



## » PROCESS OVERVIEW

# Overmolding with Polystrand™ Continuous Fiber Reinforced Thermoplastic Composites

## Processability Meets Performance

Polystrand™ advanced thermoplastic composites combine high strength, unidirectional, continuous fibers with engineered thermoplastic resins to create continuous fiber reinforced thermoplastic (CFRTP) materials that feature exceptional strength-to-weight ratio and high impact resistance.

Overmolding integrates Polystrand tapes and multiply laminates into traditional thermoplastic molding processes, such as injection and compression molding, to create locally-reinforced, molded components.

**Overmolding with Polystrand CFRTP can enhance the performance of traditional thermoplastics or enable metal replacement in a wide range of applications.**

### Improve performance, enhance your capability

- Meet higher performance requirements with thermoplastic materials
- Reduce part weight
- Achieve rapid cycle times
- Differentiate with expanded manufacturing and product performance capabilities

Dramatically increasing impact resistance and stiffness of molded components—without adding significant weight—means that OEMs can meet increasingly demanding application requirements. For molders, incorporating CFRTP overmolding capabilities expands their product offering, opening the door for increased market share.



Read the Rome Snowboard Binding Case Study [bit.ly/34PG0a6](https://bit.ly/34PG0a6)

**Incorporating Polystrand CFRTP reinforcement in molded thermoplastic components** combines the design flexibility and fast cycle times of traditional molding with the strength, stiffness, and lightweighting benefits that composites offer, all with the use of standard processing equipment.

## OVERMOLDING WITH POLYSTRAND CFRTP

### INJECTION/COMPRESSION MOLDING

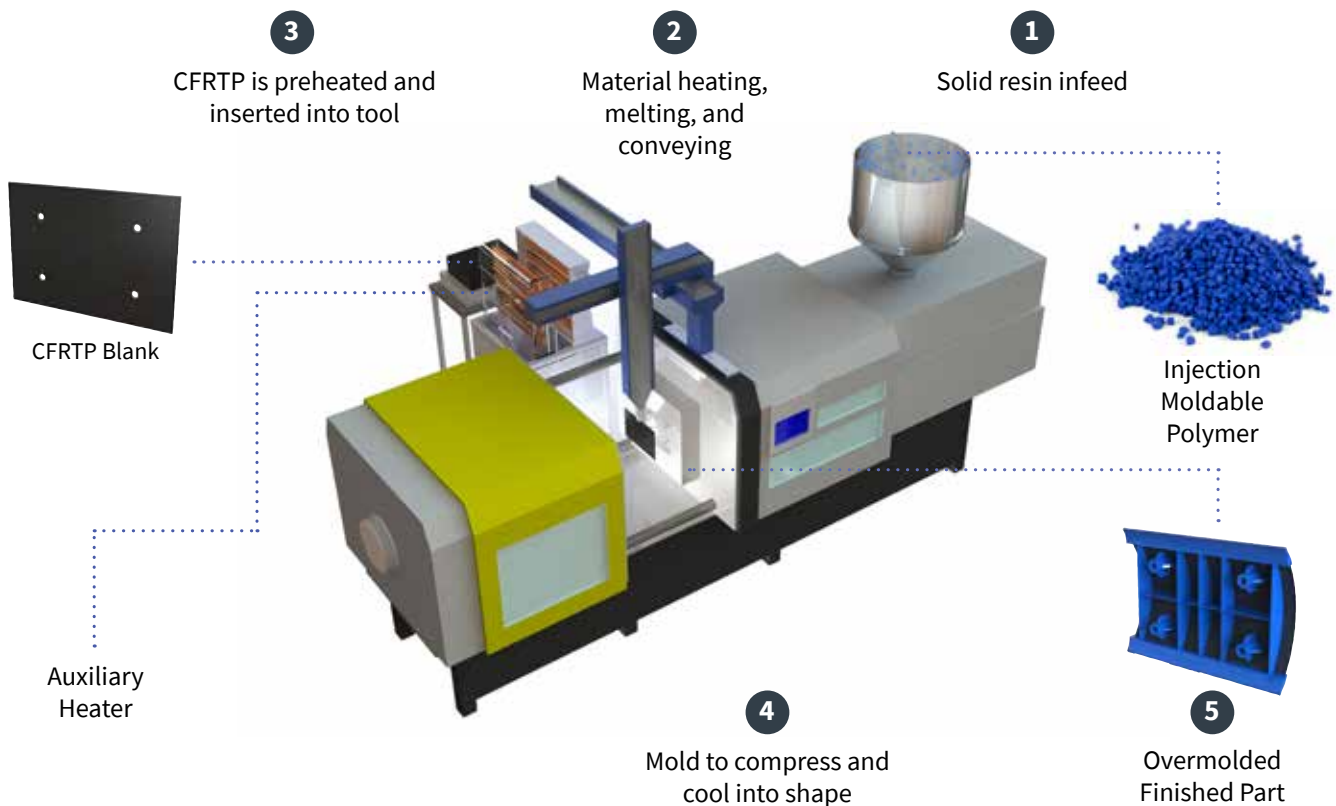
- Design flexibility
- Complex shapes
- Fast cycle times

