StackTeck In The Press

INJECTION MOLDS

Breakthrough permits 96-cavity mold

Cross channel design makes it happen. Next will be quick change systems and deep draw cavitation for four-face stack molds.

Tradesco will soon break another barrier in stack molds when it ships a four-face mold with 24 cavities per face — 96 total cavities. The system incorporates a breakthrough in channel design that has lead to other high-productivity mold developments.

The 96-cavity mold will be used by a U.S. customer to produce yogurt container lids made from 110 melt index, linear low-density polyethylene, running in a 500-ton molding machine.

"Basically, this is a continuation of the hot runner development," said David R. Brown, vice president for technical services and marketing at Tradesco Mold Ltd., Rexdale, Ontario.

"Proper thermal balancing of this type of mold is consideration Number One," he said. "Each cavity must receive plastic at the same temperature and pressure at the same time. As a result, the manifold is much more complicated than our previous stack molds."

Equal flow lengths

Tradesco uses a proprietary design to channel the melt stream from a central distribution block through crossover nozzles into hot runner nozzles on each side of the central block without use of an extended sprue bar. The crossover nozzle design is the device that equalizes the flow distance to all cavities, said Brown. The cavities on the mold face closest to the injection unit receive melt in the exact same rheological state as the cavities on the level closest to the clamp unit.

Mechanical developments were also required. The opening and closing mechanics originally developed by Tradesco for its four-face stack molds were based on cantilevered arms. That was replaced by a double spline gear system. The new system uses a low-helical angle spline gear operating on either side of the central block. The gears are threaded in opposite directions, bringing the mold halves together or driving them apart synchronously.

"Due to ever-increasing mold size, our mechanics have gone through an evolution. We needed to develop a stronger system to open and close the molds," said Brown.

Good seal-off at the cross overs was another major consideration. "How do you inject at 20,000 psi and then separate the platens without plastic pouring out?" asks Brown. Tradesco developed a built-in decompression system that eliminates nozzle droll while also allowing thermal expansion compensation.

A fourth development entailed carefully designed channel sizing. Flow channels are sized to accommodate longer flow lengths. Tradesco uses its own CAD database and modeling system for all of its molds and hot runners.

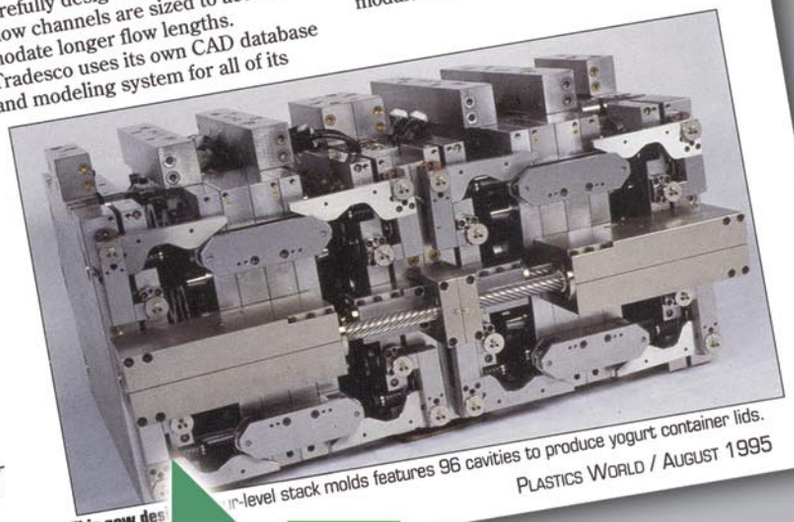
The customer will make 75,000 parts an hour on the new stack mold at a 5-second cycle. Volume is double compared to a conventional two-face stack mold with overall return on capital improved by 60%.

Deep draw concept

And it doesn't stop there. "The cross-over technology opens up a whole new ballgame because of the elimination of the sprue bar," said Brown. The requirement for a sprue bar running through the first two mold halves severely limited many potential stack mold applications.

Now back-to-back-molding of larger parts, such as tote can lids, can be accommodated on four-face molds. Brown also envisions development of a deep draw 4 X 8 stack mold for containers in the near future. "We're just waiting for the market," he added. Extra stroke and shut height on the machine would be required for the mega-molds as well as more plastizing capacity, but no more that the unusual extra 15% tonnage allowance for 2-face stack mold is envisioned.

On another front, Brown expects Tradesco to merge its "Quick Product Change" system into a four-face mold by the end of this year. QPC allows 45-minute changeovers on stack molds. Stack mold changes generally are a tedious affair, taking over seven hours. In QPC systems, carrier frames (which remain part of the press) carry all utilities, eliminating setup changes as cavity modules are replaced. —*Doug Smock*



This new design for four-level stack molds features 96 cavities to produce yogurt container lids.

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