

# MuCell® Process News

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## Trexel's MuCell® Microcellular Foam Process Meets Industry's Requirements for High-Performance, Green Packaging Solutions

This issue of our regular newsletter is devoted to green packaging solutions using the MuCell process. While several positive environmental benefits have always been available with the MuCell® Process, we haven't talked much about them with you and its high time we did. Some of our customers have developed some terrific environmental solutions using the MuCell® process and we'll tell you about some of them in this issue. We even have a few ideas of our own for you to consider. So, why are we doing this now?

Several recent trends have convinced us to spend greater effort in identifying the environmental benefits of the MuCell process to the retail industry. These trends include the following:

1. Corporate initiatives by Wal-Mart, Home Depot and others to reduce packaging bulk;
2. Continuing increases in the costs of packaging resins such as Polystyrene, HDPE (High density Polyethylene), and Polypropylene;
3. Massive increases in the costs of energy;
4. The environmentally friendly nature of MuCell® Technology, where atmospheric gases such as nitrogen or carbon dioxide are used to foam plastics rather than the traditional chemical foaming agents such as pentane, butane and HCFC's, all of which have adverse air quality effects and many of which need permits in the USA.
5. The emerging cost competitiveness of biodegradable polymers and the need for an effective foaming technique, such as the MuCell Process.

The simple facts are that the MuCell microcellular foam technology brings significant weight reduction, energy reduction, and greenhouse gas emission benefits to a wide range of packaging products and applications produced by any of the three major manufacturing processes: injection molding; extrusion; extrusion blow molding.

The MuCell process allows packaging companies to reduce the weight of their (extruded or molded) plastics containers by 6-15%. Not only that, but, in the case of injection molding, energy required to produce the packages can be reduced by 20-40% because of tremendous clamp tonnage reductions. Finally, and of greater environmental importance is the fact that simple atmospheric gases are used to obtain these results. This is in marked contrast to typical extrusion foam processing techniques, where either complex chemical foaming agents or volatile hydrocarbons such as pentane or butane gases have been used, with the resultant negative air quality impacts.

Trexel can help companies achieve their goals for smaller packaging, less packaging and recyclable packaging, and the MuCell process affects all three major plastics processes for packaging applications, whether it's injection molding of containers, extrusion of sheet or blow molding of bottles.

The MuCell® process brings it all together: high performance, environmental benefits and cost-effectiveness. That's good business for all of us.

Best Regards,



David P. Bernstein  
President & CEO

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## Injection Molding: Autobar's thin-wall rigid packaging is produced more efficiently than any other kind of thin-wall packaging

The molding of a rigid thin wall product typically means going to a larger press for the increased pressure and injection requirements, but Autobar Packaging Group, Lyon, France, is achieving the feat on smaller presses by taking thin-wall rigid packaging to new light-weighting lows. The company developed and is implementing Super Light Injection Molding or SLIM, a new thin-wall packaging concept that applies the MuCell® micro-cellular foaming process.

Autobar's main rigid product is a 0.5 kg volume margarine tub produced in a 4+4 stack mold on a 550 ton press, produced in Ravensburg, Germany. It is the company's highest volume rigid packaging part. Autobar wanted to transfer the molding of this part to smaller, existing 350 ton presses for economic savings. It manufactures 150 million of these containers



and lids a year at the plant and is looking to increase the output to 200 million annually without purchasing existing machines. Light-weighting the container was pivotal in achieving its goals.

Autobar conducted tests of its MuCell-driven SLIM process on a 550 ton press and saw immediate results. MuCell lowered the clamp force requirements from 27,902 psi to 23,941 psi and cut injection pressure needs by 15 percent, figures within the capability range of a 350 ton press.

Without MuCell the molded tub weighed 15.21g and parts exhibited a standard deviation of 0.33. However, with MuCell, part weight dropped 6.5% to 14.23g and standard deviation shrank to 0.17. More information is available at [www.autobarpackaging.com](http://www.autobarpackaging.com).

