ASSOCIATED THERMOFORMING INC.

THE THERMOFORMING TIMES

QUARTERLY NEWS ABOUT PRECISION PRESSURE, VACUUM AND TWIN SHEET FORMING

Issue Number One Winter 2004

ATI wins SPE Multipart Enclosure Assembly Award for 3D Printer

Associated Thermoforming, Inc. won the Multipart Assembly Award for the enclosure panel assembly for the InVision 3D Solid Printer manufactured by 3D Systems. The enclosure skins, and several secondary structures upon which attachment hardware is mounted, are made from painted, flame-retardant ABS of various starting gauges. The drawer front with a red handle is a twin-sheet part that features an invisible parting line and the smoke-tinted, curved door on the front of the printer is compression/drape formed.

Many of the parts include significant undercuts achieved with fully automatic articulating core pulls. The molds were designed by Associated Thermoforming and manufactured by ATI and its sub-contractors.

IN THIS ISSUE

Infrared Line Scanning Softens Tough Parts

As ATI continues to push the envelope in thermoforming solutions, we have sought out innovative technologies to assist in those efforts. One such technology is the Infrared Line Scanner from Raytek. This device is mounted in line between the oven and forming station and allows us to capture, in real-time, a thermal profile of the sheet. This tool is indispensable in developing heating patterns for challenging parts, where the goal is to maximize material distribution.

It is also an excellent trouble-shooting aid to isolate forming problems or oven problems, and periodic oven scans to assess heating element performance are an integral part of our Preventative Maintenance Program.

Utilizing such a tool is an example of one of the many technologies ATI employs to optimize process control for challenging parts.

ATI and Skydex Butt Heads

ATI has invested a great deal of resource the past 6 years helping Skydex (www.skydex.com) develop a process to manufacture a unique line of cushioning products that are far superior to foam in impact attenuation, weight and durability. The process technology is twin-sheet thermoforming, using thin gage TPU materials. TPU has almost no hot strength, making it a challenge to form at all, especially on an upper platen. ATI has developed a range of processes and technologies to work with challenging draw ratios in twin-sheet forming.

The parts pictured are from a new generation of football helmet for all levels of players from the NFL, down through major Division 1A colleges to high school programs by the leading manufacturer of football helmets, Schutt Sports (www.schuttdna.com). The Skydex cushioning pads are located between the outer shell and the comfort air bags and provide not only superior impact performance, but much lighter weight and more room for the air bags.

It is this type of innovation and development that ATI can bring to bear on your challenges.

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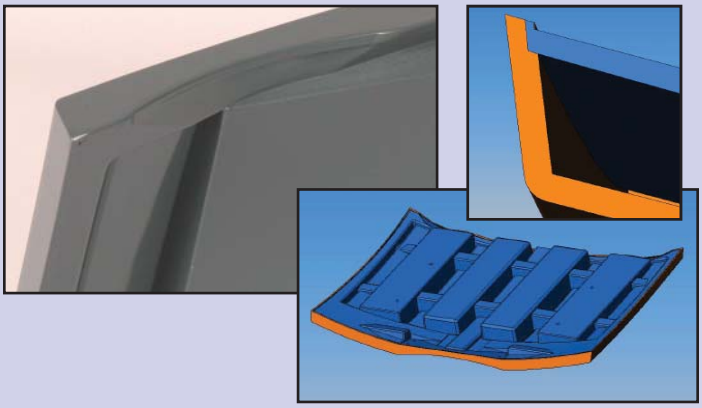
Design Tips

#1

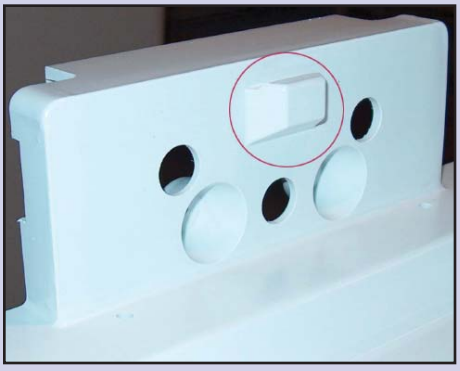
In Twin Sheet Thermoforming, ATI has designed some parts where the parting line between the two sheets is not apparent. Instead of the traditional parting line bisecting the visible edge of the part, with clever part and tool design we have re-oriented the parting line away from any visible edges to give the part a very 'finished' appearance.



Technical Twin-sheet Thermoforming® offers many opportunities to be creative with not only variable-plane parting lines, but also allows flexibility with different resins/colors on the two sides of the sheet, and of course provided close tolerance formed features on both sides of the part.

#2

Oftentimes with Precision Pressure-forming©, ATI can replace fabricated parts with "formed features". The feature shown used to be a machined and fabricated Latch, assembled to the base part at considerable cost. Through a redesign of the part and mold, we were able to pressure-form this feature as an undercut and completely eliminate part cost for that feature. This is often the case with various mounting blocks and tabs for joining parts together, and while mold costs are increased, as a rule the molded features add no cost to the part.



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