RTP Co.
Imagineering Plastics®

High Temperature Thermoplastics

Improving Performance In Extreme Conditions

High Temperature Thermoplastics

High temperature resins offer better mechanical performance, wear resistance, and chemical resistance than most other polymers. Although all polymers will lose performance over time at elevated temperatures, high temperature polymers have rigid polymer chains that allow them to operate at higher temperatures. In addition, their strong chemical bonds enable them to maintain better properties at elevated temperatures, thus enabling higher continuous use temperatures.

RTP Company uses high temperature resins as a basis for a broad range of thermoplastic compounds that are formulated with even more benefits, such as significant retention of physical properties, better dimensional stability, and excellent electrical characteristics at increased temperatures. These compounds may also be modified for flame retardance, wear resistance, conductivity, structural reinforcement, and color. We formulate these compounds to meet your specific requirements!

The properties outlined in this brochure are achievable with our High Temperature portfolio, which includes an extensive database of commercially available formulations and custom compounds. We welcome the opportunity to discuss your particular requirements and present a High Temperature solution that will work for you.

Contact us, scan our code,
or visit **www.rtpcompany.com**
to get your project started today!

PROPERTIES

Physical

- Warp Reduction
- Part Geometry
- Density

Mechanical

- Strength
- Stiffness
- Toughness - Impact Strength

Environment

- High Temperatures
- Extreme Chemical Exposures
- Radiation

Other

- Wear and Abrasion
- Flame and Smoke
- Aesthetics

In addition, we can further enhance your application by formulating a compound featuring custom color, wear and friction resistance, flame retardant, and/or conductive properties.

Morphology and Temperature Considerations

Amorphous

Semi-Crystalline

To better understand performance across wide temperature ranges, it's important to consider the morphology of the resins themselves. Amorphous polymers will behave very differently than semi-crystalline polymers or liquid crystal polymers (LCP), which retain crystallinity when molten. All thermoplastics will show a significant reduction in strength and stiffness at their glass transition temperature (Tg), the temperature at which the material transitions from rigid to rubbery. Near the Tg, amorphous polymers then lose their effective load carrying abilities. Because the polymers in crystalline regions require more energy to become mobile, LCPs and semi-crystalline polymers will continue to have reduced load carrying abilities until they approach their melting point.

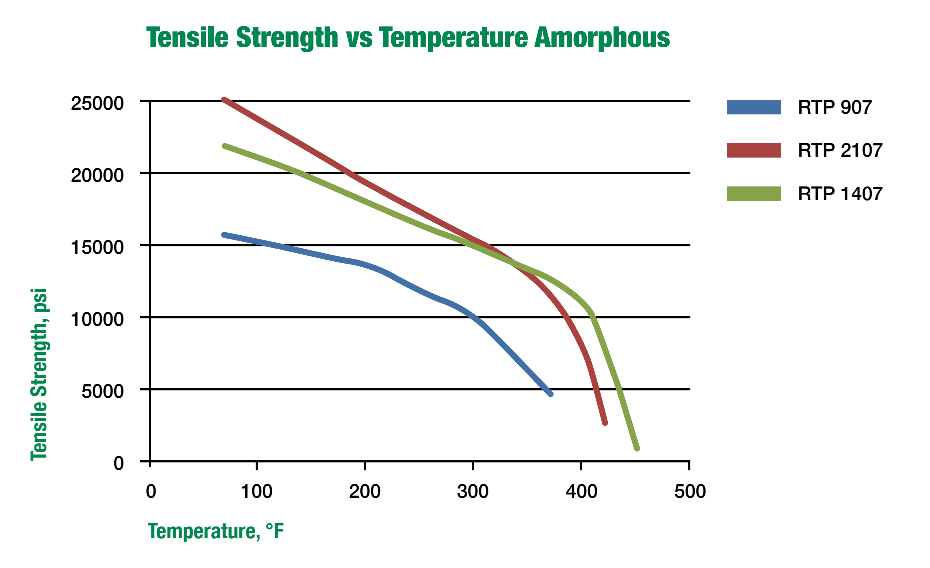
Polymer	Polymer Morphology	Glass Transition Temperature, TG	Continuous Use Temperature, CTU	Heat Deflection Temperature, HDT @ 264 psi	
				Polymer only	Polymer + 30GF
PSUL	Amorphous	370 °F(190 °C)	300-325 °F(150-160 °C)	345 °F (175 °C)	365 °F (185 °C)
PEI	Amorphous	420 °F(215 °C)	350-375 °F (175-190 °C)	390 °F (195 °C)	410 °F (210 °C)
PES	Amorphous	425 °F(220 °C)	350-375 °F (175-190 °C)	395 °F (200 °C)	420 °F (215 °C)
PPSU	Amorphous	425 °F(220 °C)	300-350 °F(150-180 °C)	395 °F (200 °C)	415 °F (215 °C)
PPS	Semi-Crystalline	190 °F(90 °C)	400-450 °F (200-230 °C)	275 °F (135 °C)	510 °F (265 °C)
PPA-WM	Semi-Crystalline	200°F(95 °C)	275-325 °F(135-160°C)	250°F (120 °C)	530°F (275 °C)
PPA	Semi-Crystalline	255 °F(125 °C)	300-350 °F (150-175 °C)	230 °F (110 °C)	520 °F (270 °C)
PEEK	Semi-Crystalline	290 °F(145 °C)	400-450 °F (200-230 °C)	320 °F (160 °C)	>570 °F (>300 °C)
PEK	Semi-Crystalline	305 °F(150 °C)	400-450 °F (200-230 °C)	330 °F (165 °C)	>600 °F(>315 °C)
TPI	Semi-Crystalline	480 °F(250 °C)	450-550 °F(230-285 °C)	500°F(260 °C)	>600 °F(>315 °C)

