MEDICAL APPLICATIONS Improving performance and supporting sustainability with

MATERIAL SOLUTIONS

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Imagineering Plastics ®

INNOVATIVE THERMOPLASTICS



For more than 40 years, **RTP Company** has been providing the healthcare industry with innovative thermoplastic compounds for medical tools, tech, devices, and equipment. We work with all medical grade resins available on the market to provide you with a wide variety of solutions, ranging from high volume engineered materials to high tech specialty compounds.

When you are designing or manufacturing products used in the healthcare industry, RTP Company is your source for thermoplastic material solutions!

One of the biggest advantages to utilizing thermoplastics is the freedom to design complex, consolidated parts. Whether your goal is to improve strength and impact resistance, reduce part weight, control heat or static, introduce color, resist wear and friction, or extend the service life of your plastic parts, we have a material solution to fit your requirements.

From pipettes and catheters to insulin management systems and surgical robotic equipment, our passion is finding a material to fit your specific needs and improve the performance of your application!

To learn more, contact your local RTP Company representative, or visit www.rtpcompany.com to get your project started today!

Accelerate your product development with our guidance in selecting the correct thermoplastic material to meet your cost, performance, and regulatory goals. We accomplish this by maintaining a database of known biocompatible materials that tracks the regulatory performance of resins, additives, and colorants.



Once your material is selected, formulation control is critical to ensuring the integrity of your medical application. Our "No Substitution" control service ensures that your custom formulation is maintained using a specific nomenclature that signifies no raw material changes or substitutions without customer authorization.

STEPS TO SUCCESS

Should there ever be a need to change your formulation, we notifiy you of the change, and provide you with information on the type of change, timing, and material options. In addition, our suppliers have been carefully vetted for their commitment to supplying the medical market in order to reduce supply chain risks.

RTP COMPANY TECHNOLOGIES



THERMOPLASTIC ELASTOMERS (TPEs)

From off-the-shelf resins to complex custom compounds, our TPEs provide unique benefits for medtech devices, tools, and equipment. Available in durometers ranging from 10 shore A to 65 shore D, our elastomers are commonly used in parts that require "soft touch" surfaces, improved surgical grip, and high performance seals, closures, and connectors. Our Nylabond[®] and Polabond[®] materials are bondable to various substrates including Nylon, ABS, PC, PC/ABS, and other engineering resins while our high temperature RTPrene[®] technology bonds well to nylon substrates for applications used in extreme environments.

Your applications will benefit from:

- Pre-tested ISO 10993 bondable grades, available with a statement of biocompatibility
- Reduced costs through bondable two-shot molding with rigid plastics
- Compatibility with gamma radiation and ETO sterilization
- Customization for color, softness, conductivity, lubricity, etc.
- Ability to replace latex, silicone, and PVC

APPLICATION EXAMPLE



Insulin Management System RTP 6000 Series bondable TPE and RTP 300 Series polycarbonate

- Utilizes FDA compliant ingredients, including light diffusing technology
- A thermoplastic elastomer and precolored white PC are bonded as part of a two-shot injection molding process
- Device maintains a water tight seal even after repeated cleaning

CONDUCTIVE/THERMAL MANAGEMENT



We offer a range of conductive compounds that provide protection against static accumulation, electrostatic discharge (ESD), and electromagnetic interference (EMI), while taking into account facets like biocompatibility, chemical resistance, sterilization compatability, and processability.

For applications such as inhalers, ECG sensors, pipette tips, IVD testing equipment, and electronics protection, we can formulate:

- Clear permanent antistatic protection known as PermaStat[®] compounds to dissipate static charge and facilitate accurate dosages for inhaled powders/aerosols (minimize buildup or sudden release)
- Fully conductive compounds for testing and monitoring equipment related to muscle stimulation and response
- Material selections including carbon black, transparent, colorable, and non-sloughing
- EMI shielding grades

For thermal-related applications, such as sterilization cases, microtiter plates, patient drug/blood bag warmers, our thermal management compounds can:

- Dissipate or conduct heat through plastic surfaces
- Resist chemicals better than metals
- Provide electrically conductive or insulative technologies

APPLICATION EXAMPLES

Asthma Inhaler

PermaStat® 600 Series anti-static ABS

- Charge-neutral all-polymeric, permanent anti-static technology
- Achieves predictable dry powder and aerosol drug delivery
- Offers a balance of low resistivity, high clarity, and strength

Diagnostic Testing Pipette Tips RTP 100 Series high flow conductive polypropylene

- Superior melt flow to 20g/10mn for fast cycle times and high cavitation molds
- Consistent conductivity properties for dependable diagnostic results
- Improved hydrophobic release properties

BUILDING STRUCTURE



Our Structural Compounds provide solutions in applications requiring excellent mechanical and/or thermal performance. Medical parts and components made from these structural compounds have excellent impact resistance, aesthetically pleasing surfaces, and lower density for lighter weight.