## Injection Molded Pallets from Loadhog Ltd.: Recyclable, Reusable Systems for Supply Chain Efficiency

The MuCell® Molding Process has been used to enable a revolutionary approach to the elimination of packaging waste. The Loadhog lid, manufactured in the United Kingdom by Loadhog Ltd. secures level loads to pallets without the need for shrink wrap delivering cost savings, enhanced load security, and can be used in a broad range of applications. The system can replace shrink wrapping and banding. Using the Loadhog lid produces savings by reducing labor requirements and eliminating single-use packaging. The Loadhog lid is the UK green award-winning supply chain product for the 21st century. More information on the Loadhog Lid is available at [http://www.loadhog.co.uk/news/news\\_detail.asp?NewsID=175](http://www.loadhog.co.uk/news/news_detail.asp?NewsID=175)



## Extrusion Blow Molding: Trexel, Inc.'s HDPE Bottle Prototype is Lightweight and Strong.

Most non-beverage liquids such as shampoos, liquid cosmetics, detergents, etc. are packaged in blow molded HDPE containers. Trexel, Inc. has developed a MuCell® blow molded container prototype which can reduce plastics consumption by 12-20%. Not only is plastics consumption reduced, but the resulting foam structure improves top load container strength. The increased container strength allows for lower protective packaging costs and subsequent, lower shipping costs.



### Blow Molding: PTI's foamed PET Bottle Design Saves Weight

Most beverage containers are made from PET and produced in the billions. Plastic Technologies, Inc. of Holland, Ohio, a leading supplier of proprietary technology and specialty manufacturing services to the plastic packaging industry, has announced the availability of a new packaging design built on the MuCell Process for foamed PET bottles (for non-carbonated beverages), and which offers the potential to save millions of pounds of PET resin in bottles. More information is available at <http://www.plastictechnologies.com/technology/technology.html>



### Extruded Sheet: Trexel, Inc.'s process for thermoforming of foamed HDPE, polypropylene packaging sheet and packaging tubes saves weight

Many packages and containers which serve a structural function (unlike polystyrene foams) use either HDPE or Polypropylene. These could include yogurt containers, printed signs, trays for the containment of electronics products, etc. These materials have been difficult to foam using traditional methods but Trexel has developed a MuCell foaming process specifically designed for these applications which allows for a 15-25% reduction in material usage while meeting all other product requirements.



### Extruded low density polystyrene foam board for packaging and insulation uses no ozone-depleting blowing agents.

The MuCell® process allows production of lightweight 1-2-inch (25-50mm) board with 96% density reductions. The MuCell process utilizes supercritical CO<sub>2</sub> which eliminates greenhouse gases by replacing the butanes, pentanes, HCFC's and other hydrocarbons and ozone depleting blowing agents with atmospheric gases.



### Low Density Extrusion: Dispoz-o Inc.'s Envirofoam® Low Density Polystyrene Food Tray and Dinner Ware.

Dispoz-o Inc. of Fountain Inn, SC has introduced an improved school lunch tray and line of dinnerware and clamshells made with the MuCell® Process which uses neither hydrocarbons, nor any other volatile agents to produce a superior tray for use in school lunch programs and other commercial applications. Unlike other sheet foaming processes, the Envirofoam process uses no ozone depleting additives, no hydrocarbons or other volatiles and has no adverse impact on air quality. More information is available at <http://www.dispoz.com/>



# Upcoming Events

## **Blowing Agents and Foaming Processes 2007**

Ninth International Conference 22-23 May 2007

Frankfurt, Germany

Vibration and Ultrasonic Welding Conditions and Performance for Glass Fibre Filled PA 6 and PA 6.6 Injection Moulded using the MuCell® Microcellular Foaming Process

Levi Kishbaugh, V.P. Engineering

## **Chinaplas 2007**

21-24 May 2007

Booth 1D615

<http://www.2456.com/chinaplas/en/general/info1.asp?eid=3655&order=135>

## **K Show 2007**

24-31 October 2007

Düsseldorf, Germany

Hall 13, Booth C22

<http://www.k-online.de>

## **Polymer Foam 2007**

2-3 October 2007

Newark, NJ

Microcellular Foams: The Evolution of a New Industrial Process Technology from Theory to Practice to Global Acceptance

David P. Bernstein, President & CEO