

➤ OVERVIEW

# AVIENT ADVANCED COMPOSITES





# ADVANCED COMPOSITES

An exceptional alternative to traditional materials such as wood, ceramic and metal, advanced composite solutions enable designers to:

- **Design lighter weight structural components for increased lifetime performance and improved fuel efficiency**—higher strength-to-weight ratios to exceed the structural performance of traditional materials while significantly reducing weight—up to 75% lighter than steel and up to 25% lighter than aluminum
- **Extend product lifetime to reduce part replacement and decrease warranty expenses**—the corrosion, weather, flame and fatigue resistance of composite solutions improve component durability
- **Reduce product lifecycle costs**—the extended product lifetime, along with the potential for reduced installation time and cost due to the lighter weight of composite solutions, significantly reduces the associated cost over the lifetime of a part
- **Lower energy costs**—by leveraging a higher strength-to-weight ratio, composite solutions allow designers to engineer products that require less energy or power during installation and use
- **Increase competitive advantage**—Avient advanced composite solutions can be customized to provide electrical insulation, thermal insulation, radiopacity, low thermal expansion, flexural memory and load damping, while delivering desired performance and aesthetic specifications

## DESIGN STRONG, LIGHTER WEIGHT COMPONENTS

Up to 75% lighter than steel and up to 25% lighter than aluminum

## EXTEND PRODUCT LIFETIME

Corrosion, flame, fatigue and UV resistant for improved durability

## REDUCE PRODUCT LIFECYCLE COSTS

Lower installation time, as well as warranty and part replacement expenses

## LOWER ENERGY COSTS

Requires less energy during installation and use

## INCREASE COMPETITIVE ADVANTAGE

Customizable solutions for specific application needs

# USES & APPLICATIONS

The Avient advanced composites portfolio offers customized solutions to serve a full range of markets and industries, including:



## TRANSPORTATION

Truck floors, liners and aerodynamic components, rail car doors and panels, automotive structural solutions, leaf springs, traffic safety markers and delineators, air cargo unit load devices (ULDs)



## BUILDING & CONSTRUCTION

Structural blast protection, garage doors, modular construction, temporary shelters, architectural columns, concrete and masonry reinforcements, pipe reinforcement



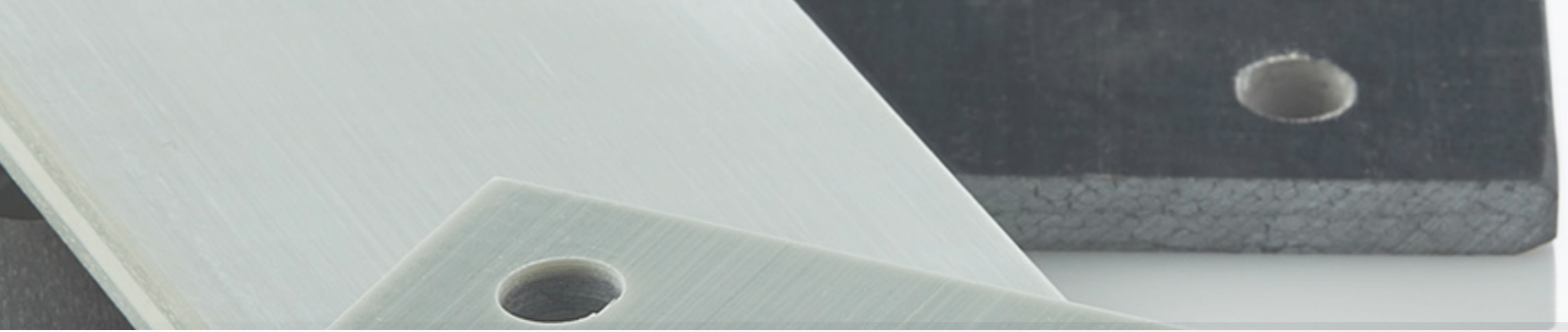
## ENERGY

Wind turbine blade stiffening components, sucker rods, oil & gas production solutions



