

THE PROVEN ADVANTAGE

of High-Performance Composites in Military and Aerospace Applications

TOTAL SYSTEMS APPROACH

With over 50 years of experience, we are the largest North American developer, formulator and manufacturer of thermoset compounds and thermoset molded parts.

We serve a broad range of industries including transportation, electrical, HVAC, construction, industrial equipment, heavy truck, aerospace and military. Customers served in these industries include Eaton, Rockwell, United Technologies, General Dynamics, GE, Lockheed Martin, Textron, Northrop Grumman, BAE Systems, Raytheon, and Boeing.

We have the widest range of commercial composite materials including Sheet Molding Compounds (SMC), Bulk Molding Compounds (BMC), Thick Molding Compounds (TMC) and Engineered Structural Composites (ESC).



F-22 & JSF – 20 mm Ammunition Cartridge Guides



Project Objective:
Develop two sets of complex parts with curved vertical walls that form the channels through which ammunition rounds travel. Also to match the thermal properties of the container's carbon/epoxy pre-preg side panels and meet specific weight restrictions.



Lytex 4149 Carbon Fiber Epoxy Engineered Structural Composite offered superior wear resistance, compared

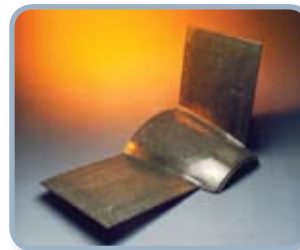
to metals, and provided better vibration damping and fatigue resistance when jarred by ammunition rounds cycling at high speed through each guide.

Benefits:

- Lightweight
- Design flexibility
- Part count reduction
- Reduction in secondary operations
- Dimensional stability



Paveway iii Fairing



Project Objective:
To lower weight and reduce cost while meeting critical performance requirements at elevated temperatures. Vinyl Ester structural molding compound, QC-85600D was chosen to replace the original aluminum die-cast parts.

Benefits:

- Thermo-oxidative stability
- Mechanical strength at 250°F
- Selected over aluminum casting for cost savings

120 mm Mortar Round Mono Pack Container

Project Objective:
To develop a lightweight packing system for the 120 mm mortar ammunition in support of the Army's goal of transformation to a smaller and lighter force with the ability of rapid deployment with overwhelming power.



Benefits:

- Single man-portable (existing system required two soldiers)
- 62% weight reduction
- Design flexibility
- More efficient handling
- 100% compatible with existing and future mortars
- Part count reduction
- Quicker access to round

M-4 & M-16 Hand Guards



Project Objective:
A glass-reinforced hybrid polyester thermoset material was developed to provide an improved solution over the incumbent phenolic material. In addition to improved mechanical performance, a fiber flow and warpage problem was removed.

Benefits:

- Good impact strength
- Low gloss finish
- Lightweight
- Fire resistant
- Thermal management



Our experience with High-Performance Composite (HPC) materials and processes offers many benefits ...

■ **Design Flexibility**

The ability of HPC materials to be molded into complex shapes offers designers the freedom to create geometry which is difficult or impossible to achieve via typical metal fabrication or casting processes. This benefit gives rise to the potential to **consolidate parts and simplify assembly**.

■ **High Strength-to-Weight Ratio**

HPC materials exhibit exceptional strength and stiffness given their low density relative to aluminum and steel, enabling designers to achieve stringent performance criteria while in parallel **reducing component weight**.

■ **Noise and Vibration Reduction**

HPC materials demonstrate outstanding damping properties versus metals, enabling a **reduction in Noise, Vibration, and Harshness (NVH) characteristics** without the need for supplemental insulation or costly sound deadening coatings.

■ **Low- and High-Temperature Performance**

HPC materials exhibit a relatively **flat property response over a wide temperature range**. This attribute results in reliable performance in virtually any service temperature environment.

■ **Cost Reduction**

HPC materials leverage multiple advantages to deliver a **lower cost-per-cubic inch versus aluminum or steel** in a variety of applications and environments.

■ **Corrosion Resistance**

HPC materials are inherently **resistant to a variety of corrosive agents**. This characteristic eliminates the need for expensive coating processes required of metal components in harsh service environments.

OUR TOTAL SYSTEMS APPROACH

Part Design
Structural Analysis
Materials Development
Mold Design and Construction
Production Molding
Total Project Management



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