Short Glass Fiber (SGF) Compounds

Chopped glass fiber provides strength and stiffness to our SGF compounds, which in turn provide good, general purpose reinforcement properties. Benefits include:

- Increased flexural modulus and toughness when compared to non-reinforced plastics
- Replacement of metal parts and ability to consolidate parts with lightweight, strong materials

Xtra Performance (XP) Compounds

RTP 100 Xtra Performance Compounds are PP compounds formulated for higher strength, modulus, and impact properties than SGF PP Compounds, exhibiting up to 20% higher modulus values and more than 50% improvement in impact resistance. These unique compounds effectively bridge the gap between SGF and LGF Compounds, and at a reasonable cost.

Carbon Fiber (CF) Compounds

Our CF Compounds provide tremendous stiffness without adding significant weight to a medical part or component. These high-end materials, which are commonly used in aerospace, are finding broader use for lightweighting in the healthcare market.

APPLICATION EXAMPLE

Surgical Drill Guide RTP 300 Series glass fiber reinforced polycarbonate

- Very stiff and dimensionally accurate, sterilizable compound
- Achieves a complex shape without the machining steps necessary
- Less than half the cost of comparable stainless steel versions



In addition to an improvement in strength and stiffness versus SGF Compounds, LGF Compounds provide improved impact strength and are commonly used for metal replacement. In doing so, the overall weight of the medical device or equipment is reduced, often making it less expensive to produce and easier to move.

 Long glass fiber compounds offer superior stiffness, impact strength, dimensional stability, and creep and fatigue performance over short glass fiber reinforced plastics

APPLICATION EXAMPLE

Wheelchairs

Wheelchair components such as foot pedals, brakes, arm rests, and wheels can be made from our toughest thermoplastic compounds. For example, wheels undergo strict ASTM testing such as temperature, load capability and impact; our compounds have been proven very successful in these applications.

	RTP Company Property Comparison of Structural and Long Glass Fiber Compounds							
	Fiber wt. %	Specific Gravity	Unnotched Izod, ft-Ibs/in	Tensile Strength, PSI	Tensile Modulus, X 10 ⁶ PSI	Flexural Strength, PSI	Flexural Modulus, X 10 ⁶ PSI	
Polypropylene								
PP 40% GF - Standard	40	1.21	12.5	11900	1.01	18850	0.94	
PP 40% XP GF - Xtra Performance	40	1.21	17	17500	1.31	27000	1.16	
PP 40% LGF - Long Glass	40	1.21	17	17500	1.30	26000	1.20	
PP 40% CF - Carbon Fiber	40	1.11	9	16000	2.20	22000	2.00	
PP 50% GF - Standard	50	1.33	13	13775	1.52	21750	1.31	
PP 50% XP GF - Xtra Performance	50	1.33	18	19140	1.60	30500	1.45	
PP 50% LGF - Long Glass	50	1.33	18	18000	1.70	29000	1.50	
PP 50% CF - Carbon Fiber	50	1.20	5	17000	2.30	27000	2.50	
Nylon 6/6								
PA66 40% GF - Standard	40	1.46	21	27000	1.90	43000	1.68	
PA66 40% LGF - Long Glass	40	1.47	21	33000	2.00	48000	1.70	
PA66 40% CF - Carbon Fiber	40	1.31	20	40000	4.10	54000	3.70	
PA66 50% GF - Standard	50	1.56	23	30000	2.30	46000	2.10	
PA66 50% LGF - Long Glass	50	1.57	25	38000	2.40	56000	2.30	
PA66 50% CF - Carbon Fiber	50	1.37	15	36000	5.00	54000	4.00	

IMAGINEERING WITH RTP COMPANY



Let's partner together! The sky's the limit for your imagination ... bring your product designs, requirements, and material goals for your medical application.

When we combine your ideas with our engineering expertise, we'll be **imagineering plastics together**, a process that's both challenging and rewarding!

Frame Support and Handles

PP-based structural and color compounds for lighter weight, antimicrobial properties, colorability, and durability.

Control Panels

Antibacterial TPE, PP, and PC solutions that also maintain infrared/Bluetooth compatibility for remote operation.

Levers and Locks Precolored or PA compounds for durability, stiffness, and two-shot overmolding for grip.

Bed Castors and Wheels Colored TPU compounds overmolded on PA substrate with ESD for no static discharge, smooth operation, and colorability.

Monitor Housing PC/ABS alloy formulated for

good melt flow, impact resistance, and UL 94 regulatory requirements.

Control Covers

PC, ABS, and PP-based formulations with flame retardant packages to meet UL 94 requirements and resist impact.

