

GP[®] FRP COMPOSITE RESINS

Proven Products for High Temperature and
Fire-Resistant Applications

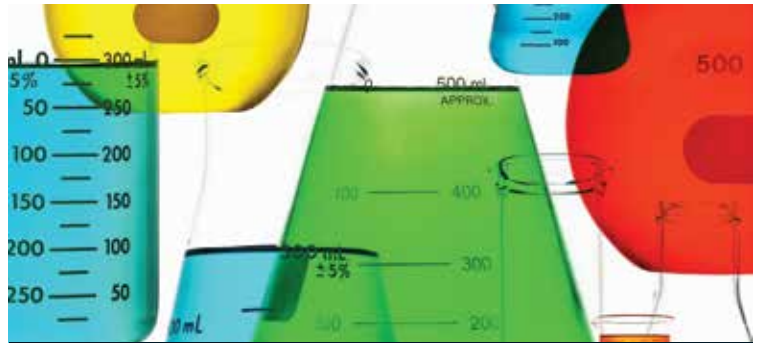


Composites of Fiber-Reinforced Polymers (FRP) are used to replace steel, aluminum, and wood in a wide range of applications from ballistics to ducting. They offer numerous advantages over these materials - lower density, lighter weight, better corrosion resistance, strength, and durability. Composites' inherent fire resistance, strength, and ability to withstand high temperature environments with less weight than those materials have made them the product of choice for firesafe piping, mining ventilation systems, and armored vehicles. In public transportation, they are used in aircraft interiors, firesafe railcar and bus parts, passenger decking and walkways.

Georgia-Pacific Chemicals products are used around the globe as a primary component of FRP composites in applications ranging from mass transit to oil rigs to aerospace. We bring decades of experience and a portfolio of proven phenolic products from which to choose the properties needed for pultrusion, sheet and bulk molding compounds (SMC/BMC), hand lay-up/spray-up resin transfer molding (RTM), vacuum infusion, filament winding, honeycomb and glass fiber and carbon fiber prepreg applications. Parts made from GP resins systems have passed United States, British and International Maritime Organization Standard Fire tests or meet Military Specification MIL-R-9299C requirements.

The products in this brochure represent many of our off-the-shelf products. Some of our products are used with resin systems that include a GP catalyst. For example, GP® 012G23 catalyst can be used with these resins as a base accelerator to improve cure speed.

We know that every application is different. Our knowledge of these resins provides us the foundation for helping you to assess the product that will be right for you.

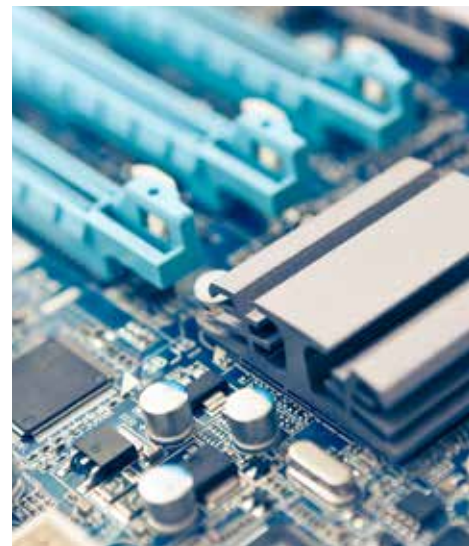


GP Resins Applications and Fitness

<h3>PULTRUSION</h3>	<p>Can process on traditional polyester pultrusion equipment.</p> <p>Styrene-free.</p> <p>Thermally cured.</p>
<h3>SHEET AND BULK MOLDING COMPOUNDS (SMC/BMC)</h3>	<p>Resistance to hydrocarbon and chlorinated solvents.</p> <p>Viscosity, processing and cure properties that can avoid special processing or equipment adjustments.</p>
<h3>HAND LAY-UP AND RESIN TRANSFER MOLDING (RTM)</h3>	<p>Parts made from many GP resins meet requirements of United States, British, and International Maritime Organization Standard Fire Tests.</p>
<h3>HONEYCOMB AND PREPREG</h3>	<p>Resins for Nomex® and Kevlar® honeycomb, glass and carbon fiber prepregs.</p> <p>Solventborne and waterborne resins.</p> <p>Parts made from many GP resins meet requirements of United States Military Specification MIL-R-9299C and MIL-DTL-64154B requirements.</p>
<h3>FILAMENT WINDING</h3>	<p>Latent catalysts to produce a pot life equal to that of a polyester mix while maintaining cure speed.</p> <p>Typical resin cure temperatures are 65°C to 95°C.</p> <p>After curing, pipes demonstrate strength, dimensional stability, and glass transition temperature (Tg) from 120°C to 220°C. Higher Tg is possible.</p>

