

## **Gill Athletics, Inc.** **Soft Vault Box**

“Shamrock Plastics was instrumental and extremely helpful in bringing our soft vault box to market in a timely manner”

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- > **Problematic cover delays product introduction.**
- > **Experience and collaboration prevail.**
- > **Fewer pole vault injuries anticipated.**

### **Issue presented to the Shamrock team.**

Gill Athletics, the world's largest provider of track and field equipment wanted to improve overall safety of the pole vaulting experience. Until recently pole vault boxes were all made of steel or aluminum and a fall into the box by a vaulter in many cases resulted in injury or even death. In response to this Gill helped to develop and wanted to manufacture a “soft” vault box and in doing so minimize injuries. The box consisted of a fiberglass base lined with a proprietary and unique cushioning product developed by a partnering company and topped with a polyethylene, plastic protective cover.

### **The problem.**

Gill tried twice to outsource the plastic cover but could not get a flat cover because of polyethylene's propensity to warp and a flat cover was a necessary requirement. Secondly, when the new cover was tested at both Gill's vault facility and at Purdue University the cover developed cracks in the bottom seam area.

### **The solution.**

Shamrock Plastics has had many years experience with vacuum forming polyethylene material and we knew that we could solve Gill's problem. Some

of the things we did to produce a flat cover, which means eliminating or at least minimizing the amount of warp, were to build an aluminum mold that is sand blasted for better material adhesion, cut a channel around the perimeter of the mold to draw the material flat, run a longer cooling cycle to speed up the shrinkage process and finally place the newly formed part on a cooling rack with weights for a period of time. It worked and Gill was happy with the part. However, while testing the new covers cracks developed. With much collaboration between Jeff Watry, Gill's VP of Engineering, and Shamrock personnel it was determined that the most probable cause of the cracking was the high impact of the pole at the seam between the bottom and back surfaces of the box and that a more generous radius would more evenly distribute the impact. The mold was modified and more test covers produced. With additional testing, cracks still appeared but much higher up on the cover. As a result, we again modified the mold to add radii on both vertical seams adjacent to the one we had already modified. From that point on the covers tested beautifully.

### **The outcome.**

Gill is now able to manufacture, market and sell a quality, state of the art vault box that is safer than any other. The soft vault box is being recommended by various high school and college sanctioning organizations and has been certified by the IAAF (International Association of Athletic Federations). How much safer is it? Pole vault landing surfaces are tested using a device that simulates the impact of an athlete's head and measures the shock of impact. One important measurement used to rate surface performance is “G-max”, which measures the maximum shock produced by an impact. For example, at a height of 20 feet, the soft vault box yields a G-max of only 163, substantially below the 200 G maximum for safety. Incredibly, landing on a standard vault box yields a G-max of more than 500 at a fall height of just six inches.