

## Total Image Specialists

Lenticular signage supported by thermoformed housing of high strength thermoplastic sheet

COLUMBUS, OH — It's the flashy exterior of the new customer service sign in Macy's Queens-NY store that gets the attention, not the thermoformed housing that supports it. Suspended above cash registers throughout the store, these 0.91m x 1.83m (3' x 6') signs feature lenticular visual effects, brand identification and advertising messages, all of which is mechanically affixed to the thermoplastic clamshell structure designed to go relatively unnoticed. At such a height, the integrity of the support is critical.

"We chose vacuum formed KYDEX® 110 thermoplastic sheet for the clamshell design because of its durability and formability," says Bill Jipping, project manager for Total Image Specialists (Columbus, OH), which manufactures the signs for Macy's parent company, Federated Department Stores, Inc. (Cincinnati, OH). The proprietary sheet offers tensile strength of 44.8 MPa (6500 psi) (ASTM D-638), Notched Izod impact resistance of 128 J/m (2.40 ft-lbs/in) (ASTM D-256), flexural strength of 76 MPa (11,000 psi) (ASTM D790), and modulus of elasticity of 2,450 MPa (356,000 psi) (ASTM D-790).

"Also, Federated requires a silver anodized aluminum finish on all of its signage, and the KYDEX® 110 sheet that offered an exact colour match with the surface texture we wanted was available off-the-shelf," Jipping adds, an advantage for Total Image considering the number of Federated signs it produces.

Clamshell halves are vacuum formed using water-cooled aluminum tools specially designed by Total Image. "We typically run 1.22m x 2.44m (4' x 8') sheets of KYDEX® 110 at 4 mm (0.156") thickness," Jipping explains. Parts are vacuum formed on one of the company's six presses, a 1.83m x 3.05m (6' x 10') vacuum forming machine. During the process, the sealed air space between the heated plastic and mold is evacuated. "We've used KYDEX® sheet on hundreds of jobs due to its formability, extreme hot tear strength, and ability to maintain uniform wall thickness," says Jipping.

"Even on a deep draw part like this, thin-out is kept to a minimum," points out Jipping. "At its thinnest, the clamshell is 3.18mm (0.125") thick, which is within limits."

The finished sign is comprised of 11 assembled components. "A center aluminum support is positioned inside the two halves of the thermoplastic clamshell, and an extrusion runs down the middle," explains Jipping. "All components are mechanically affixed to the clamshell or aluminum support using capped screws or, in the case of the 0.61m x 1.22m (2' x 3') lenticular graphics display, pop rivets."



Mounted above cash registers throughout Macy's stores, this customer service sign relies on the integrity of its structural support, a thermoformed housing made of high-strength thermoplastic sheet that supports a lenticular graphics display, a store name-plate, and advertising message boards.



The centerpiece of the customer service sign is its 0.61m x 1.22m (2' x 3') lenticular graphics display, which employs a specially prepared (interlaced) image and a lenticular lens to produce a sequence of images. For instance, (above) a marching band plays within the star, while (below) fireworks explode. The display is pop-riveted to the clamshell for structural support.

### Thermoplastic Clamshell Ensures Structural Integrity

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### Thermoplastic Clamshell Ensures Structural Integrity (cont'd)

"The lenticular image on the sign is its main attraction," explains Jipping. "When customers view the sign from different directions they see different images." Lenticular graphics employ a specially prepared (interlaced) image and a lenticular lens to produce either a three-dimensional or animated sequence.

Interchangeable blades, which hold messages such as "Open a New Account," and "Make a Purchase," are made of styrene, laminated with a thin silver film to allow for screen-printing. Three of these blades are then slipped into an injection molded polypropylene holder mounted to the clamshell, allowing easy interchangeability. The large nameplate sign consists of a flat strip of silver-laminated styrene, printed with the store name and affixed to the KYDEX® sheet.

The Macy's customer service sign is part of a massive "reinvent" program with improved visual presentations and signage targeted at more than 400 Federated department stores, each of which requires eight to 20 customer service signs and 90 to 100 other directional and informational signs. In two years, Total Image, sole supplier for the reinvent initiative, has overseen more than 150 store remodels, producing more than 2000 new customer service signs and tens of thousands of smaller directional and informational signs.

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Clamshell halves are vacuum pressed on a large-format press using water-cooled aluminum tools specially designed by Total Image Specialists. KYDEX® thermoplastic sheet maintains a uniform wall thickness and minimizes thin-out in deep draw areas.



The clamshell design presents two halves, one slightly smaller than the other. The sides slip into one another and are secured by a thin extrusion. Depending on the location within the store, signs can be single- or double-faced.



An injection molded polypropylene holder mounted to the clamshell facilitates interchangeable message blades, carrying advertising slogans such as "Open a New Account."

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