Product	Category	Sample Applications	Characteristics of Parts	Non-Volatiles @ 135°C, %	Viscosity, @25°C, cps	Solvent/ Water %
GP 5236	PREPREG	Aircraft interiors, armored vehicles, ballistics, composites, firesafe construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components.	<ul style="list-style-type: none"> • Low smoke generation • Strength • Fire resistance • Meets the requirements of Military Specification MIL-R-9299C, Type II, Class 2 Grades A & B and Military Specification 64156B. 	60–65	300–800	Ethanol
GP 5236M	PREPREG	Aircraft interiors, armored vehicles, ballistics, composites, firesafe construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components.	<ul style="list-style-type: none"> • Low smoke generation • Strength • Fire resistance • Meets the requirements of Military Specification MIL-R-9299C, Type II, Class 2 Grades A & B and Military Specification 64156B. 	60–65	300–800	Methanol/ Ethanol
GP 5236H	PREPREG	Aircraft interiors, armored vehicles, ballistics, composites, firesafe construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components.	<ul style="list-style-type: none"> • Low smoke generation • Strength • Fire resistance 	68–72	1,000–2,000	Methanol/ Ethanol
GP 7600	PREPREG	Aerospace, aircraft interiors, composites, firesafe construction materials, high-temperature applications, laminates.	<ul style="list-style-type: none"> • Low smoke generation • Strength • Fire resistance 	73–75	500–1,000	Water
GP 7624	PREPREG HONEYCOMB	Fiberglass honeycomb, composites, aerospace.	<ul style="list-style-type: none"> • Post-formability • Low smoke generation • Fire resistance 	56–62	500–1,500	Isopropanol (IPA)

Product	Category	Sample Applications	Characteristics of Parts	Non-Volatiles @ 135°C, %	Viscosity, @25°C, cps	Solvent/ Water §
GP 7648	HONEYCOMB	Aircraft interiors, composites, firesafe railcar and bus parts and construction materials, high-temperature applications, laminates.	<ul style="list-style-type: none"> • Low smoke generation • Strength • Fire resistance • Meets the requirements of Military Specification MIL-R-9299C, Type II, Class 2 Grade A. 	64–68	100–200	Water
GP 445D05	HONEYCOMB IMPREGNATING RESIN	Aircraft interiors, armored vehicles, ballistics, composites, firesafe construction materials, laminates.	<ul style="list-style-type: none"> • High temperature resistance • Low smoke generation • Fire resistance • Strength • Meets the requirements of Military Specification MIL-R-9299C, Grade A. 	64–68	500–1,000	IPA
GP 582D58	SMC/BMC	Automotive parts, mass transit, aircraft interiors.	<ul style="list-style-type: none"> • Fire resistance • Low smoke generation • High strength and modulus properties 	74–78	800–1,600	Water
GP 486G34	HAND LAYUP, RTM	Composites, firesafe bus and railcar parts, firesafe construction materials, firesafe walkways, high temperature applications, laminates, passenger platform decking.	<ul style="list-style-type: none"> • Low smoke generation • Fire resistance • Strength 	71–75	350–750	Water
GP 5018	FILAMENT WINDING, HAND LAYUP, RTM	Mining ventilation ducts, composites.	<ul style="list-style-type: none"> • Fire resistance • Low smoke generation • Flexibility 	70–76	800–1,400	Glycol/ Water



Product	Category	Sample Applications	Characteristics of Parts	Non-Volatiles @ 135°C, %	Viscosity, @ 25°C, cps	Solvent/ Water §
GP 145K26	FILAMENT WINDING, VACUUM INFUSION, HAND LAYUP, RTM	Aerospace, firesafe construction materials, composites, mass transit.	<ul style="list-style-type: none"> • Low smoke generation • Fire resistance 	68–72	150–350	Water
GP 677D60 with GP 4840 catalyst	COATING RESIN	Aircraft composite part repair.	<ul style="list-style-type: none"> • Fire resistance 	78–82	3,000–6,000	Water
GP 161G66	PULTRUSION	High temperature applications, composites, firesafe railcar parts, walkways, passenger platform decking, offshore oil rig grating.	<ul style="list-style-type: none"> • Low smoke generation • Fire resistance 	72–76	1,500–2,000	Methanol

§ Contact Georgia-Pacific Chemicals for your specific solvent requirements

Georgia-Pacific Chemicals recommends the use of a catalyst with many of our resins. Parts characteristics are contingent on proper application of the GP resins.





1-866-4GP-CHEM
(447-2436)

www.gp-chemicals.com

Why Work with Georgia-Pacific Chemicals?

Our customers tell us four things make us different from other chemical suppliers.

- **EXPERTISE** – Experts in phenolic resin chemistry tied to a proven line of products.
- **RESOURCES** – Analytical and technological capabilities to help you assess the best products to meet your needs.
- **RELIABILITY** – Consistent, dependable quality.
- **INNOVATION** – A diverse line of innovative products designed for performance and value creation.



Georgia-Pacific
Chemicals

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