



## Zotefoams stretches MuCell into extrusion applications

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Zotefoams plc, a minority partner in MuCell Extrusion LLC, has started a tandem extrusion line in England running the MuCell microcellular process to make foamed sheet — and allowing Zotefoams to crack new markets for extremely thin seals and gaskets for cell phones and electronics, packaging and other applications.

Croydon, England-based Zotefoams and Woburn, Mass.-based Trexel Inc. formed MuCell Extrusion in 2008 to expand the MuCell process beyond its base in injection molding. Zotefoams owns a 30 percent stake, and has licensed the technology to make foams.

Zotefoams installed the new tandem extrusion line to make very low density foam. Initially, the company is running low density polyethylene, but plans to add polypropylene and nylon foam in the future.

The tandem line, with screw diameters measuring 31/2 inches and 41/2 inches, can extrude sheet up to 52 inches wide.

This marks Zotefoam's first use of MuCell to make foam sheet. According to MuCell Extrusion President Mark Lindenfelzer, the technology produces thin foams with tight gauge control and excellent skin quality.

"What we're after is a cell structure that is extremely small," he said. "It's under 100 microns, so it has the appearance of a solid surface. They're very smooth. And you can hold the tolerances on those surfaces extremely well."

MuCell is best known for injection molding. But extrusion applications are growing in North America, Europe and Asia. "It's being accepted very well," Lindenfelzer said.

MuCell Extrusion did more than 20 line conversions in North America in the past year, including 16 to reduce product density and cut resin costs. Four were to extrude brand-new applications, he said.

The new-products side is growing. "Right now, half of our sales are of the nature of unique products that cannot be made without our technology, and the other half of our sales — traditional sheet, tube and hose lines — is from taking material out to have cost reduction," Lindenfelzer said.

Increasing resin prices also are driving inquiries, he said. MuCell can be retrofitted onto existing extrusion lines.

Zotefoams' core business is cross-linked foams sold in blocks to converters.

The MuCell process is different, and Zotefoams will use it to enter new markets, including thin sealing gaskets and tapes for electronics such as cell phones and microprocessor controls, where the process creates foams that resist water but allow for cooling the small devices.

Other applications include hose, tubes and sheet for thermoforming into cottage cheese tubs, yogurt cups and other types of packaging. Lindenfelzer said MuCell reduces weight for thermoformed packaging while retaining strength.

MuCell also is environmentally friendly, according to Lindenfelzer, because it uses the naturally occurring gases of carbon dioxide or nitrogen, rather than a chemical reaction of a hydrocarbon-based blowing agent.

Zotefoams' new MuCell line uses two extruders. The primary extruder melts the polymer. Gas gets injected about three-quarters of the way down the primary extruder. The gas is in a supercritical state, so it has properties of both a liquid and a gas, and forms a solution with the melted plastic.

The melt moves to the secondary extruder, which cools it down.

The entire process is under pressure, so the gas remains in solution. But when the melt exits through the die, the sudden pressure drop releases the microscopic bubbles.

It comes out as a tube, then is slit into a sheet before moving to a winder.

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