

## Product Overview

RF FIBER is certified USDA biomass natural fiber. RF FIBER 's benefits to the reinforced plastic composites marketplace are numerous, and include:

- Improved Impact Strength and other physical properties,
- Styrene Suppression
- Weight Reduction,
- Reduce formulation costs,

## Market Focus

RF FIBER is well-suited for a variety of FRP processes and applications such as:

Continuous Panel	Spray-up	SMC/BMC	Press Molding
Filament Winding	Casting	Hand Lay-up	Pultrusion
Tooling	RTM	Prepreg	Linings/Coatings
Vacuum Bagging			

Architectural: Building Panels, Railing & Ladders, Light Poles, Columns, Stairways, Polymer Concrete, Facades, Baseboards, Roof Slates, Furniture, Doors, Window Frames, HVAC Ducting, Fascia Panels, Appliances, Molding, Floor Grating

Industrial: Tanks, Linings & Floorings, Pumps, Fans, Stacks, Buildings & Building Panels, Insulators, Duct, Domes & Covers, Scrubbers

Marine: Power Boat Hulls & Decks, Kayaks, Mooring Buoys, Sail Boats, Protective Coatings, Docks, Canoes, Fuel Tanks, Floats, Personal Watercraft, Mufflers, Gel Coats

Transportation: Body Filler, Seating, Bumper Beams, Body Panels, Truck Panels, Barge Covers, Truck Bodies & Cabs, Structural Parts, Mass Transit Cars

Consumer: Sinks, Counter Tops, Spas, Bowling Balls, Figurines, Statuary, Bathtubs & Showers, Cultured Marble, Fishing Rods, Solid Surface

## Compatibility

RF FIBER is compatible with most widely used resins. With the exception of resins that require elevated processing temperatures, or those few known to be hydroscopically sensitive.

## Sizes and Grades

RF FIBER is available in a variety of mesh sizes. RF FIBER 16, RF FIBER 16/50, RF FIBER 30/50, RF FIBER 50, RF FIBER 80

RF FIBER is available in 35 lb to 50 lb bags, Super Sacks and Container Cars

## Chemistry Makes The Difference

The unique chemical composition of RF FIBER enhances performance and cost savings. RF FIBER interacts chemically with the matrix resin. RF FIBER is very compatible with the unsaturated polyester chemistry. It wets well and offers [OH] sites for chemical coupling during polymerization. RF FIBER acts like a three-dimensional cross-link fence, linking the composite. This translates into better physicals in the finished product. RF FIBER is a unique micro-fiber with varying sizes of flakes, fiber and granular particles. The distribution of the varying size micro-fiber provides high packing factors. RF FIBER acts like little chemical “rebar”, reinforcing the composite. RF FIBER has a lower specific gravity (1.2) when compared to glass (2.5). This allows RF FIBER to decrease the amount of glass fibers and resin in an application determined ratio with no loss in performance.

## RF FIBER AND PROCESS APPLICATION SOLUTIONS FOR THE FRP INDUSTRY

### I. RF FIBER IN FRP POOLS

*FRP pool manufactures look for solutions to economically increase the strength of their pool laminates to reduce “in transient damage” and increase product properties.*

**RF FIBER can improve physical properties and “toughness “ in pool laminates.**

*FRP pool manufactures have very thick laminates that require special attention. Resin exotherm must be controlled in order to prevent excessive shrinkage, laminate warping, and other problems related to high exotherms during cure.*