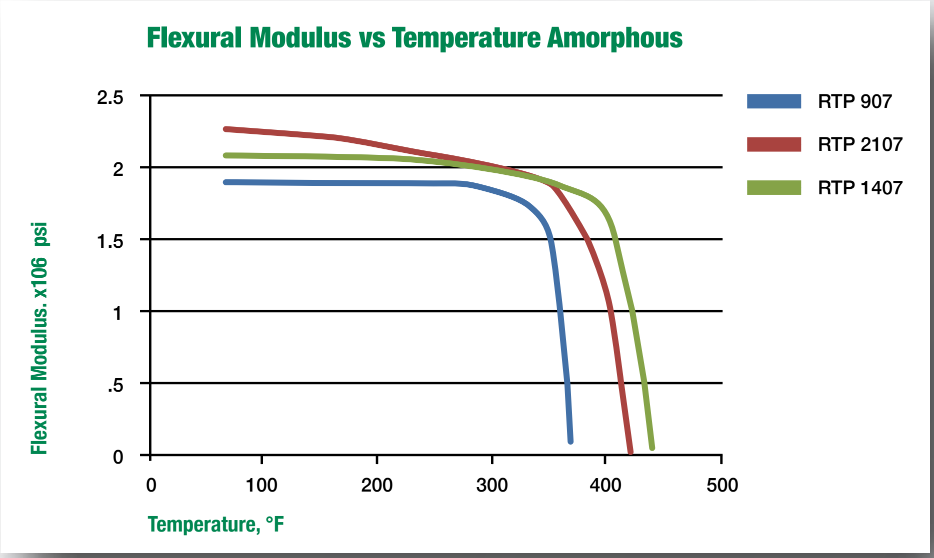
The information contained here represents only a small portion of the products offered by RTP Company. Contact our engineers to get your project started today!

Properties vs. Temperature

The following tables show specific data for 40% glass fiber reinforced compounds and general trends of how compounds based on high temperature polymers behave as the temperature changes. Keep in mind, however, when selecting high temperature compounds, it's important to note that data is often generated from specific tests that do not directly correlate to end-use part performance. The most successful application designs account for the balance of load/temperature/time, allow for creep (strain over time), and include appropriate safety factors. Our Product Development Engineers have access to nearly all thermoplastic and additive technologies; when combined with the expertise to apply them successfully, the result is a custom formulation that meets your cost and performance expectations.

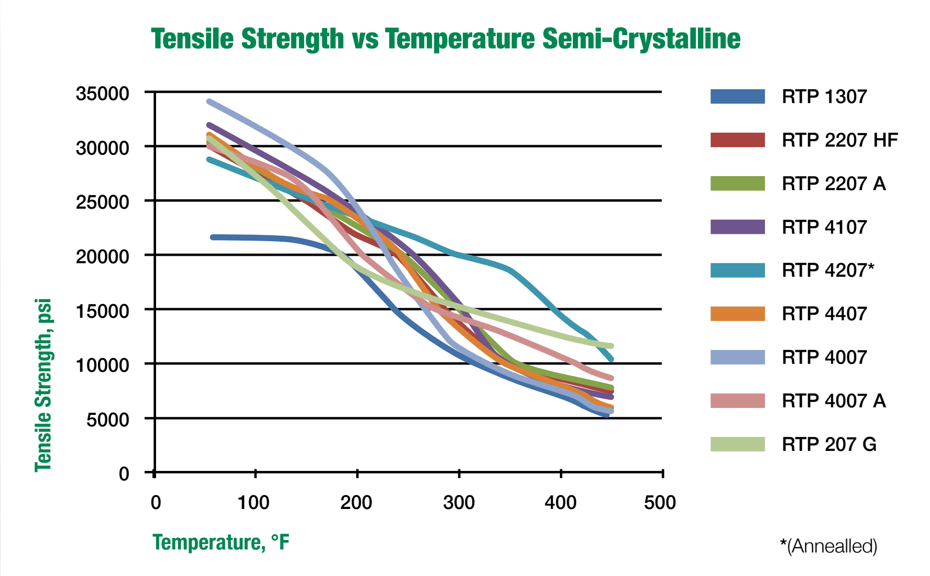
Properties vs. Temperature for Amorphous, 40% Glass Fiber Filled Compounds