## HEALTHCARE

External orthopedic fixators, endoscopy wands, prosthetics



## CONSUMER & RECREATION

Archery bow limbs and risers, furniture springs, diving board springs, golf flagpoles, snowsports equipment, sporting stick shafts, paddle shafts, lightweight and extendable mast structures



## ELECTRICAL & TELECOMMUNICATIONS

Utility poles and cross-arms, high voltage transmission & distribution insulator cores, surge arresters, bus bar covers and electrical tool components



## INDUSTRIAL

Pallet stiffeners, pipe reinforcement, conveyor springs, dock shelters



## MARINE

Panels for decking, bulkheads, cabinets, doors, transoms, ceilings; reinforcements for stringers; sail battens

# PROCESSES & CAPABILITIES

Avient's reinforced composite technologies use carbon, glass and aramid fibers with custom formulated thermoset or thermoplastic resins in continuous forming processes. These methods include:

## **PULTRUSION**

- Fibers are impregnated with liquid thermoset resins, then pulled through a heated die to cure the resin and form the product
- This continuous, automated manufacturing process creates constant cross section profiles of any pre-determined length with consistent, uniform quality and exceptional mechanical performance
- Applications include rods and profiles of various lengths and complexities, such as utility poles, insulator core rods and structural beams

## **CONTINUOUS FILAMENT WINDING**

- Combines the principles of filament winding with pultrusion to create constant or tapered cross-sectional tubing in precision sizes
- The unique axial and biaxial fiber orientation provides flexural and tensile strength, as well as crush and burst resistance
- Applications include lightweight shelter frames and sporting goods components

## **CONTINUOUS RESIN TRANSFER MOLDING (CRTM™)**

- Engineered core materials are sandwiched between structural composite laminate face sheets
- Continuous composite sandwich panels feature high specific strength and stiffness-to-weight ratio
- Applications include ballistic resistant panels, truck floors and rail car doors

## **CONTINUOUS FIBER REINFORCED THERMOPLASTICS**

- Fully recyclable tape, X-Ply™ (0°/90°), and other multi-ply configurations with widths up to 10' wide
- Sandwich panels in unlimited lengths, up to 6" thick and 10' wide
- High volume production capacity
- Applications include structural and aerodynamic components in transportation, and reinforcement of materials such as wood and metal

## **THERMOSET COMPOSITE LAMINATES & BARSTOCK**

- Unidirectionally reinforced barstock, laminates and hybrid composites engineered to maximize deflection and fatigue resistance
- Customizable shapes and sizes
- Applications include archery bow limbs, flat springs, prosthetics, sporting equipment

## **THERMOSET FINISHING OPERATIONS**

- Customized finishing capabilities for barstock and laminates including machining, water-jet cutting, profiling/shaping, sanding, slitting, laminating, molding and coatings

## **TESTING CAPABILITIES**

- Mechanical – Flexural, tensile, compression, shear, fatigue, impact resistance
- Physical – Specific gravity/density, Barcol hardness, water absorption, void content, resin/fiber content, dye penetrant, viscosity
- Thermomechanical – Coefficient of linear thermal expansion, glass transition temperature, deflection temperature, degree of cure, curing properties
- Electrical – High-voltage, low current dry arc resistance of solid electrical insulation, dielectric strength, water diffusion

## **ABOUT AVIENT ADVANCED COMPOSITES**

The Avient advanced composites portfolio consists of Glasforms™, Gordon Composites™ and Polystrand™ branded materials. This leading-edge product offering of high performance alternatives to typical fiber reinforced composites and traditional materials such as wood, ceramic and metal serves applications requiring high strength-to-weight ratios, stiffness, and dimensional stability. Avient's designers and engineers formulate and manufacture customized solutions to meet the technical and structural demands of design across a broad range of market applications.

**To learn more about Avient advanced composite solutions, call +1.844.4AVIENT  
or visit [www.avient.com/composites](http://www.avient.com/composites)**



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