Reusable and Disposable Devices

Pre-colored, engineered PPSU, PSU, and PEEK compounds with biocompatibility statements that can withstand autoclave, high heat, and multiple sterilization cycles.

Tool Arms

RTP 2000 HC, a unique polyester alloy that resists cracking and damage caused by harsh hospital disinfectants.

Needle Cap Impact-resistant PC compounds to protect needle.

Medication Cartridge

Abrasion Resistant compounds are strong, rigid, transparent, and resist scuff and mar for clearer viewing.

> Body Colorable and laser markable PC or PBT compounds to protect pen mechanism.

Dial

PFAS-free, internally lubricated wear resistant compounds for smooth operation of dosage dial.

www.rtpcompany.com

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SMOKE/HEAT/FLAME CONTROL



Many thermoplastics used in the medical industry are inherently flammable, and therefore require an additive package to meet industry flame standards such as UL94 V-0; in addition, they must function well in the end application.

We offer materials with differing physical properties that can address specific needs and issues associated with medical devices and equipment, including exposure to extreme temperatures and chemicals. We can also provide alternate materials that target different specifications or custom materials to address specific flammability or safety concerns, including halogenated or non-halogenated solutions.

Some medical applications that can benefit from flame retardant thermoplastic compounds include:

- Durable housings
- Enteral feeding and drug pumps
- Dialysis machines

APPLICATION EXAMPLE

ECG Cables

To meet global standards or UL certification, flame retardant compounds can be used for applications such as electrical cords to reduce the chances of heat, smoke, or flame spread. In addition, colored thermoplastics can be incorporated for easy visual recognition.

REDUCING WEAR/FRICTION

WEAR AND FRICTION RESISTANT COMPOUNDS

Our Wear and Friction Resistant Compounds solve a host of issues, including noise, abrasion, friction, and scratching/marring. Molded parts made from these compounds can be internally lubricated to provide noise reduction between mated or sliding parts. In addition, they provide protection from scratching and marring of surfaces, and corrosion resistance for handles, latches, gears, bushings, and more.

Wear and friction resistant compounds are ideal for injection pens, inhalers, valves, sliding mechanisms, safety syringes, and moving parts on medical devices, with benefits such as:

- Lower coefficient of friction, promoting smooth, unforced motion and eliminating "stiction"
- Minimization/elimination of external lubricants
- Reducing noise like motion-induced squeaking

APPLICATION EXAMPLE



Hospital Equipment Wear and friction resistant compounds are ideal for hospital equipment with moving parts to ensure smooth function and less noise, particularly for plastic-on-plastic components.

COLOR YOUR WAY



PRECOLORED COMPOUNDS AND ADDITIVE MASTERBATCHES

Items made from our Precolored Compounds and Additive Masterbatches use specific colors to draw attention, communicate instructions, enhance safety features, provide brand recognition, or differentiate sizes. We offer a standard color palette or you can request a custom color match.

Benefits of our precolored compounds include:

- Pre-tested ISO 10993 colorants, available with a statement of compatibility for:
- Part 5 Cytotoxicity
- Part 10 Irritation and delayed type hypersensitivity
- Part 11 Systemic Toxicity
- Combining color with gamma and UV protection
- Consistency of brand colors across the globe with our internal color controls

APPLICATION EXAMPLE



Lung Expiratory Pressure Device RTP 900 Series precolor PS

- Outstanding dimensional stability and heat resistance
- Maintains functionality through repeated cleaning and sterilization cycles
- FDA compliant material, including aqua colorant for housing

SPECIALTY COMPOUNDS

2000 HC/HC FR COMPOUNDS

This innovative and unique polyester alloy has been formulated for superior resistance to damage caused by hospital cleaners. While harsh chemical disinfectants are necessary to kill bacteria, viruses, and microbial organisms, they can also cause weakness, cracking, and catastrophic failure of plastic parts on hospital equipment.

In response to these issues, our engineers formulated unique combinations of resins and additives, and tested them for strength and functional performance after exposure to hospital cleaners. The resulting material, known as 2000 HC, provides outstanding resistance to damage from hospital disinfectants, even under molded-in stresses. This series of compounds is available in Flame Retardant and non-Flame Retardant versions, and can be further enhanced with properties such as UV resistance, EMI shielding, and colorability. With the exception of Birex[®] and Sani-Cloth Bleach[®] exposure, results showed that the RTP 2000 HC series had much better chemical resistance as compared to standard PC/ABS, as shown in the chart below.