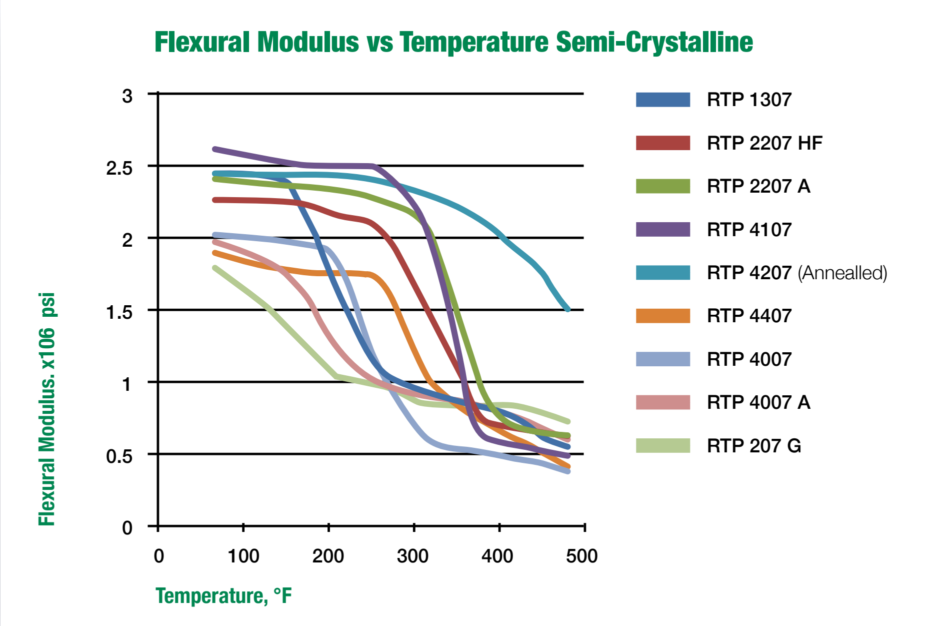


Note that the amorphous polymers have a moderate and steady loss of properties until they approach their Tg. Then they rapidly lose strength and stiffness and become incapable of carrying a load.

Properties vs. Temperature for Semi-Crystalline, 40% Glass Fiber Filled Compounds



Note that all the semi-crystalline polymers start with fairly high properties that gradually decline. As they near the Tg, the slope of the reduction increases. Then, unlike amorphous polymers, the rate of loss stabilizes and they remain useful until they get near their melting point.



RTP Company Additive Technologies

This table shows a general overview of how various additive technologies influence performance.

Mechanical Technology	Abbr.	Description	Strength	Stiffness	Impact Resistance
Colored Thermoplatics or Unfilled Resin	Resin	The baseline reference for comparing physical performance	•	•	•
Impact Modified	IM	Improved ductility at room and low temperature	•	•	••••
Mineral Fillers	MF	Increased stiffness and improved dimensional stability	•	••	•
Short Glass Fiber	GF	Balanced increase of most physical performance characteristics	•••	•••	••
LT Series Short Glass	LT	Designed for weight savings without sacrificing short glass fiber performance	•••	•••	••
Very Long Fiber	VLF	Very best performance available using glass reinforcement	••••	•••	••••
Carbon Fiber	CF	Lightweight with extremely high load bearing capability	•••••	•••••	•
Ultra- Performance	UP	Lightest and best performance available in carbon fiber reinforcement	••••••	••••••	•

Technology	Abbr.	Description	Desired Effects		
Controlled Geometry Pellets	CGP	Remarkably small and specially shaped pellets for compression molding	Reduced porosity	Improved properties	Compression molding
Conductive Compounds	-	A broad range of solutions providing properties such as anti-static, static dissipative, EMI/RFI shielding, and thermal conductivity	Improve conductivity	ESD protection	EMI shielding
Wear and Friction Resistant Compounds	-	Improve wear resistance and reduce coefficient of friction to improve product life span	Reduce wear rate	Reduce friction, scratch, and mar	Reduce noise
Flame Retardant Compounds	-	Control ignition resistance, flame spread, heat release and smoke generation	Retard ignition	Reduce flame spread	Lower smoke levels

Additional technologies include Plateable, Laser Direct Structuring, Electronic Encapsulation, and Radiopaque.

A Polysulfone was selected for this respiratory medical device, which required a unique color that could withstand repeated cleaning and sterilization.

Colored Thermoplastics or Unfilled Resins

Color is a great way to build brand recognition, provide direction, and enhance the aesthetics of your plastic product. Whether you select from our palette of popular colors or choose a custom formulation, we deliver consistent color in precolor, masterbatch, or cube blend options. If your application requires a simple, unfilled (or “neat”) resin, RTP Company can supply it with excellent pricing through our partnership with ResMart.

