EUROPEAN plastic product MANUFACTURER
MATERIALS ■ SERVICES ■ EQUIPMENT

TECHNOLOGY FOCUS

VOL. 2 • ISSUE 2

Take a New Look at RTM

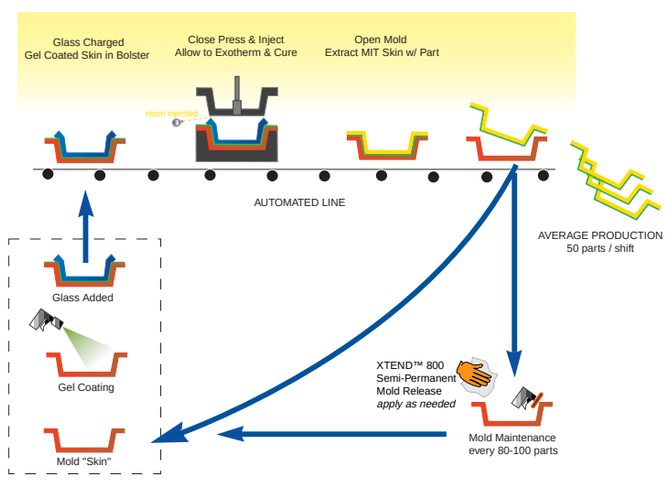
New Soft Tooling Technology for Resin Transfer Moulding

In manufacturing, truly important innovations are distinguished by their broad impact on process improvement -maximising productivity, assuring quality, and minimising environmental impact. New soft tooling technology for resin transfer moulding is doing just that. While the RTM process has existed for many years and long been acknowledged as superior to open moulding for the controlled production of multiple composite parts, the cost of matched metal tooling -- long regarded as essential -- has prohibited many manufacturers from employing the process. One company that has pioneered new soft tooling technology is Plastech TT in the U.K. Their patent pending MIT (multiple insert technology) process combines the best advances in tooling with automated RTM injection equipment. According to one US Manufacturer, this has been the key to producing more, higher quality parts at a lower cost, while reducing VOC's and improving working conditions for employees.

Cincinnati Fiberglass, located in Batavia, OH, USA has a 90,000 square foot manufacturing facility that has been RTM and infusion moulding for 18 years. Typical RTM projects for the company include parts ranging in size from 5-140 lbs. In 1997, Cincinnati Fiberglass' President, John Glass was first introduced to MIT when he visited Plastech's booth at the 1998 CFA show in San Antonio.

"What first intrigued me about the Plastech system", says Glass, "was that it offered the possibility of preparing moulds offline. I wasn't thinking solely about productivity, I was attracted to being able to spray moulds in a vented area and then easily and quickly put them in service. I thought that a MIT system would solve a lot of our VOC issues and improve conditions for our operators."

According to John Moore, President of JHM Technologies, the US technical representative for Plastech TT, it is the thin



(6mm) dimensionally stable MIT "skins" which the company produces from a master pattern, or plug that are critical to MIT success.

"With the availability of low cost highly accurate mould skins", says Moore, "it is possible to gel coat and load glass into several moulds offline, and at optimum temperature, so there is no downtime in the moulding cycle". "On average", says Jeff Burgess, Production Manager for Cincinnati Fiberglass, "we find that multiple insert tooling enables us to cycle our presses quicker by taking advantage of the out-of-press operations available with MIT. Offline gelcoating has also reduced the pinholing that used to occur when gel coat was applied to online moulds that were too warm."

So what is the downside of this new soft tooling technology? Well, there is the initial investment in equipment, although according to Glass, this can be recouped in production gains. Other concerns frequently voiced by manufacturers accustomed to metal tooling, are questions about mould life and mould maintenance. While composite tooling does not have the life span of steel tooling the low cost and easy reproducibility of MIT "skins", more than compensate for the cost of mould replacements. Mould maintenance comes into question because it is generally more difficult to release composite parts from composite tools rather than from metal mould surfaces. According to both Moore and Burgess this problem is remedied by selection of a proper mould release.

After competitive testing of mould releases, Cincinnati Fiberglass selected XTEND', a proprietary, solvent-based semi-permanent mould release manufactured by AXEL Plastics Research Laboratories in NYC. Nancy Teufel, Technical Support Manager for AXEL, says that closed moulding from composite tools poses unique challenges to mould release. "Outside of sticking, the problem that we hear about most often is scumming, or styrene buildup on the top tool surface which forces the tool to be removed from production for cleaning. "We address this with a special line of semi-permanent releases which require no mould sealer and are formulated to resist styrene and reduce buildup." Cincinnati's Jeff Burgess reports that composite moulds coated with XTEND are stripped only after every 80-100 parts are moulded. Teufel reports that AXEL is also working with Cincinnati Fiberglass, JHM Technologies and several major resin manufacturers on internal mould releases (resin additives) specifically for RTM. "These are already being employed to improve cavity fill and wetting of reinforcement, she says, "while our new development is centered on reducing scumming".

The combination of increased production at lower cost, with less maintenance and improved environmental conditions is truly big news to the composite moulder. It is expected that soft tooling successes like Cincinnati Fiberglass will convince more manufacturers that RTM is a great process and an affordable one.