Pass/Fail, ASTM D638 Tensile Strength/Elongation						
Disinfectant	RTP 2000 HC Series	Standard PC/ABS				
Birex [®] - Phenol	\checkmark	\checkmark				
CaviCide 1 [®] - Alcohol	\checkmark	×				
Cidex Plus [®] - Glutaraldehyde	\checkmark	×				
Incides N [®] - Alcohol	\checkmark	×				
Incidin Plus [®] - Glucoprotamin	\checkmark	×				
Incidin Pro [®] - Alcohol	\checkmark	×				
Sani-Cloth Active® - Quarternary Compound	\checkmark	×				
Sani-Cloth Bleach [®] - Chlorine	\checkmark	\checkmark				
Sani-Cloth Plus [®] - Alcohol	\checkmark	×				
Super Sani-Cloth [®] - Alcohol	\checkmark	×				
T-Spray II [™] - Chlorine	\checkmark	×				



LASER MARKABLE COMPOUNDS

Because the marks are permanent and resistant to wear and abrasion, lasers are often used for marking logos, serial numbers, bar codes, and other important information onto parts. We can formulate thermoplastic compounds specifically for laser marking, which provide design flexibility in marking flat, curved, or 3-D surfaces with simple to intricate patterns and produce durable, high contrast wear-resistant marks. Our ability to pre-test your formulation saves time and ensures the mark meets your expectations.

We formulate these specialized compounds for:

- Medical device packaging
- Dosage counters for injection pens
- Inhalers





Radiopaque compounds are used in medical devices that are inserted into the body for diagnostic or surgical procedures. They contain additives that make the devices visible under x-ray imaging or fluoroscopy, and are used to monitor device position for more accurate procedures. In addition, these compounds can selectively protect personnel and equipment from scattered/indirect x-rays. Sometimes, the compounds are formulated for high density to mimic the weight of surgical medical tools without the need for metal as a material.

Medical products benefiting from radiopaque compounds include catheters, surgical tools, radiation shielding, radioisotope (radiation therapy) shipping containers, dental products (prone to accidental ingestion), food delivery tubes, and collimators.

APPLICATION EXAMPLE



Epidural Anesthesia Catheter RTP 2900 Series polyether-block-amide (PEBA), biocompatible, radiopaque TPE • Easily observed during x-ray imaging

- Consistent radio pacifier loadings equals tight tolerance catheter extrusion
- Achieves uncompromised catheter operation and placement

GLOBAL MANUFACTURING, LOCAL SUPPORT

Whether you need a very specific compound or an unfilled resin, RTP Company works with over 60 thermoplastic resin systems and hundreds of modifiers to provide the right solution for you. We offer a wide range of technologies available in pellet, sheet, and film that provide properties such as:

- Color
- Conductivity
- Flame retardancy
- Structural
- Elastomeric
- Wear and friction resistance

With more than 20 manufacturing facilities, we formulate and produce our thermoplastic compounds worldwide, and support them locally by our expert sales and engineering staff. Wherever you are manufacturing your parts, components, or finished goods, we're there, too!

To learn more, contact your local RTP Company representative, or visit www.rtpcompany.com to get your project started today!

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Your Global Compounder of Custom Engineered Thermoplastics

RTP COMPANY THERMOPLASTIC TECHNOLOGIES

🥝 COLOR

We offer precolored resins, UniColor[®], Masterbatches (including Color Conduit), and cube blends for plastic parts ranging from automotive to rocket components and medical devices to toothbrush handles. Our Hueforia color experts provide color selection advice and precise custom color matching services.

We offer compounds for electrostatic discharge (ESD) protection, thermal management, 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.

🕕 HIGH TEMPERATURE

We formulate our high temperature compounds precisely to retain their performance properties, provide better dimensional stability, and offer excellent electrical characteristics in continuous-use high temperatures.

LONG GLASS FIBER

As pioneers in developing a proprietary pultrusion process, we've perfected the manufacturing of our Long Glass Fiber (LGF) Compounds. These pellets encapsulate long fibers for superior strength, stiffness and impact resistance, making them ideal for metal replacement.

STRUCTURAL

Our reinforced Structural Compounds are formulated to increase strength and stiffness, and provide resistance to impact, creep, and/or fatigue. These materials can be customized to meet cost and performance targets.



Our thermoplastic elastomers provide rubber-like performance with the processing benefits of thermoplastic resin. Our portfolio ranges from standard, in-stock resins to custom compounds designed to meet your specifications.



For stiff, lightweight, and impact resistant material, our Thermoplastic Polyolefins are your solution, providing excellent low temperature ductility, as well as UV- and scratch/mar-resistance.

🛞 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.

ENGINEERED SHEET

We're your one-stop-shop for thermoplastic sheet. We can offer you a unique material, designed with these technologies and extruded to meet your exact sizing requirements.



Through our sister company, Wiman Corporation, we can provide you with polymer film in a variety of resins, and customized with additives to provide specific properties.

No information supplied by RTP Company constitutes a warranty regarding product performance or use. Any information regarding performance or use is only offered as a suggestion for investigation for use, based upon RTP Company or other customer experience.

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



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