Impact Modified (IM) Compounds

Our Impact Modified Compounds provide increased impact resistance at all temperatures in comparison to unfilled compounds. Other additives and fillers (such as colorants, mineral, glass fiber, Carbon Fiber or other specialty additives) can be used to increase ductility in compounds that also need to retain their strength and stiffness. These Compounds are used in markets such as sporting goods, industrial, outdoor recreation vehicles, automotive, consumer goods and electronics.

The thermoplastic for this handheld drill was modified for high impact resistance to improve toughness and durability.

When mating connectors require precise dimensions, mineral filled compounds can provide big benefits.

Mineral Filled (MF) Compounds

Our Mineral Filled Compounds offer improvements in dimensional stability and stiffness over unmodified resin, and are the lowest cost filler option when price sensitivity is important.

Calcium carbonate, talc, and mica are commonly used as mineral fillers in nearly all resin systems. Mineral Filled Compounds may be used in high volume, low cost applications such as appliances, automotive, and packaging or to reduce costs of more expensive polymers. Some mineral fillers can also be used to add radiopacity, allowing for x-ray identification.

Short Glass Fiber (GF) Compounds

When additional performance from a part is needed, Short Glass Fiber Compounds from RTP Company offer excellent strength and stiffness vs. Mineral Filled Compounds. Short Glass Fiber Compounds can be individually formulated to end-use specifications and offer better mechanical properties than competing materials. They are widely used in many markets, including energy, automotive, healthcare, consumer goods, and more.

This HVAC fan required additional strength and dimensional stability, making a Short Glass Fiber Compound an ideal choice.

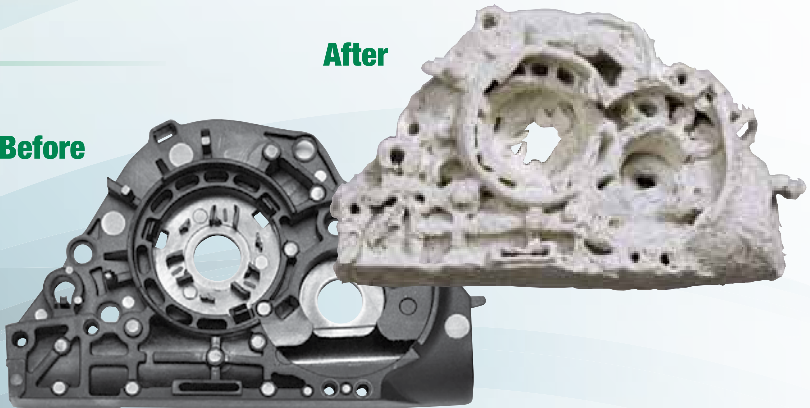
When lighter weight is critical, as in the case of a drone or aerospace applications, our Light and Tough Compounds are an excellent choice for metal replacement..

Light and Tough (LT) Compounds

Our light and tough compounds introduce hollow glass spheres and weigh 5-10% less than typical reinforced compounds, while targeting equivalent mechanical properties and similar molding shrinkage. Unlike chemical foaming agents, this technology is not dependent on wall thickness. These compounds are best used as lightweight alternatives when the goal is to minimize energy consumption. This is particularly attractive in parts that are moved by human power.

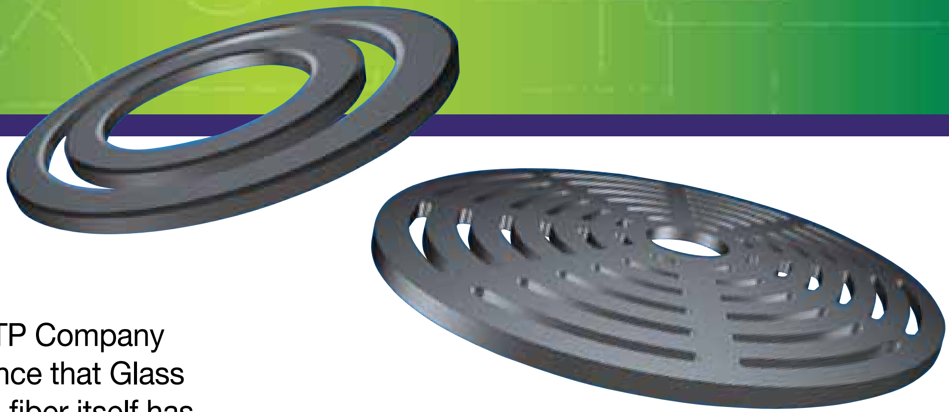
Very Long Fiber (VLF) Compounds

Our VLF Compounds are made using a proprietary pultrusion process to create long pellets (11mm) with long fibers inside – the same length as the pellet. These long fibers create an internal skeleton during the molding process which not only increases strength and stiffness, but impact resistance as well. These stiff and tough VLF Compounds are the go-to technology for metal replacement, making them a top technology for automotive and industrial applications.



