eliminating current compromises within their existing technologies, the combination of these two technologies, will provide a major new opportunity for molders to produce high quality products and to implement new low cost product designs.

RHCM Technology alone does not eliminate sink marks, nor does it improve the dimensional stability of parts. The results with RHCM alone are the same as with the conventional solid molding process. Sink is a particularly difficult challenge for high gloss parts.

MuCell can produce a consistent smooth, but dull finish and often exhibits splay marks with certain materials or certain geometries, making it useful for non appearance parts, but unsuitable for appearance products.

## Combined RHCM + MuCell

For this reason, Trexel and Ono Sangyo have engaged in an extended process development effort after Ono Sangyo installed a MuCell Modular Upgrade on its 350 ton Meiki molding machine in Tokyo, Japan. The results have been excellent particularly on products made of ABS, ABS/Glass fiber, PC, PC/Glass fiber, and mineral-filled Polypropylene. Excellent surface MuCell parts have been produced which have high gloss, lower weights, no sink marks and improved dimensional stability.

### **{SEE ATTACHED PHOTOGRAPHS OF MUCCELL GLOSS SAMPLE}**

Both Ono Sangyo and Trexel agree that the combination of the two technologies will open up new opportunities for customers who have been unable to accept the previous limitations of either technology. The targets for this combined technology will be in three categories:

1. Companies that would like to replace plating or painting or to reduce the number of steps involved with the painting process.
2. Companies that would like to introduce high gloss products with exceptional dimensional stability and free of warp and sink.
3. Companies that must improve dimensional stability and eliminate warpage but must have excellent surfaces.

Both Trexel and Ono Sangyo caution that, unlike the MuCell Process, which is often used to reduce costs in high volume applications, the benefits of the combined technologies will result from higher quality or the replacement of expensive secondary process steps. Of course, as always, MuCell will contribute operating benefits in cycle time and weight.

Furthermore, as with RHCM alone, the combined process should be adopted only for new products, and new molds should be designed to optimize the effect of the technology. Retrofits to existing tools are not recommended and in many cases are not possible.

## Target Applications

There are many target applications for this new technology in automotive, electronics, and business equipment.

The target applications include products like TV frames, LCD frames, computer and printer cases, which need to be warp-free and free of sink marks. Some of these are painted today and the MuCell Gloss Process makes it possible for customers to replace the painting process with a less expensive process.

Also many printer platens need the dimensional stability of MuCell but they must have an excellent surface finish. Also high gloss trim bezels on appliances and electronics will benefit from this breakthrough.

There are many precision applications which need better dimensional stability, but which must have very smooth surfaces because of concerns about particulate contamination. Examples are wafer carriers and disk drive components.

In the automotive industry, target applications generally include parts that require a Class A finish or are “molded in color”. Cowl vent grills, exterior mirror shells and housings (molded in color), center consoles, door panels, dome light bezels, light housings, door handles, and bumper fascias (painted) represent likely applications.

The process will offer alternatives on plated parts such as door handles, wheel trim, and headlight reflectors.

## Marketing and Commercialization Plan

In order to proceed, Trexel will become the demonstration center for North America and Europe, while Ono Sangyo will be the demonstration center for Japan and Asia. Ono Sangyo will be able to manufacture molds, produce parts for customers, or license the combined technologies to other producers.

In the US, Trexel and Ono Sangyo plan to align with a mold maker that will have the capability to implement RHCM mold designs. Trexel and Ono Sangyo also plan to align with a molder who will be able to produce the customer's products and will be able to build economies of scale with the combined technologies. Of course, companies with suitable applications will be able to license the combined technologies for themselves.

## Equipment Requirements

In order to use the combined technologies, a customer will need to install the standard Trexel equipment package (SCF System and Modular Upgrade) as well as a RHCM controller. A license will be available that covers the use of both technologies.

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## About The MuCell Process

Trexel, Inc. of Woburn, Massachusetts is the inventor and promoter of the MuCell Microcellular Molding Process. By introducing small, precise amounts of supercritical N<sub>2</sub> and carbon dioxide gas into the molten resin during the molding process, the MuCell process enables the otherwise unattainable production of stress free parts that maintain strict dimensional stability.

The process, which is targeted for thin wall parts (less than 3 mm), provides substantial operating savings in the form of reduced cycle times (15-25%) reduced parts weights (8-12% recommended), and lower clamp tonnage molding machines. More important, however, is the ability of the MuCell Process to deliver stress free parts with little or no warpage, no sink, and uniform shrinkage characteristics from gate end to vent end in most applications. Viscosity reductions of 15-30% in most resins allow for better fill and more material choices than solid molding.

There are hundreds of MuCell parts in commercial production today around the world. Examples of MuCell products include electrical components, electronics connectors, internal business equipment and printer components, and automotive HVAC products.

### **About Trexel**

Trexel is the exclusive developer of the MuCell microcellular process technology and has an extensive portfolio of patents in the U.S., Canada, Europe, Japan, Korea, and Asia. Trexel's primary business is licensing the MuCell technology for the production of injection molded and extruded articles. It also provides to licensees world-class engineering support, training and other services, and the equipment and components integral to the MuCell process. In support of these activities, Trexel operates a plastics development laboratory in its Woburn, MA facility and a second one in Gummersbach, Germany at the facilities of Plastech. Other MuCell support facilities are located throughout the U.S., Europe, Japan, Korea, Hong Kong, Australia, and Singapore.

### **About Ono Sangyo**

Ono Sangyo of Tokyo, Japan has been a leading manufacturer of plastic products for its unique injection molding technologies. Its main markets are for electrical and electronic products, automotive parts, daily life related products, industrial products and food packaging .Recently Ono Sangyo has developed a new application for the AV and IT field with its special injection technology, the Rapid Heat Cycle Molding (RHCM) process. Ono Sangyo uses RHCM technology to supply super high gloss surface products to its customers without weld lines. Now more than half of its production lines use the RHCM Process in response to the large demand of its customers. Ono Sangyo not only produces RHCM products , but Ono Sangyo will license RHCM technology to other molders.

### **About Rapid Heat Cycle Molding (RHCM)**

Ono Sangyo Co. Ltd. of Tokyo, Japan has been a leader in the application of the Rapid Heat Cycle Molding (RHCM) process which was originally co-developed by Ono Sangyo and Mitsui Chemicals, Inc. 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 weld lines and without visible flow lines. These high gloss surfaces are obtained

even with glass fiber or mineral- filled polymers. The ability to produce a very high gloss surface as molded allows the RHCM technology to reduce total system costs by eliminating painting or by substituting for other more expensive processes. There are RHCM patents pending or issued in fourteen countries throughout the world.

*Examples of RHCM products include: Flat TV Panel, Digital Video Camera, Digital Still Camera, TV Stand, PDA, Notebook PC's.*