

## SafeGuard® Delivers Unique Protective Solution to Midwestern Motor Drives Manufacturer – A Shape Molding Case Overview



The CNC Machine Center produces exact product prototypes

### **Project:**

A protective packaging solution for a large national manufacturer of variable speed drives. The packaging design is required to fit multiple drives of varying sizes, and assure that the drives, shipped around the world from a Midwestern United States location, arrive at their destination in mint condition.

### **Product:**

A custom-designed, shape-molded expanded polystyrene (EPS) protective packaging made by the SafeGuard® Protective Packaging division of Plymouth Foam, Inc.

### **Application:**

An economical alternative to the multi-piece fabricated polyethylene and corrugated product the manufacturer had been using to protect its line of variable speed drives while in finished inventory storage and during transportation.

### **Project Participants:**

**Packaging Distributor** Midwest Container  
Jim Wallar – General Manager  
Rockford, IL

**Manufacturer** SafeGuard® Protective Packaging  
Division of Plymouth Foam  
Bret Blau – Division Sales Manager  
Jeff Pahl – Design Manager  
Plymouth, WI

### **Timeframe:**

The entire process, from initial design and concepting, prototype development, preliminary testing and refinement, to the manufacturing of the production mold, final testing and the first production run, took from September 2003 to February 2004.

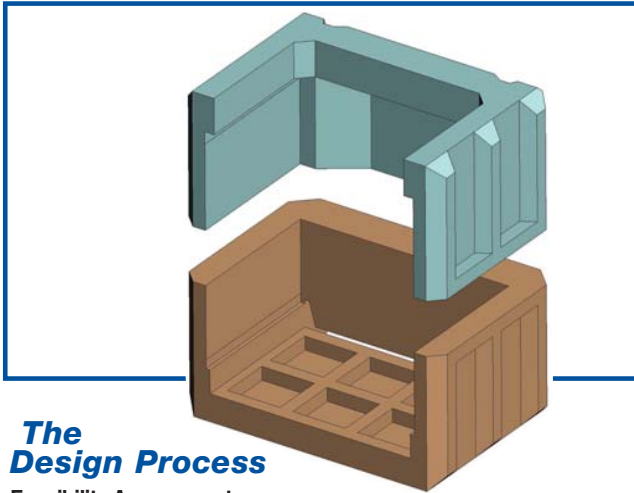
"From the initial consultation to the first production run this project probably took four to five months," said Jeff Pahl, SafeGuard Design Manager. "But now we have the ability to produce large quantities in minimal time, and the product specs are perfect every time."

### **The Challenge:**

The packaging must provide the primary protective element for the drives while in transit, and absorb the weight of pallets stacked on top while in storage. Transportation is often via LTL carrier so the products are handled multiple times in route, and the drives are shipped domestically and internationally from a Midwestern location.

Additionally, in designing the new protective packaging solution the customer sought to:

- Reduce the cost by 50% from that of the previously used materials
- Standardize the protective elements across ten different drive products ranging from 40" to 60" long (16" wide x 16" high), and 195 to 314 pounds.
- Maintain or improve performance, including stacking strength and environmental resistant properties.



## The Design Process

### Feasibility Assessment

- Initial consultation with manufacturer attended by Bret Blau, Division Sales Manager – SafeGuard Protective Packaging and Jim Wallar, General Manager of Midwest Container, a packaging distributor with whom PFI has a strategic alliance.

- Blau submits a full project write up to Pahl, who is in charge of all shape-molding design. Pahl develops preliminary concepts for the solution and submits a SolidWorks CAD design of the various configurations along with a full estimate for the necessary molds and the per unit production costs.

### Active Design

- The drives manufacturer OKs the preliminary concept, and the project moves to the active design stage. The customer submits CAD designs of 10 drives that must fit with the common solution, and Blau and Pahl work closely with engineers from the customer to refine the design.

- The 3-D models are refined and the SafeGuard CNC Machining Center develops prototypes of the proposed solution.

### Testing

- The prototypes are fully tested to assure the integrity of fit on each of the 10 drives, and that the compressive strength is able to withstand pallet stacking.

- Additional testing included rigorous drop tests, humidity resistance tests and an international delivery test.

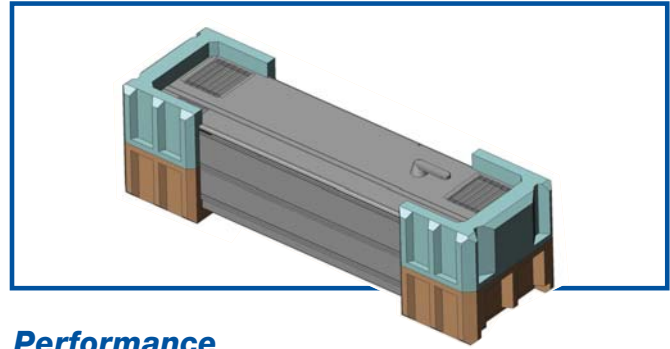
### Mold Production

- Final prototype approval is given and the design is submitted to the tooling manufacturer. Before the tool is finalized several pre-production samples are made and the protective elements are tested a final time.

- Final testing is complete and full approval is granted. The tools are finalized and delivered to Plymouth Foam.

- Initial production commences several days later

"We were very comfortable having our customer work directly with the SafeGuard design staff," said Wallar. "We've worked with Plymouth Foam on a number of projects and they are a leader in cost-effective design innovation."



## Performance

In the final analysis SafeGuard was able to deliver the desired results:

- A better performing protective solution at a reduced cost. When the cost of the production mold is amortized over five years, the 50% cost reduction goal is achieved.

- Simplified inventory management. The previous protective components consisted of 10 to 12 corrugated inserts and fabricated polyethylene pieces and a pallet, depending on the particular drive. SafeGuard was able to standardize the protective SKU across all drives and reduce the number of protective pieces per drive from 10-12 to five (two molded foam pieces, two corrugated trays and a pallet).

- An easy to handle protective product, delivered on a timely basis to Midwestern Container in truckload quantities (400 sets per truck). Midwestern then delivers a daily supply to the drives manufacturer.

## Product Specs

- Two EPS molded corner units that break into four corner pieces, with each piece fitting over two corners of the drives

- Each piece, though approximately the same size (14" x 20.5" x 9.625"), has different contours to fit snugly over the corners of 10 drives of varying sizes, each with a series of fixtures and protrusions.

- 2.0 lb. density EPS

- Used in conjunction with a Pallet, slip sheet, and a half corrugated top box, all banded to the pallet

## Other Applications for SafeGuard Protective Packaging

SafeGuard shape molded products are often used for applications that require three-dimensionally shaped and contoured foam protection. Because a custom mold must be produced, shape molded solutions are more appropriate for high volume quantities where the mold cost can be absorbed over time. Consumer and commercial appliances and electronics are two product types where the EPS molded process is often used.

The drives project review displays the depth of the custom shape-molded development process, the intricate challenges that are often involved, and the great efficiencies that can be realized with effective design.



**SafeGuard** Protective Packaging

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