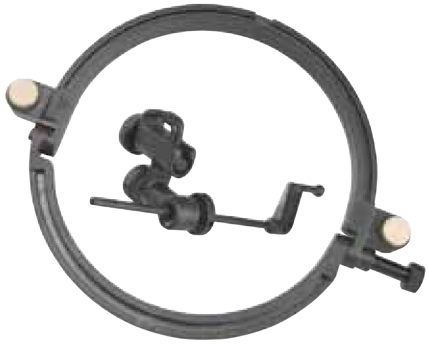
Automotive parts made from VLF Compounds showing before and after resin burn off, which exposes the VLF skeleton structure.

Carbon Fiber (CF) Compounds



Carbon Fiber Compounds from RTP Company can achieve mechanical performance that Glass Fiber Compounds cannot. Carbon fiber itself has unique advantages of being stronger, stiffer, and lighter than traditional glass fiber reinforcements. CF Compounds also provide an excellent alternative to aluminum, die cast zinc, and other metals, as they can maintain similar properties with 60-80% weight reduction.

RTP Company engineers have formulated compounds for oil and gas components that must withstand extreme temperatures and harsh conditions.



Our Ultra-Performance Compounds are the right choice for critical components, like this surgical halo for the medical industry

Ultra-Performance (UP) Compounds

Drawing on our expertise in high temperature polymers and fiber reinforced materials, we have created Ultra-Performance Compounds, featuring elevated mechanical properties. These industry-leading compounds, based on either carbon or glass fiber, stand up to the most demanding requirements when compared to standard polymer compound options. Ultra-Performance Compounds also offer a competitive alternative to aluminum, zinc, magnesium metals, and thermoset compounds.

Controlled Geometry Pellets (CGP)

RTP Company's patented Controlled Geometry Pellets are small, shape defined pellets used to improve your compression molding process, productivity and performance. The shape and size of these pellets allows for better packing and easier handling. The compounding process improves fiber-to-polymer interface compared to dry blends of reinforced compression molded parts. This results in better mechanical performance. Also, by eliminating powders, proper drying of the raw materials becomes easier.

The CGP pellets also convey better in screws. This allows for colder rear zones, moving the melting point further down the barrel. So, for any process with longer residence times, CGPs may provide benefits in extrusion and injection molding applications.

Best suited for compression molding, our Controlled Geometry Pellets can improve the fiber-to-polymer interface, which results in better product performance.

High Temperature Compounds from RTP Company

The materials listed here are a small selection of our standard grades. For more information on combining technologies or obtaining a custom High temperature compound for your application, contact your local RTP Company sales rep or visit **www.rtpcompany.com**.

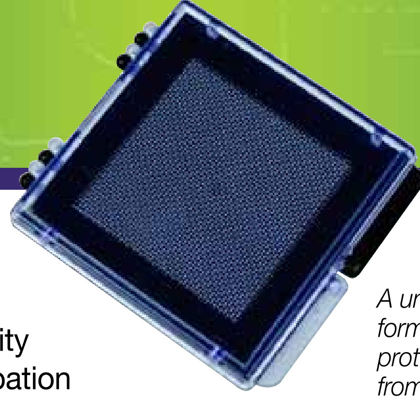
Nomenclature	Polymer	Primary Additive	Tensile Strength ASTM D638 (psi)	Tensile Strength ASTM D638 (MPa)	Flexural Modulus ASTM D790 ($x10^6$ psi)	Flexural Modulus ASTM D790 (MPa)	Notched IZOD Impact ISO 180/1eA (kJ/m^2)	Notched IZOD Impact ASTM D256 (ft-lb/in)	Notched IZOD Impact ASTM D256 (J/m)	Specific Gravity
Unfilled/Colorable Compounds										
RTP 900	PSUL	Colorable	10,500	72	0.39	2,700	n/a	1.0	53	1.24
RTP 1400	PES	Colorable	12,000	83	0.42	2,900	n/a	1.3	69	1.37
RTP 1400 P	PPSU	Colorable	10,000	69	0.35	2,400	n/a	13.0	694	1.30
RTP 2100	PEI	Colorable	15,800	109	0.48	3,300	5	1.0	53	1.27
RTP 2200 HF	PEEK	Colorable	13,500	93	0.55	3,800	5	0.8	43	1.30
Impact Modified (IM) Compounds										
RTP 1399 X 142203	PPS	IM	7,000	48	0.35	2,400	55	9.0	480	1.25
RTP 4099 X 134209	PPA	IM	7,500	52	0.30	2,000	77	18.0	961	1.10
Mineral Filled (MF) Compounds										
RTP 2299 X 101544	PEEK	17% MF	13,900	96	0.75	5,200	n/a	1.4	75	1.36
RTP 2299 X 114936 Z	PEEK	30% MF	15,000	103	1.1	7,600	n/a	1.2	64	1.55
RTP 2299 X 137705 NS	PEEK	20% MF, RO	13,500	93	0.70	4,800	n/a	0.8	43	1.49
RTP 4000 A-1240 L	PPA	40% MF	17,000	117	1.1	7,600	n/a	0.9	48	1.53
Glass Filled (GF) Compounds										
RTP 905	PSUL	30% GF	16,000	110	1.1	7,600	6	1.4	75	1.46
RTP 907	PSUL	40% GF	19,000	131	1.4	9,700	7	1.6	85	1.56
RTP 1305 P-1	PPS	30% GF	23,000	159	1.7	11,700	10	1.5	80	1.58
RTP 1307 P-1	PPS	40% GF	24,500	169	2.2	15,200	11	1.5	80	1.68
RTP 1399 X 142237 B	PPS	40% GF/IM	22,000	152	1.8	12,400	15	2.3	123	1.60
RTP 1309 P-1	PPS	50% GF	24,500	169	2.8	19,300	10	1.5	80	1.77
RTP 1399 X 102898 B	PPS	65% GF/MF	19,000	131	2.9	20,000	6	1.0	53	1.98
RTP 1403	PES	20% GF	19,000	131	0.9	6,200	7	1.0	53	1.51
RTP 1405	PES	30% GF	20,500	141	1.3	9,000	8	1.2	64	1.59
RTP 1407	PES	40% GF	23,000	159	1.7	11,700	12	1.5	80	1.68
RTP 2103	PEI	20% GF	23,000	159	1.0	6,900	6	1.3	69	1.41
RTP 2105	PEI	30% GF	25,100	173	1.5	10,300	7	1.6	85	1.50
RTP 2107	PEI	40% GF	27,500	190	1.9	13,100	8	1.8	96	1.59
RTP 2203 HF	PEEK	20% GF	22,000	152	1.2	8,300	5	1.4	75	1.44
RTP 2205 A	PEK	30% GF	27,000	186	1.6	11,000	n/a	1.6	85	1.53
RTP 2205 HF	PEEK	30% GF	27,000	186	1.6	11,000	8	2.0	107	1.52
RTP 2207 HF	PEEK	40% GF	30,500	210	2.1	14,500	11	2.4	128	1.61
RTP 4005	PPA	30% GF	28,000	193	1.5	10,300	7	1.5	80	1.44
RTP 4007	PPA	40% GF	32,000	221	2.0	13,800	9	2.0	107	1.55

