THERMOFAB
A PRODUCTO GROUP COMPANY

Performance Under Pressure: Titleist Hits Hole in One with New Launch Monitor®

Sleek Enclsoure Protects Launch Monitor's Sensitive Internal Equipment and Enhances Titleist Brand

Challenge – Protect Sensitive Electronics

The Titleist Launch Monitor® (TLM®) is a diagnostic tool that analyzes a golfer's swing. With this data, equipment changes can be recommended to help improve the golfer's game based on his or her current swing. TLMs make the rounds of golf courses—from New England to Florida to Arizona. Often packed in cars or vans, the launch monitor's plastic housing needs to protect the delicate digital cameras and other computer components inside from extreme temperatures found in the environment and inside vehicles.

The original prototype for the most recent version of the Titleist Launch Monitor was made from cast urethane. While urethane works well for prototypes and trade show models, it cannot meet the demands of fluctuating temperatures, specifically extreme heat. Despite this fact, production began, and urethane was used. The resulting TLM could not withstand the grueling summer weather.

Solution – Right Materials Provide Heat-Resistance

Massachusetts-based Acushnet Company, which owns the Titleist brand, brought in Carroll Design, based in Lowell, Mass., to finish the CAD models for the TLM. Carroll Design then referred the project to ThermoFab to correct the issue with the material and process used in the prototype. "One of the biggest challenges that the Titleist housing presented was arriving at a cost-effective solution at small initial volumes," said Steve Johnson, president of Carroll Design. "I approached ThermoFab with these requirements as I was aware of their reputation for experience with a variety of materials that could solve the problems with Titleist's high-profile project – and I wasn't disappointed."

Urethane has limitations in terms of heat resistance, and it became obvious that it was a poor choice from the beginning. In the new prototype, which ultimately led to the product that's currently in use, ThermoFab chose to pressure form the parts using KYDEX® V103 (UL Std. 94 5V), a fire-retardant thermoplastic sheet.

Pressure forming is preferable to vacuum forming because custom plastic enclosures often require features that cannot be achieved by vacuum forming alone. For smaller volume runs, pressure forming offers injection-molded quality and details. The pressure applied (up to 100 pounds per square inch) is approximately five times higher than with vacuum forming, which makes it possible to obtain highly detailed parts and textured finishes. Pressure forming uses air pressure to achieve intricate detail on the mold side and a higher quality finish that leads to sharp edges, undercuts, and other close tolerance details.

ThermoFab used its 5-axis computer numeric controlled (CNC) router for the 3-dimensional machining. The 5-axis machine allows for the most complex finishing to take place with one set-up, which saves significant time by eliminating additional fixturing and set-up for secondary operations. ThermoFab used the 3D model supplied by Carroll Design to cut the tools and trim the parts, and then the three main monitor parts were bonded together using adhesive called Plexus MA300.

The parts were then painted with Urachem, a two-component polyurethane enamel, which can be textured or applied as a smooth coat. Urachem is extremely resilient in myriad weather conditions and can be color matched. To this end, ThermoFab took a metal Titleist golf club and matched the color of the club's head to the color of the Urachem used on the TLM.

After assembling the product, ThermoFab used its coordinate measuring machine (CMM) to ensure the dimensions matched those of the 3D file. In addition, it conducted drop tests from a height of three feet to check for joint strength and the durability of the structure.

Result

A product that performs well under pressure…and looks great. Thanks to ThermoFab's choice of materials and manufacturing process, the Titleist Launch Monitor can withstand extreme weather conditions, such as heat, while still maintaining the cool, professional image that Titleist is known for.