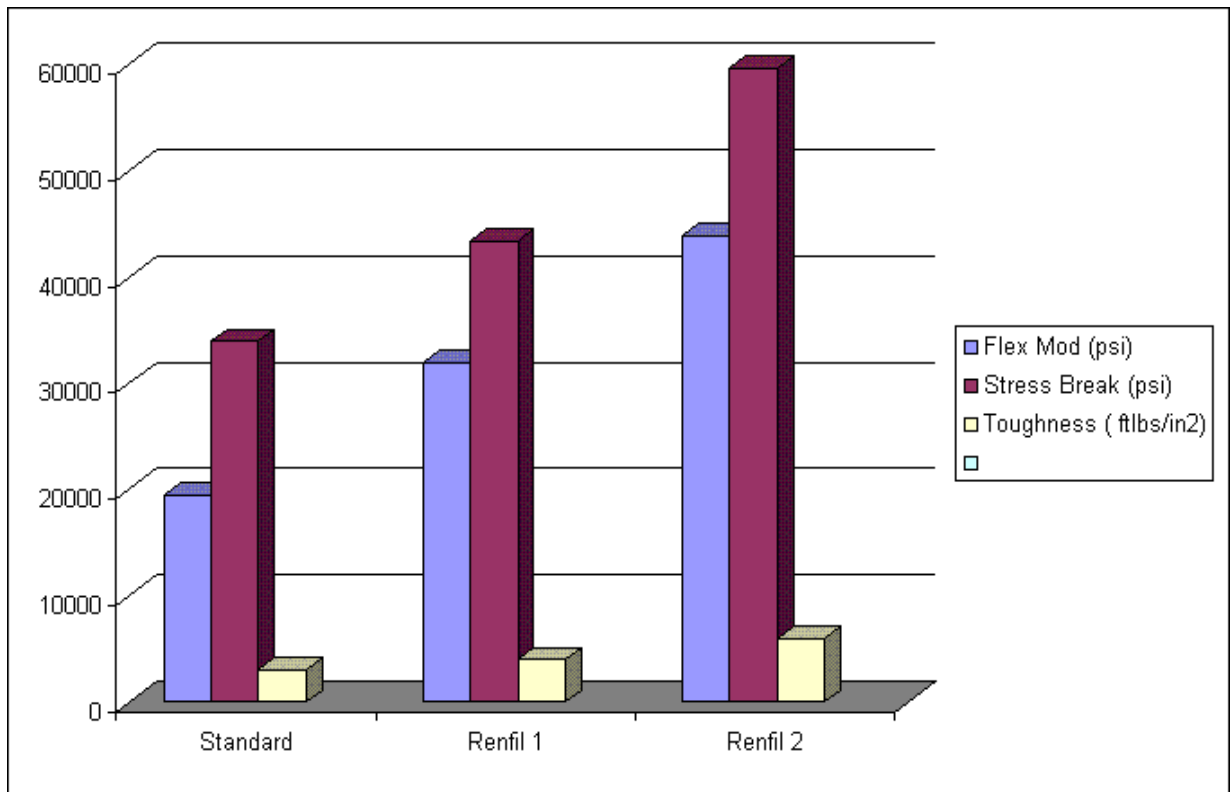
**RF FIBER lowers exotherm and improves physical properties as it is applied with each laminate layer.**

*FRP pool manufactures seek solutions to increase production thru-put.*

**RF FIBER lowers exotherm and builds bulk quickly; this results in faster production thru-put.**

*FRP pool manufacturers seek to lower styrene emissions without sacrificing product quality.*

## **RESULTS FROM A FRP POOL MANUFACTURER USING RF FIBER**



RF FIBER 1 is RF FIBER added to the core only.

RF FIBER 2 is RF FIBER added to the core and the back laminate

- **50% Improvement in Physical Properties**
- **50% Increase in “Toughness”**
- **Lower Exotherm Resulting in Faster Production Thru-Put**

## II. RF FIBER IN FRP SEPTIC TANKS

*FRP septic tank manufactures look for solutions to reduce material costs without forfeiting product properties.*

**RF FIBER can replace 25 to 33 percent of the glass in a standard septic tank and still have physical properties above the industry standard.**

*FRP septic tank manufactures search for solutions to reduce weight.*

**RF FIBER has a low specific gravity (1.2) compared to glass (2.5). This allows RF FIBER to decrease the amount of glass fibers and resin in an application determined ratio with no loss in physical properties and significant loss in product part weight.**

*FRP septic tank manufactures seek solutions to increase impact strength.*

**RF FIBER increases impact strength which lowers “in transient” damage.**

*FRP septic tank manufactures seek solutions to increase production thru-put.*

**RF FIBER builds bulk quickly allowing for faster production.**

RF FIBER IN A SEPTIC TANKS		
PHYSICAL PROPERTIES	INDUSTRY STANDARD	RF FIBER SEPTIC TANK
Tensile Strength	12,000 psi	17,122 psi
Tensile Modulus		1,900,802 psi
Flex Strength	19,000 psi	39,002 psi
Flex Modulus	800,000 psi	856,878 psi
Wall Thickness	.25 inches	.25 inches
Composition	30% Reinforcement	27% Reinforcement 28 lbs of Glass 9.4 lbs of RF FIBER
Tank Weight		140 lbs
Cost Reduction		\$ 16.88 per tank
Weight Reduction		25 lbs

- **Glass Reduction by 43%**
- **Improvement in Physical Properties**
- **Cost Reduction of \$16.88 per Tank**
- **Weight Reduction of 25lbs per Tank**
- **Improvement in Impact Strength**

### III. RF FIBER IN FRP LARGE FILAMENT WOUND TANKS

*FRP tank manufactures look for solutions to reduce material costs without forfeiting product properties.*

**RF FIBER can replace up to 25 percent of the glass in a standard tank with no loss in physical properties.**

*FRP tank manufactures search for solutions to reduce weight.*

**RF FIBER has a low specific gravity (1.2) compared to glass (2.5). This allows RF FIBER to decrease the amount of glass fibers and resin in an application determined ratio with no loss in physical properties and significant loss in product part weight.**

*FRP tank manufactures seek solutions to increase impact strength.*

**RF FIBER increases impact strength which lowers “in transient” damage and in field damage.**

*FRP tank manufactures seek solutions to increase production thru-put.*

**RF FIBER builds bulk quickly allowing for faster production.**

#### RESULTS FROM A FRP FILAMENT WOUND CHEMICAL TANK MANUFACTURER USING RF FIBER

TANK LAMINATES		
PHYSICAL PROPERTIES	TANK STANDARD	RF FIBER TANK
Tensile Strength	60,961 psi	58,396 psi
Tensile Modulus	342,229 psi	347,842 psi
Flex Strength	50,395 psi	51,440 psi
Flex Modulus	1,663,837 psi	1,562,871 psi
Composition	246.312 Lbs Glass	195.716 lbs Glass 30.3 lbs RF FIBER 225.746 lbs
Glass Reduction		20.5% Reduction in Glass

- Glass Reduction by 20.5 %, With No Loss in Physical Properties
- Significant Cost Savings
- Reduction in Weight
- Improvement in Impact Strength / “Toughness”

## **IV. RF FIBER IN FRP PIPES**

*FRP pipe manufactures look for solutions to reduce material costs without forfeiting product properties.*

**RF FIBER can replace up 10% percent of the glass in a standard pipe and increase physical properties.**

*FRP pipe manufactures search for solutions to reduce weight.*

**RF FIBER has a low specific gravity (1.2) compared to glass (2.5). This allows RF FIBER to decrease the amount of glass fibers and resin in an application determined ratio with no loss in physical properties and significant loss in product part weight.**

*FRP pipe manufactures seek solutions to increase stiffness and build thickness. The stiffness of the pipe indicates its ability to resist deformation. The ability of a pipe to resist deflection from external forces and internal vacuum pressures depends on its stiffness, which is in turn influenced by the wall thickness.*

**RF FIBER builds wall thickness very quickly and very economically, while improving impact or stiffness of the pipe.**

*FRP pipe manufactures seek solutions to increase production thru-put.*

**RF FIBER builds bulk quickly allowing for faster production.**

*FRP pipe manufactures seek to lower styrene emissions without sacrificing product quality.*

## RESULTS FROM A FRP PIPE MANUFACTURER USING RF FIBER

PIPE LAMINATES		
PHYSICAL PROPERTIES	ALL FIBERGLASS NO RF FIBER	FIBERGLASS CHOPP WITH RF FIBER
Tensile Strength Hoop	17,053 psi	18,744 psi
Tensile Modulus Hoop	1.6 msi	1.8 msi
Flexural Strength Hoop	24,398 psi	30,609 psi
Flexural Modulus Hoop	1.1 msi	1.6 msi
Tensile Strength Axial	3,577 psi	3,854 psi
Tensile Modulus Axial	1.2 msi	1.3 msi
Flexural Strength Axial	8,195 psi	7,942 psi
Flexural Modulus Axial	.9 msi	1.1 msi
Compressive Axial	15,024 psi	17,015 psi
Compressive Modulus Axial	1.1 msi	.9 msi
Imprint	25 ft/lbs	19 ft/lbs
Composition	29% F/G , 23% Filler	24% F/G, 5% RF FIBER, 31% Filler
Thickness	.28 inches	.47 inches
Cost Reduction		15%
Weight Reduction		15%

- **8% Reduction in Glass**
- **Cost Reduction by 15%**
- **Weight Reduction by 15%**
- **Improvement in Physical Properties**
- **12% Increase in Impact Strength**
- **40% Increase in Wall Thickness**
- **Lower VOC Emissions**