Nomenclature	Polymer	Primary Additive	Tensile Strength ASTM D638 (psi)	Tensile Strength ASTM D638 (MPa)	Flexural Modulus ASTM D790 ($x10^6$ psi)	Flexural Modulus ASTM D790 (MPa)	Notched IZOD Impact ISO 180/1eA (kJ/m^2)	Notched IZOD Impact ASTM D256 (ft-lb/in)	Notched IZOD Impact ASTM D256 (J/m)	Specific Gravity
Short Glass Fiber (GF) Compounds cont.										
RTP 4009	PPA	50% GF	36,000	248	2.5	17,200	11	2.2	117	1.64
RTP 4005 A	PPA	30% GF	25,000	172	1.4	9,700	7	1.5	80	1.43
RTP 4007 A	PPA	40% GF	30,000	207	1.9	13,100	8	1.7	91	1.52
RTP 4009 A	PPA	50% GF	35,000	241	2.4	16,500	10	2.1	112	1.62
RTP 4207	TPI	40% GF	28,000	193	1.9	13,100	n/a	2.7	144	1.63
RTP 4405	HTN	30% GF	25,000	172	1.4	9,700	6	1.4	75	1.42
RTP 4407	HTN	40% GF	30,000	207	1.8	12,400	9	2.0	107	1.51
Light & Tough (LT) Series Compounds										
RTP 1399 X 147239	PPS	40% GF	24,500	169	2.3	15,900	12	1.6	85	1.56
RTP 2299 X 147234 A	PEEK	30% GF	25,500	176	1.6	11,000	9	1.7	91	1.43
RTP 4099 X 147233 A	PPA	30% GF	28,000	193	1.6	11,000	9	1.5	80	1.35
RTP 4099 X 147247 A	PPA	10% CF	27,000	186	1.6	11,000	4	0.6	32	1.16
Very Long Fiber (VLF) Compounds										
RTP 1399 X 68907 A	PPS	40% VLF	24,500	169	2.1	14,500	23	4.5	240	1.64
RTP 1399 X 68907 B	PPS	50% VLF	25,000	172	2.6	17,900	25	5.0	267	1.73
RTP 2199 X 113442 A	PEI	40% VLF	28,000	193	2.1	14,500	14	3.5	187	1.59
RTP 2299 X 108578 A	PEEK	30% VLF	26,500	183	1.6	11,000	17	3.5	187	1.52
RTP 2299 X 108578 B	PEEK	40% VLF	30,000	207	2.2	15,200	18	4.0	214	1.61
VLF 84007	PPA	40% VLF	33,000	228	2.1	14,500	22	5.5	294	1.57
VLF 84009	PPA	50% VLF	39,000	269	2.7	18,600	25	6.5	347	1.65
Carbon Fiber (CF) Compounds										
RTP 985	PSUL	30% CF	20,000	138	1.8	12,400	n/a	0.8	43	1.36
RTP 1385 P-1	PPS	30% CF	30,000	207	3.3	22,800	6	1.0	53	1.45
RTP 1387 P-1	PPS	40% CF	31,000	214	4.5	31,000	6	1.0	53	1.48
RTP 1485	PES	30% CF	27,500	190	3.0	20,700	7	1.2	64	1.45
RTP 2281 HF	PEEK	10% CF	27,000	186	1.4	9,700	3	0.9	48	1.33
RTP 2283 HF	PEEK	20% CF	35,500	245	2.7	18,600	5	1.3	69	1.36
RTP 2285 HF	PEEK	30% CF	39,000	269	3.7	25,500	6	1.4	75	1.41
RTP 2287 HF	PEEK	40% CF	40,000	276	4.5	31,000	7	1.5	80	1.45
RTP 2185	PEI	30% CF	34,000	234	3.0	20,700	6	1.2	64	1.39
RTP 4085	PPA	30% CF	41,000	283	3.2	22,000	6	1.4	75	1.33
RTP 4087	PPA	40% CF	43,000	296	4.0	27,600	7	1.5	80	1.38
Ultra Performance (UP) Compounds										
RTP 1309 UP	PPS	50% GF UP	28,000	193	2.7	18,600	10	1.6	85	1.77
RTP 1387 UP	PPS	40% CF UP	33,000	228	5.0	34,500	8	1.3	69	1.48
RTP 2109 UP	PEI	50% GF UP	29,000	200	2.6	17,900	10	1.8	96	1.70
RTP 2187 UP	PEI	40% CF UP	37,000	255	4.3	29,600	7	1.2	64	1.43

