

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. They offer numerous advantages over these materials - lower density, lighter weight, better corrosion resistance, 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 fire-resistant piping, mining ventilation systems, and armored vehicles. In public transportation, they are used in aircraft interiors, fire-resistant railcar and bus parts, passenger decking and walkways.

Georgia-Pacific Chemicals resins are used around the globe as a primary component of FRP composites in applications ranging from mass transit to oil rigs to aerospace. Increasingly they are being used in the fast-growing electric vehicle battery market and other electronic and circuit board industries. We bring decades of experience and a portfolio of proven phenolic products from which to choose the properties needed for the specific application. Parts made from GP[®] resin systems have passed United States, British and International Maritime Organization Standard Fire tests or meet Military Specification MIL-R-9299C requirements.

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 resin knowledge provides us the foundation for helping you to assess the product that will be right for you. The products in this brochure represent many of our off-the-shelf products but our goal is to meet the requirements of your specific application so contact us if you have other needs.

GP Resins Applications and Fitness	
PULTRUSION	Can process on traditional polyester pultrusion equipment. Styrene-free. Thermally cured.
SHEET AND BULK MOLDING COMPOUNDS (SMC/BMC)	Resistance to hydrocarbon and chlorinated solvents. Viscosity, processing and cure properties that can avoid special processing or equipment adjustments.
HAND LAY-UP AND RESIN TRANSFER MOLDING (RTM)	Parts made from many GP resins meet requirements of United States, British, and International Maritime Organization Standard Fire Tests.
HONEYCOMB AND PREPREG	Resins for aramid fiber honeycomb, glass and carbon fiber prepregs. Solventborne and waterborne resins. Parts made from many GP resins meet United States Military Specification MIL-R-9299C and MIL-DTL-64154B requirements.
FILAMENT WINDING	Latent catalysts to produce a pot life equal to that of a polyester mix while maintaining cure speed. Typical resin cure temperatures are 65°C to 95°C. After curing, pipes demonstrate strength, dimensional stability, and glass transition temperature (Tg) from 120°C to 220°C. Higher Tg is possible.
VACUUM INFUSION	Vacuum used to infuse/pull atmospheric (not under pressure) resin into a dry reinforcement, wetting the fibers and producing high quality parts. Usually used with a catalyzed resin, such as epoxy.



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, fire-resistant construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components, custom molding compounds for rocket nozzles, automotive electrical parts, specialty electrical and electronic molded parts.	<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, fire-resistant construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components, custom molding compounds for rocket nozzles, automotive electrical parts, specialty electrical and electronic molded parts.	<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 • Meets industry-accepted tests for surface flammability, smoke density & toxic gas generation: ASTM E162, ASTM E662, BSS 7239 	60–65	300–800	Methanol/ Ethanol
GP 5236H	PREPREG	Aircraft interiors, armored vehicles, ballistics, composites, fire-resistant construction materials, high temperature applications, laminates, missile and aircraft structural components and insulation, circuit board components, custom molding compounds for rocket nozzles, automotive electrical parts, specialty electrical and electronic molded parts.	<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 • Same properties as GP 5236M but with higher processing viscosity 	68–72	1,000–2,000	Methanol/ Ethanol
GP 7600	PREPREG	Aerospace, aircraft interiors, composites, fire-resistant 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)
GP 7649	PREPREG, HONEYCOMB	Abrasives; fire-resistant construction materials, railcar parts, bus parts; aircraft interiors; composites; air conditioning and mining ventilation systems; high temperature applications.	<ul style="list-style-type: none"> • Low smoke generation • Fire resistance • Strength • Flame resistance • Meets the requirements of Military Specification MIL-R-9299C, Type II, Class 2 Grades 	64–67	100–200	Water