### POLYSTRAND CFRTP

- Impact resistance
- Strength & stiffness
- Light weight

## PROCESS DESCRIPTION

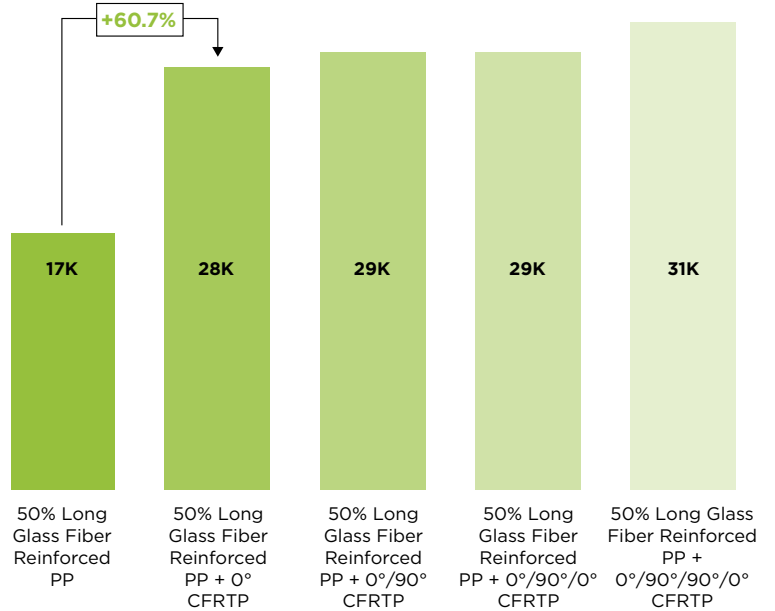
Polystrand CFRTP materials are integrated into the molding process in a few simple steps, allowing you to add lightweight, localized reinforcement without compromising cycle times or shape complexity.



# Increase strength and impact resistance. Enable thinner, lighter part design.

Traditionally, molding with short and long glass-filled polypropylene to gain flexural performance over unfilled polypropylene also results in a loss of impact resistance. As illustrated here, molding with continuous fiber reinforced composites enables **improved flexural performance** over filled polypropylene as well as **increased impact resistance** and **overall weight reduction**. The result? Game-changing design freedom achieved through improved stiffness and strength combined with thinner, lighter part design.

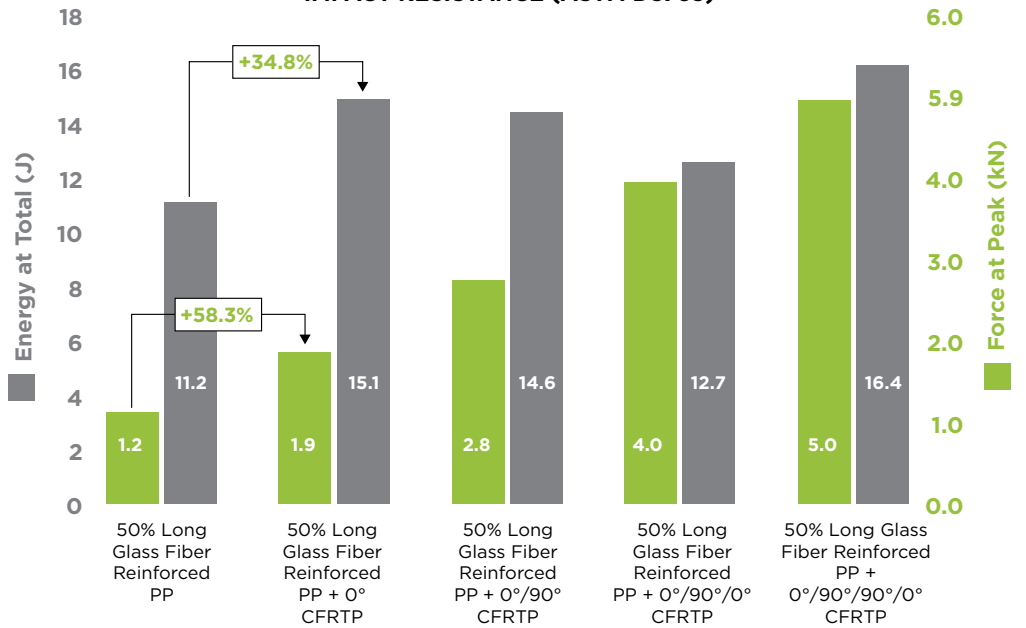
**FLEXURAL STRENGTH (ASTM D7264)**



With a single layer of Polystrand CF RTP:

- Flexural strength increases more than 60%
- Total energy absorbed on impact improves by nearly 35%
- Peak force at puncture increases over 58%

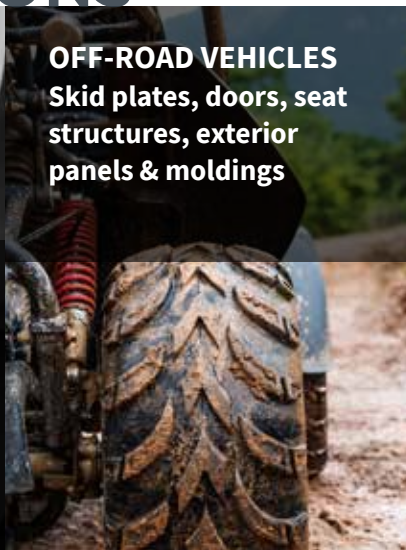
**IMPACT RESISTANCE (ASTM D3763)**



## APPLICATIONS



**ON-ROAD TRANSPORTATION**  
Underbody shields, underhood enclosures, interior components, storage



**OFF-ROAD VEHICLES**  
Skid plates, doors, seat structures, exterior panels & moldings



**MARINE**  
Hull reinforcement, seats, paddles



**SPORTING GOODS**  
Boots, bindings, protective equipment

## WHEN YOU WORK WITH Avient

From concept to component, you can leverage Avient's expertise throughout the development cycle in three key areas: Materials, Processing & Design

### MATERIALS

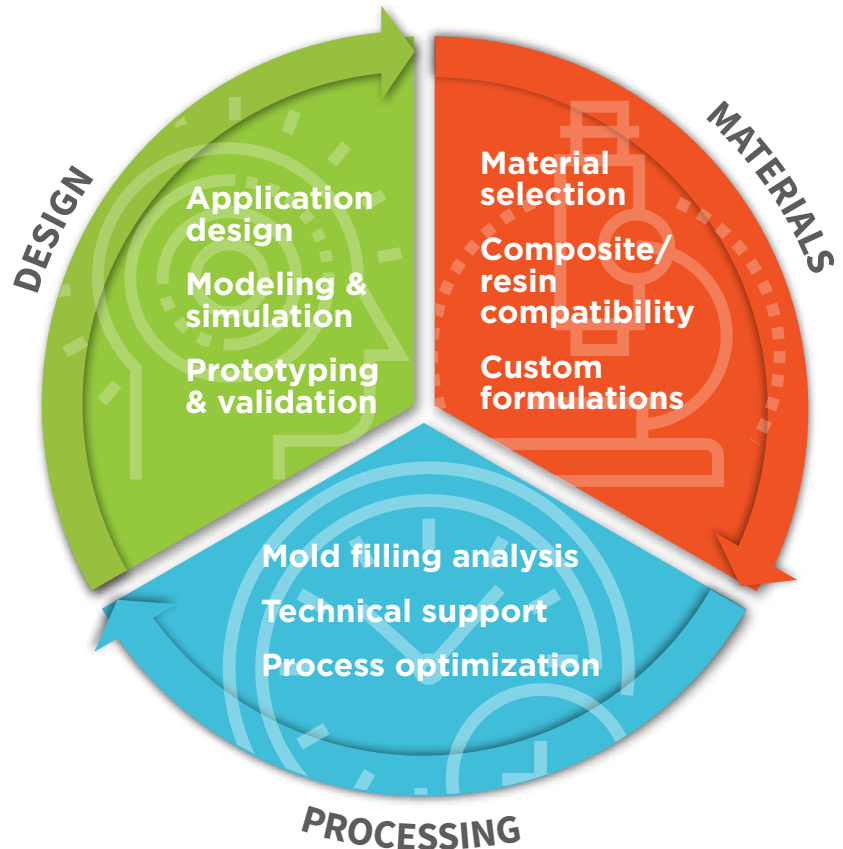
Material selection is crucial to an application's success. From resin formulations to composite matrix and fiber configurations, we can help you develop the combination that will meet your specific needs.

### PROCESSING

While selecting the right material combination is critical, understanding how to process the materials is equally important. We can help you optimize your process—including via hands-on testing and trials at our Denver-based **Composites Innovation Cell**—to achieve targeted part performance.

### DESIGN

Finally, when creating a component that will meet your application requirements efficiently and economically, it's important to consider design early in the development process. With a comprehensive approach combining application engineering and industrial design, our technical and design experts will work with you to accelerate your process from concept to finished component.



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