Nomenclature	Polymer	Primary Additive	Tensile Strength ASTM D638 (psi)	Tensile Strength ASTM D638 (MPa)	Flexural Modulus ASTM D790 ($x10^6$ psi)	Flexural Modulus ASTM D790 (MPa)	Notched IZOD Impact ISO 180/1eA (kJ/m^2)	Notched IZOD Impact ASTM D256 (ft-lb/in)	Notched IZOD Impact ASTM D256 (J/m)	Specific Gravity
Ultra Performance (UP) Compounds cont.										
RTP 2209 HF UP	PEEK	50% GF UP	34,500	238	2.5	17,200	12	2.8	149	1.73
RTP 2287 HF UP	PEEK	40% CF UP	44,000	303	4.9	33,800	7	1.5	80	1.45
RTP 4009 UP	PPA	50% GF UP	41,500	286	2.7	18,600	15	2.3	123	1.64
RTP 4087 UP	PPA	40% CF UP	52,000	359	5.0	34,500	7	1.5	80	1.38
Electrically Conductive Compounds										
EMI 2161	PEI	10% SS	15,800	109	0.58	4,000	n/a	0.8	43	1.39
ESD C 1305	PPS	30% GF, ESD	12,500	86	1.9	13,100	n/a	0.9	48	1.65
ESD C 2180	PEI	CF	23,000	159	1.1	7,600	n/a	1.0	53	1.32
ESD C 2280	PEEK	CF	34,000	234	3.0	20,700	n/a	1.5	80	1.41
Thermally Conductive Compounds										
RTP 1399 X 138961	PPS	TC, EI	11,000	76	2.5	17,200	n/a	0.7	37	2.28
RTP 1399 X 133243 B	PPS	TC, EC	8,000	55	1.9	13,100	n/a	0.5	27	1.66
RTP 1399 X 137162 J	PPS	TC, EC	18,000	124	2.1	14,500	n/a	1.0	53	1.70
Wear and Friction Compounds										
RTP 1399 X 91160	PPS	CF/Wear	17,000	117	1.7	11,700	3	0.7	37	1.52
RTP 2299 X 80218	PEEK	50% PTFE	7,500	52	0.35	2,400	n/a	1.0	53	1.58
RTP 2299 x 81382	PEEK	CF/Wear	23,000	159	1.7	11,700	n/a	1.3	69	1.44
RTP 2299 X 125404 A	PEEK	Wear	24,000	165	1.4	9,700	n/a	1.3	69	1.34
Controlled Geometry Pellets										
RTP 1399 X 121572 A	PPS	40% GF	7,500	52	1.4	9,700	n/a	0.2	13	1.67
RTP 1399 X 126095	PPS	CF, Wear	10,000	69	1.5	10,300	n/a	0.3	16	1.50
RTP 2199 X 121589 A	PEI	30% GF	25,000	172	1.5	10,300	6	1.4	75	1.51
RTP 2205 CGP	PEEK	30% GF	23,500	162	2.2	15,200	8	2.0	107	1.52
RTP 2299 X 120320 B	PEEK	30% CF	26,500	183	2.3	15,900	7	1.5	80	1.39
RTP 2299 X 120345	PEEK	CF, Wear	18,500	128	1.3	9,000	5	1.0	53	1.45

IM = Impact Modified, MF = Mineral Filled, RO = Radiopaque, GF = Glass Fiber, VLF = Very Long Fiber, CF = Carbon Fiber, UP = Ultra Performance, SS = Stainless Steel Fiber, ESD = Electrostatic Dissipative, TC = Thermally Conductive, EC = Electrically Conductive, EI = Electrically Insulative, PTFE = Polytetrafluoroethylene

The table above offers a limited selection of the property data available. For more information, please contact your local RTP Company sales rep or visit **www.rtpcompany.com**.