Product	Category	Sample Applications	Characteristics of Parts	Non-Volatiles @135°C, %	Viscosity, @25°C, cps	Solvent/ Water §
GP® 5403	PREPREG, HONEYCOMB	Rocket nozzles, composites, aircraft interiors, carbon components, fire-resistant construction materials, fire-resistant bus and railcar parts, abrasives.	<ul style="list-style-type: none"> • Low smoke generation • Flame resistance • Strength • Fire resistance 	70–74	400–900	Water
GP 7648	HONEYCOMB	Carbon fiber components, aircraft interiors, composites, fire-resistant 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, fire-resistant 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 5432	IMPREGNATING RESIN	Carbon components, fiberglass laminates.	<ul style="list-style-type: none"> • Water soluble • Good carbon yield 	66–69	75–125	Water
GP 307135	IMPREGNATING RESIN, PREPREG	Aircraft interiors, fire-resistant construction materials, composites, high-temperature applications.	<ul style="list-style-type: none"> • Low smoke generation • Fire resistance 	60–63	150–300	Ethanol
GP 486G34	HAND LAYUP, RTM, VACUUM INFUSION	Carbon fiber for carbon parts, composites, fire-resistant bus and railcar parts, fire-resistant construction materials, fire-resistant walkways, high temperature applications, laminates, passenger platform decking.	<ul style="list-style-type: none"> • Strength • Meets industry accepted test methods for surface flammability, smoke density and toxic gas generation: ASTM E162, ASTM E662, BSS 7239 	71–75	350–750	Water



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GP® 5018	FILAMENT WINDING, HAND LAYUP, RTM	Mining ventilation ducts, composites, conduits for electrical wires.	<ul style="list-style-type: none"> • Fire resistance • Low smoke generation • Flexibility 	70–76	800–1,400	Glycol/ Water
GP 5022	FILAMENT WINDING, HAND LAYUP, RTM	Fire-resistant construction materials, mass transit, composites.	<ul style="list-style-type: none"> • Fire resistance • Low smoke generation • Strength • Classified F1 for British Mass Transit Fiberglass Laminates Qualification 	70–74	600–1,000	Water
GP 145K26	FILAMENT WINDING, VACUUM INFUSION, HAND LAYUP, RTM	Aerospace, fire-resistant 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	INTUMESCENCE BARRIER	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, fire-resistant 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
GP 5168	LAMINATING	Electrical components, aircraft interiors, composites, laminates, prepreg, fiber-reinforced polymers, fire-resistant construction materials, high temperature applications.	<ul style="list-style-type: none"> • High temperature resistance 	55–59	400–1,200	Methanol
GP 5006	ABRASIVE	Carbon components, abrasives.	<ul style="list-style-type: none"> • Adhesion 	75–79	2,600–3,400	Water
GP 213K47	SMC/BMC	Electric vehicle battery enclosures.	<ul style="list-style-type: none"> • Low smoke generation • Flame resistance* 	74–78	1,400–3,000	Water
GP 5546	SMC/BMC	Electric vehicle battery enclosures, synthetic carbon, molding compounds, abrasives.	<ul style="list-style-type: none"> • Short flow distance • Self-curing (Two-step) 	Not applicable	Not applicable	Powder Not applicable
GP 582D58	SMC/BMC	Electrical laminates.	<ul style="list-style-type: none"> • Flame resistance • Low smoke generation • Strength • Good carbon yield 	74–78	500–800	Water

§ Contact Georgia-Pacific Chemicals for your specific solvent requirements

* Not applicable on cellulose

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.

BREAKTHRU™ Technology to Reduce Free Formaldehyde

Reducing residual formaldehyde content in phenolic resins is a frequent request in composites and other industries. Phenolic resins used for industrial applications historically contain free formaldehyde levels ranging from 0.3 % to greater than 1.5 %. Reducing these levels can favorably affect plant emissions. BREAKTHRU™ technology has been shown to reduce free formaldehyde in phenolic resins to below 1000ppm or less than 0.1 %.

Analysis shows that free phenol levels can also be reduced with BREAKTHRU technology. Resins with BREAKTHRU technology have a faster curing profile. In addition, a honeycomb composite compressive strength study suggested BREAKTHRU technology may improve performance in honeycomb applications. BREAKTHRU technology is used in conjunction with GP® resins.

Not Just Resins

Our innovation doesn't stop with creative products that meet our customers' needs. Our exclusive Customer Inventory Tracking and Prediction service (CIT) is a technology solution that predicts resin usage to optimize plant operations. CIT utilizes a plant's digital level monitoring of its resin tanks and transforms the data, based on that plant's unique operations, into a dashboard to be used to optimize order profiles. Based on the previous two-week usage or as recent as one-hour usage, the system can recommend canceling, moving, or placing additional orders - predicting resin usage 12 days or beyond, as needed for optimal efficiency. Optional features of CIT include email alerts for order cancelation, tank cycling, projected inventory going below minimum or to zero, or a bad tank sensor. The service can help a plant to reduce working capital, downtime, quality issues related to tank rotation, and costs related to rushed and/or canceled orders.



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Effect on Free Formaldehyde Levels with BREAKTHRU™ Technology from Georgia-Pacific Chemicals

