Greetings,

Thank you for your interest in RTP Company. We’d like to take this opportunity to tell you a little more about our organization:

**Whether your application is simple or complex, we can help you find a thermoplastic material to fit your needs.** Our engineers develop customized thermoplastic compounds in over 60 different resin systems for applications requiring color, conductive, elastomeric, flame retardant, high temperature, structural, and wear resistant properties.

Our conductive product line offers 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.

**We provide you with honest recommendations.** Private ownership allows us to be completely objective in our selection of resins and additives. Unlike larger companies, we are not obligated to use specific materials; rather, we’ll suggest the thermoplastic that will work best for your application, even if it is not one of our own.

**We’re here to support you.** With over 20 manufacturing plants located in the United States, Mexico, Europe, Singapore and China, our global team of sales representatives are available to serve you efficiently – no matter where you do business.

**Looking for samples?** Please contact us and tell us about your application! We typically offer five-to-ten day lead times for engineered samples, color matches, and production orders of standard materials.

**For more information**, please telephone (507) 454-6900, or visit our website at www.rtpcompany.com. We look forward to working with you!

Sincerely,

RTP Company
EMI Shielding

Engineered Thermoplastics for Managing Electromagnetic Interference (EMI) & Electromagnetic Compatibility (EMC)
Imagineering Plastics

RTP Company is a privately-owned global compounder of engineered thermoplastics. We offer customer-driven material solutions for multiple processes, including injection molding and extrusion. We work with more than 60 engineering resins to create a unique compound with your precise combination of conductive, flame retardant, color, structural, and wear resistant properties. RTP Company has more than 20 manufacturing locations, plus sales representatives throughout the world that will meet your needs with short lead times for samples, color matches, and standard production orders.

From the Start, Partner with RTP Company

- **Innovative, value-added EMI and EMC solutions,** not off-the-shelf materials.
- **Engineered thermoplastics** that optimize your design and reduce manufacturing costs.
- **Short lead times** that expedite prototyping and streamline production.
- **Consistent quality** that you can rely on globally.
- **Responsive, personalized service** from experienced materials experts.
EMI Shielding

Custom Compounds from RTP Company

Reliable and Flexible
EMI shielding compounds from RTP Company offer reliability and value in a wide range of applications where EMC is required. These materials provide designers and processors with tremendous flexibility and significant benefits over metal, metallized coatings, foiling, and other EMI technologies.

Custom Formulations
Begin your search for a unique EMI shielding compound with RTP Company. Our engineers apply their knowledge of EMI principles and material capabilities to create a plastic compound that’s ideal for your application. Instead of offering just a few standard products, we routinely develop custom compounds offering multi-property solutions such as conductivity, flame retardance, structural reinforcement, color, and wear resistance.

CASE STUDY
FLEXIBILITY COMBINED WITH SHIELDING
An RTP 2700 Series styrenic thermoplastic elastomer compound provides EMI shielding and is pliable enough to serve as a gasket or seal. Developed to shield two halves of a cellular telephone housing, these materials have potential uses throughout the business equipment and electronics industries. The compound features volume resistivity of $10^1$ ohm-cm.
Device Design is Key to EMI Control

Proper circuit design/grounding and selection/placement of components (including specially designed filters) within a device are common methods for preventing emission or reception of EMI.

When such methods are not sufficient to meet agency standards, achieve proper operation of the device, or are not economical, incorporating an RTP Company thermoplastic compound can provide the additional protection necessary for success.

Typically, EMI shielding compounds utilize stainless steel conductive fillers in a thermoplastic matrix to provide the necessary shielding. These compounds can also incorporate flame retardant additives, wear additives, reinforcements, and colorants in a single custom material solution to meet the requirements of your application.

CASE STUDY
EMISSION AND RECEPTION CONTROL

When point-of-sale printers sit side-by-side with other electronic equipment, EMI can interrupt their operation. Shielding in this printer base protects the printer’s components from incoming EMI and prevents emissions of EMI to other susceptible equipment.

The RTP 300 Series polycarbonate specialty compound contains stainless steel fibers that provide critical shielding properties. This precolored compound has a UL94 flammability rating of V-0 at 1/8" (1.5 mm) and is UL Yellow Card listed.
Electromagnetic Interference

The most common type of EMI typically occurs in the radio frequency range of the electromagnetic spectrum, from 10 KHz to 77 GHz. This energy can be radiated by computer circuits, radio transmitters, fluorescent lamps, electric motors, internal combustion engines, lightning, and many other sources.

Device failures caused by interference – or “noise”– from electromagnetic energy are increasing due to the growing number of products that contain sensitive electronic components. The smaller size and faster operating speeds of these components often make it more challenging to manage electromagnetic pollution. Increased device frequencies over 10 GHz are now common, resulting in proportionally decreased wavelengths that can penetrate very small openings in housings or enclosures.

Increasingly strict regulations address device emissions. At the same time, a product’s immunity to external EMI determines its commercial success or failure. To comply with regulations on both emissions and susceptibility, designers and manufacturers integrate shielding into their product designs through a working knowledge of EMI behavior and shielding techniques.

Electromagnetic Compatibility

Standards governing EMC also refer to the topic as shielding against EMI. While EMI shielding can be partially controlled through the use of suppression components and good circuit design, it is the device enclosure that is often called upon to provide functional EMC compliance.

EMC is a property of overall system design, including the enclosure, the connectors, and the internal electronic components. Weakness in any one of these parts will reduce EMC. Conversely, strength in any one alone cannot ensure EMC. A well-designed electronic device will incorporate good EMC practices in all of these areas.

CASE STUDY

SIGNAL BLOCKING COMPOUNDS FOR CRITICAL GEAR CASES

This protective case for cell phones provides crucial blocking of GPS and cell phone signals to protect military personnel who are working in danger zones.

RTP Company’s EMI Polypropylene compound provides over 90 dB of signal reduction between 300 and 1500 MHz, blocking standard cell tower, GPS, various Apps, and other tracking devices.
There are three scientific phenomena that occur as electromagnetic waves encounter material:

**Absorption:** Energy loss as electromagnetic waves pass through a material. This energy loss is usually converted to thermal energy. Absorption is highly dependent on the thickness and magnetic properties of the material.

**Reflection:** Energy reflected when electromagnetic waves encounter a material. Reflection can occur from both the front and back surfaces and from additives within the material, independent of the material’s thickness.

**Transmission:** Energy passing through a material with minimal disturbance.

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**Shielding Effectiveness Data**

Figure 1 shows the effects that different additives, loading levels, and material thicknesses have on EMI Shielding effectiveness. Data is based on ASTM D4935 testing that uses a plane-wave, far-field, EM wave to determine the shielding effectiveness of a given material.
EMI Shielding Compounds Instead of Coatings

RTP Company conducted a study that compared cost per piece for achieving an EMI shielding level of at least 40 dB on a plastic part. The study considered RTP Company’s EMI shielding compounds versus three coating methods: painting, metallic plating, and vacuum metallizing. The plastic part was a housing 2” x 2” x ½” (51 mm x 51 mm x 13 mm) in size, with wall thickness of 0.120” (3.050 mm). Costs reflect volumes of 10,000 and 100,000 parts.

Two RTP Company compounds were selected for the study, both of which exceed the minimum requirement for EMI shielding:

- EMI 661 - ABS with 10% stainless steel fiber
- RTP 682 HEC - ABS with 15% nickel-coated carbon fiber

A drawing of the plastic part was submitted to several coaters. Their prices included a unit cost to apply the coating, a tooling/f ixturing/masking cost, and a scrap rate.

The part design and shielding specifications were appropriate for a conductive coating process. Yet, even under such favorable conditions, EMI shielding compounds are competitive or less costly than conductive coatings for both low and high volume applications.

Figure 2:
Cost Per Part for Low and High Volume Parts

There are two primary ways to shield plastics: EMI shielding compounds or conductive coatings.

Download our complete white paper “Dramatic Cost Reductions for Electronic Device Protection”.

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.

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 1-800-433-4787 (U.S. only), by Email at rtp@rtpcompany.com, or visit www.rtpcompany.com