A unique custom compound was formulated for this plastic tray, which protects highly sensitive electronics from Electrostatic Discharge (ESD).

Conductive Compounds

Our Conductive Compounds offer reliability and value for applications requiring dissipation of static charges, protection from electrostatic discharge (ESD), electromagnetic interference (EMI) protection, or thermal management. Specialty high temperature compounds can provide electrical properties spanning the surface resistivity spectrum from 10^2 to 10^{12} ohm/sq and be formulated for injection molding or extrusion processing.

EMI shielding compounds provide "immunity" for sensitive components from incoming EMI and/or prevent excessive emissions of EMI to other susceptible equipment.

RTP Company also offers a wide variety of thermally conductive products, including grades that are either electrically insulative or electrically conductive. Thermal conductivity up to 30 W/m K can be achieved in the direction of flow and up to 4 W/m K through the thickness of the part.

RTP Company formulated a precise compound with chemical and wear resistance, crucial properties for this agricultural pump system.

Wear and Friction Resistant Compounds

RTP Company's Ultra Wear and Friction compounds exhibit excellent wear and friction performance at very high speeds and under elevated temperatures. These products combine high temperature thermoplastic resins with synergistic wear improving additives like carbon fiber, graphite powder, aramid fiber, PTFE, MoS2 and/or ceramics. Because Ultra Wear and Friction compounds can be injection molded, there is more design freedom for applications that historically required thermoset-type materials. In addition, flexibility in manufacturing can significantly lower costs.

Flame Retardant Compounds

While many polymers require additives to meet flammability requirements, such as UL 94 testing, most high temperature polymers from RTP Company are inherently flame retardant. The rare exceptions are the nylon based chemistries and the impact modified PPS compounds.Through careful formulating, RTP Company engineers can modify these compounds to meet the most stringent flame requirements, as well as smoke, toxicity and heat release. RTP Company has high temperature solutions for the most demanding applications!

When flame retardant properties are required, RTP Company engineers formulate high temperature compounds that meet even the most stringent requirements

Imagineering Plastics®

STRUCTURAL • ELASTOMERS • WEAR • COLOR
CONDUCTIVE • FLAME RETARDANT • FILM/SHEET

Your Global Compounder of Custom Engineered Thermoplastics

RTP COMPANY is committed to providing you with solutions, customization, and service for all of your thermoplastic needs. We offer a wide range of technologies available in pellet, sheet, and film that are designed to meet even your most challenging application requirements.

COLOR
Color inspires, energizes, and builds brand recognition, and choosing the right supplier is as important as selecting the right color. We offer color technology options in standard precolored resins or custom compounds, UniColor®, Masterbatches, or cube blends.

CONDUCTIVE
We offer compounds for electrostatic discharge *(ESD)* protection, EMI shielding, or PermaStat® permanent anti-static protection. Available in particulate and all polymeric-based materials, these compounds can be colored, as well.

FLAME RETARDANT
Whether you are developing a new product or need to reformulate due to ever-changing regulations, we can custom engineer a flame retardant material with the exact properties you require.

STRUCTURAL
Our reinforced structural compounds can increase strength, stiffness, and provide resistance to impact, creep and fatigue. Ideal for metal or other material replacement, our formulas can be customized to meet cost and performance targets.

TPE
Our thermoplastic elastomers provide rubber-like performance with the processing benefits of thermoplastic resin. We offer a wide range of options, from standard, in-stock resins to custom compounds designed to meet your specifications.

WEAR RESISTANT
Our wear resistant thermoplastic compounds can incorporate internal lubricants to reduce wear and friction, thereby lengthening the service life of your application and reducing your processing costs.

Please contact your local RTP Company Sales Engineer by calling 1-507-454-6900 1-800-433-4787 *(U.S. only)*, E-mail rtp@rtpcompany.com or visit **www.rtpcompany.com**

RTP Company Corporate Headquarters • 580 East Front Street • Winona, Minnesota 55987 USA **website:** www.rtpcompany.com • **email:** rtp@rtpcompany.com

ISO 9001 REGISTERED FACILITIES

TELEPHONE:	U.S.A.	SOUTH AMERICA	MEXICO	EUROPE	SINGAPORE	CHINA	WIMAN CORPORATION	ESP™
	+1 507-454-6900	*+55 11 4193-8772*	*+52 81 8134-0403*	*+33 380-253-000*	*+65 6863-6580*	*+86 512-6283-8383*	*+1 320-259-2554*	*+1 800-432-2386*