CARBON FIBER COMPOUNDS

STRUCTURAL PRODUCTS

FEATURES

- Up to 50% carbon fiber-filled thermoplastic compounds
- Can be used in all the same base polymers with which glass fiber is compounded
- Global availability

BENEFITS

- Lighter weight than Glass Fiber Compounds and metals; excellent option for metal replacement (Aluminum, Steel, ZAMAK)
- Higher strength than Glass Fiber Compounds; can achieve similar stiffness with lower loading
- Processing and tool wear are similar to Glass Fiber Compounds, making material replacement a smooth process

Carbon fiber provides the unique advantages of being lighter, stronger and stiffer than traditional glass fiber reinforcements. RTP Company transforms these advantages into Carbon Fiber (CF) Compounds with mechanical properties that are stronger, stiffer, and lower weight than compounds that are reinforced with glass fiber. This means that your applications can be lighter and stronger without sacrificing process-ability or other physical properties.

RTP Company's Carbon Fiber Compounds are designed for replacing aluminum and zinc die cast alloys in applications. These compounds can approach the tensile modulus and strength of some metals, while providing a 60-80% reduction in weight. This equates to an enormous amount of weight savings without sacrificing mechanical performance in the application.

RTP Company also offers Carbon Fiber Compounds for lightweight applications that would typically be made from Glass Fiber (GF) Compounds. Since carbon fiber has a lower density than glass fiber, Carbon Fiber Compounds are naturally lighter in weight. Carbon Fiber Compounds are much stiffer than glass fiber counterparts, providing applications with increased structural integrity that holds its shape and does not bend as much under increased loads. In addition, similar performance can be achieved with lower carbon fiber loading levels, which can help reduce costs.

What can be done when all other compounds have failed? RTP Company's Ultra Performance (UP) series of Carbon Fiber Compounds are successful in applications that require the highest strength, stiffness, chemically resistant and heat resistant thermoplastic compounds in the world. With UP Carbon Fiber Compounds, designs that were previously impossible are a reality!

When designing new parts, RTP Company's standard Carbon Fiber Compounds are a great place to start! These compounds are an excellent option for applications that require lightweight and stiff parts (See Figure 1).

FIGURE 1: 40% STANDARD CARBON FIBER COMPOUNDS

Polymer Matrix	Product Grade	Specific Gravity	Tensile Strength	Flexural Modulus	Unnotched Izod - Impact Strength, 1/8 in (3.2mm)	Tensile Elongation, %
PA 6	RTP 287 A	1.31	34,000 psi 234 MPa	3.10 X 10^6 psi 21,374 MPa	21 ft-lbs/in 1,121 J/m	1.0 - 2.0
PA 6/6	RTP 287	1.31	40,500 psi 276 MPa	3.70 X 10^6 psi 25,512 MPa	20 ft-lbs/in 1,068 J/m	1.0 - 2.0
PPA	RTP 4087	1.38	43,000 psi 296 MPa	4.00 X 10^6 psi 27,580 MPa	16 ft-lbs/in 854 J/m	1.0 - 2.0
PPS	RTP 1387	1.48	30,000 psi 207 MPa	4.50 X 10^6 psi 31,028 MPa	7.5 ft-lbs/in 400 J/m	0.8
PES	RTP 1487	1.50	29,000 psi 200 MPa	3.50 X 10^6 psi 24,132 MPa	10 ft-lbs/in 534 J/m	1.0
PEI	RTP 2187	1.43	35,000 psi 241 MPa	3.90 X 10^6 psi 26,890 MPa	11 ft-lbs/in 587 J/m	1.3
PEEK	RTP 2287 HF	1.45	40,000 psi 276 MPa	4.50 X 10^6 psi 31,028 MPa	13 ft-lbs/in 694 J/m	1.3

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CARBON FIBER COMPOUNDS

LIGHTWEIGHTING: REPLACING GLASS FIBER COMPOUNDS WITH CARBON FIBER COMPOUNDS

RTP Company also has Carbon Fiber Compounds that can be used to replace existing Glass Fiber Compounds in applications, offering similar properties but weighing up to 25% lighter. These compounds can facilitate the use of a less expensive base resin and lower carbon fiber loading level, which, in turn, helps reduce tool wear (see Figure 2).

FIGURE 2: CROSS POLYMER COMPARISON - GLASS FIBER VS. CARBON FIBER

Polymer Matrix	Fiber	Product Grade	Specific Gravity	Weight Reduction, %	Tensile Strength	Flexural Modulus
PA 6/6	30% Glass	RTP 205 (conditioned)	1.36		16,800 psi 116 MPa	1.04 X 10^6 psi 7,170 MPa
PP	20% Carbon	RTP 199 X 138502 D	1.00	26.5	13,500 psi 93 MPa	1.15 X 10^6 psi 7,930 MPa
PPA	50% Glass	RTP 4009	1.64		36,000 psi 248 MPa	2.50 X 10^6 psi 17,236 MPa
PA 6/6	30% Carbon	RTP 285	1.27	22.5	36,000 psi 248 MPa	2.75 X 10^6 psi 18,960 MPa
PEEK	50% Glass	RTP 2209 HF	1.73		32,000 psi 220 MPa	2.80 X 10^6 psi 19,205 MPa
PPA	20% Carbon	RTP 4083	1.28	26.0	35,000 psi 241 MPa	2.30 X 10^6 psi 15,858 MPa

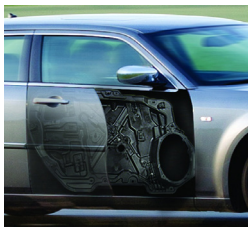
Human powered sporting goods, like this kayak paddle, benefit from the lighter weight and strength of Carbon Fiber Compounds.

ULTRA PERFORMANCE COMPOUNDS: REPLACING METAL WITH CARBON FIBER COMPOUNDS

Ultra Performance Compounds from RTP Company are go-to options when metal replacement is the goal. These compounds provide similar or better mechanical properties with weight savings up to 80%, while also allowing for part consolidation and design flexibility (see Figure 3).

FIGURE 3: ULTRA PERFORMANCE COMPOUNDS VS. METAL

Description	Product Grade	Specific Gravity	Tensile Strength	Flexural Modulus	Unnotched Izod - Impact Strength, 1/8 in (3.2mm)	Tensile Elongation, %
Aluminum	6061-T6	2.70	40,000 psi 276 MPa	10.0 X 10^6 psi 68,947 MPa	-	17.0
40% CF PPS	RTP 1387 UP	1.48	38,000 psi 262 MPa	4.70 X 10^6 psi 32,405 MPa	12 ft-lbs/in 640 J/m	1.0
Zinc Alloy	ZAMAK 3	6.60	41,000 psi 282 MPa	13.00 X 10^6 psi 89,600 MPa	-	10.0
40% CF PPA	RTP 4087 UP	1.38	52,000 psi 359 MPa	5.00 X 10^6 psi 34,475 MPa	15 ft-lbs/in 801 J/m	1.0 - 2.0
40% CF PEEK	RTP 2287 HF UP	1.45	43,000 psi 297 MPa	4.90 X 10^6 psi 34,000 MPa	18 ft-lbs/in 960 J/m	1.3



Carbon Fiber Compounds are used in automobile applications because the material is strong and stiff enough to replace metal, and the lighter weight results in better fuel economy for the vehicle.

Data on RTP Company Carbon Fiber Compounds is available on our website at **www.rtpcompany.com**

RTP COMPANY: YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS