



Prominent Plastics, From the **Packaging Company** to Your Home

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Plastic is one of the most ubiquitous materials on the planet, and in the hands of a skilled **plastic manufacturer**, it's also one of the most versatile. The same type of plastic that your milk jug is made from could also be used in life-saving protective equipment and medical supplies.

Because the different types of plastic can take so many forms, it's good to know how **plastic molding companies** manufacture the things you use on a daily basis. That way, you can understand just how much care and precision goes into the creating even the most unassuming objects—when it comes to plastic, nothing is ever as simple as it looks

PET Plastic Packaging

PET plastics are some of the most common materials used on the market today—in fact, most people use one of these types every single day. It's used in everything from **packaging for cosmetics** and food to bottles for soda and cleaning chemicals.

Renowned for their recyclability and versatility, these plastics—all types of polyethylene terephthalates—are popular with **plastic manufacturers** for a number of reasons:

- Easy to recycle
- Crystal clear
- Safe and leak-proof
- FDA-approved
- Lightweight
- Well-suited for thermoforming



Plastic Manufacturer Applications for PET Plastics

Because this material is so versatile, **packaging manufacturers** utilize PET plastics for a wide variety of different applications across industries. Some types of PET plastic applications that you may use on a daily basis include:

- Water and soda bottles
- **Packaging for cosmetics**
- Chemical cleaner bottles
- Food containers
- Salad dressing bottles
- Peanut butter jars

After they're recycled, these plastics can take the form of RPET—the R stands for "reprocessed." **Plastic manufacturers** use this material to make products you may not expect, like:

- T-shirts
- Shoes
- Fleece sweaters
- Car parts
- Fuse boxes
- Sleeping bag insulation



PET and the Challenge for Packaging Companies

While PET is a widely used **packaging solution**, manufacturers have to demonstrate precise care when molding it. During the molding process, it's called APET—the A stands for "amorphous."

If kept in the APET stage for too long, the plastic crystallizes, developing a hazy consistency and turning brittle. An over-crystallized package is imperfect aesthetically and functionally, so **plastic manufacturers** have to carefully monitor the material throughout the thermoforming process, making sure that it stays in the proper state until it takes its final shape.

How Plastic Manufacturers Create PETG

Thermoforming plastic is like baking—if you add a single ingredient, it can change the entire end result! That's what happens when **packaging companies** create PETG, also known as polyethylene terephthalate - glycol modified.

When glycol is added to the mix to make PETG, the material can no longer crystallize. That takes away the risk of the plastic developing that murky, brittle consistency that can ruin a product. The reason manufacturers don't just always add glycol to PET, though, is because it changes the consistency of the material in other ways, too, and it isn't necessarily ideal for the same applications that PET is. Some of the features of this material include:

- Total transparency
- More impact-resistant and chemical-resistant than PET
- Thermoforming without the risk of crystallization
- Still FDA-approved for food and medical products

PETG Applications and Products

PETG is a strong, impact-resistant material, making it perfect for housing and protecting high-value items without sacrificing visual clarity. A few typical applications for which **packaging manufacturers** utilize PETG include:

- Advertisement displays
- Packages for electronic devices
- **Medical packaging**
- Medical braces
- Packaging for pharmaceuticals



What Packaging Companies Have to Remember

When glycol is used to create PETG, it doesn't just eliminate the risk of crystallization—it has other effects, too. For example, it's more likely to be affected by UV light, and loses some of its integrity when used outdoors for too long. While the material has high impact-resistance and generally won't break, it is susceptible to scratching.

During the thermoforming process, PETG also takes on a sticky consistency that makes it somewhat tricky to work with. For a **plastic manufacturer** to successfully utilize PETG, it has to have experience working with the material and a firsthand knowledge of the delicate touch it requires. Otherwise, the stickiness can result in imperfections in the final product, and denesting issues.

CPET: Durability Trusted by Plastic Manufacturers

Another relative of the PET family, CPET is so named because it is crystallized. Unlike a typical PET package, for which crystallization is a bad thing, CPET products are crystallized on purpose—albeit very, very carefully.

When **packaging companies** create CPET, they do so by adding a nucleating agent during the thermoforming process. The material is then intentionally heated to induce crystallization, and once it is crystallized to the target density, it is exposed to cold that will halt the process, giving it properties like:

- Ability to endure frozen temperatures
- Durability to last in hot ovens
- Microwave safe
- Melt-resistant when containing hot items

Uses for CPET's Strength

Because it can withstand relatively extreme temperatures, **packaging manufacturers** often use CPET for kitchen tools and food use. For example, a few different applications for the strength and durability of CPET include:

- Cupcake pans
- Cake molds
- Microwaveable takeout containers
- Frozen dinner trays
- Food delivery packaging

Typically, CEPT plastic products can withstand temperatures as high as 375 degrees Fahrenheit.

Why Packaging Companies Crystallize with Caution

When a **packaging company** makes CPET plastic products, it has to be careful about how much crystallization it allows to happen. If the **plastic manufacturer** crystallizes the material too much, it loses its resiliency and will shatter. On the other hand, if it doesn't crystallize the material enough, it doesn't develop the strength that it needs to withstand high temperatures, and it will melt.

As the crystallization takes effect, the material becomes denser and denser, and this is how **packaging companies** determine whether or not the material has crystallized just the right amount. They use a density scale to measure how much crystallization has taken place, and when the material reaches that level, they stop the process with a cold mold.

The Uncommon Strength of HDPE

Known as HDPE, High Density Polyethylene lives up to its name no matter what industry it's being used in. It isn't just **packaging companies** that take advantage of this strength—**plastic manufacturers** of all types utilize HDPE for applications that require its unique strength and durability. The benefits of this plastic include:

- Extreme impact resistance
- Withstanding high temperatures
- Safe enough for medical products
- Strong enough for military applications
- Cost-effective for use in everyday consumer goods packaging

What Plastic Manufacturers Make with HDPE

HDPE is uniquely versatile because while it can be strong and reliable enough to save lives, it can also be produced relatively inexpensively. This means that people rely on HDPE in a wide variety of different forms, from the typical to the very specialized. Some products that **plastic molding companies** make using this material include:

- Mortars
- Chemical piping
- Hard hats
- Plastic grocery bags
- Milk jugs
- Soda bottle caps
- Gas tanks
- Laundry detergent bottles



HDPE's Major Drawback

HDPE is tough, but **plastic manufacturers** that work with the material know that it isn't perfect. In the hands of an inexperienced **packaging company**, in fact, this material can cause more problems than it solves. This is because HDPE has a shrink rate that is considerably higher than other plastics, and in untrained hands, that fast shrinkage can be difficult to work around.

In order to accommodate the high shrink rate of HDPE, manufacturers have to compensate when they create the plastic mold, accurately predicting just how much the material will shrink during the forming process.

HIPS and Packaging for Retail

HIPS, or High Impact Polystyrene, is yet another type of plastic that many people use on a daily basis. This material has a few industrial applications, but is most commonly used in consumer goods—especially ones you see in the record store and the break room at work. This material is naturally translucent, but can be colored relatively easily, as well. Other advantages of HIPS that make it popular with **plastic manufacturers** include:

- Impact-resistant
- Low shrink rate
- Hygienic for use in food-related applications
- Inexpensive
- Lightweight
- Temperature-resistant

Plastic Manufacturer Uses for HIPS

Because of its advantages that include extreme cost-efficiency, light weight and insulating properties, HIPS is utilized for a variety of consumer goods, including one-time-use products and long-lasting applications. Some products you use regularly that **plastic companies** make using HIPS include:

- Plastic spoons, knives and forks
- Disposable food containers
- CD jewel cases
- Refrigerator insulation

And because HIPS retains its thermoforming properties better than many other **plastics, manufacturers** are able to take the regrind—the bits and pieces left over after manufacturing—and repurpose it for other uses.

The Downside of HIPS

Despite all of its advantages, HIPS has a notable flaw: It's a remarkably brittle material. While its impact resistance means that a HIPS-made package won't shatter on impact and will protect its contents, it will crack. When it meets concentrated resistance, its brittleness will make it snap—for example, you can break a CD jewel case in half with relative ease. That in mind, though, HIPS is a highly cost-efficient material, so **plastic manufacturers** typically use it to make products that are to be used once and recycled or otherwise cheaply replaced.

Fun and Games with ABS

Thanks to its unique combination of rigidity, durability and light weight, ABS is utilized by **plastic manufacturers** for a wide variety of products. It's strong, safe and reliable, so **plastic molding companies** use it to make products that include:

- Golf clubs
- Lego bricks
- Canoes
- Protective padding
- Musical instruments
- Luggage
- Furniture
- Kitchen appliances



Improper Molding of ABS Plastics

If a **plastic manufacturer** isn't careful, products made using ABS plastics can easily be compromised during the molding process. The material has to be thoroughly dried before it's extruded—the process by which raw plastic is melted to make one large piece. If it isn't completely dry before extrusion, bubbles form in the plastic, ruining its appearance and compromising the strength. Any **plastic molding company** that works with ABS must be careful to ensure that no bubbles form and the material retains its unique strength.

PVC: A Customizable Material

Polyvinyl Chloride has a few more recognizable names, including PVC and vinyl. On its own, PVC isn't ready for a **plastic manufacturer** to create a final product. Instead, it requires the use of additives that change its composition. These additives, which may include heat and UV stabilizers, flame retardants, smoke suppressors, pigments and impact modifiers, are chosen based on the needs of the eventual product. Essentially, PVC can be customized to make it more suitable for whatever you want to make with it. Depending on the additives used, PVC can be:

- Tough
- Flexible
- Waterproof
- Sterile
- Cost-efficient
- UV-resistant



What Plastic Manufacturers Make with PVC

Because the use of additives allows **plastic manufacturers** to convert unfinished PVC in so many ways, this material can ultimately be used for applications that include inexpensive domestic products and sterile, life-saving medical equipment. Some products that are made using PVC include:

- Commercial signs
- Plumbing pipes
- Flooring
- Toys
- Records
- Electrical cables
- Medical Equipment



Because PVC products can be made so that they do not leak or crack, and because it is both cost-effective and sterile, many medical products like IV tubing are made using this material. In fact, PVC products account for almost one-third of all plastic medical products.

Considerations in the **Molding of PVC Plastics**

Plastic manufacturers and consumers have certain things they must consider when choosing PVC, because while it is often a cost-effective alternative to materials like metals, it can also be used improperly. For example, certain plasticizing additives used in the forming of PVC products make the material more flexible and durable—over time, however, those plasticizing agents can wear off, leaving the material brittle. If PVC pipes are improperly installed, then, they may eventually begin to crack—proper, responsible installation, however, leaves PVC exceptionally strong. While not recycled as frequently as alternative materials like PET or PETG, PVC can be formulated to be comparably stronger and longer-lasting.

The Increasing Popularity of Bioresins

While most traditional resins are petroleum-based, increasing demand for environmentally friendly materials and other green technology has renewed popular interest in bioresins, and **plastic manufacturers** have noticed. So what are bioresins, exactly?

Bioresins are materials made from renewable resources, which make it an environmentally sound form of **biodegradable packaging**. Traditional plastics are so tightly bonded at the molecular level that they typically can't be broken down by decomposer organisms. Bioresin **plastic packaging**, however, is made from natural resources and can be broken down by microbes relatively easily.

Bioresin Costs and Materials

Until recently, bioresin **plastic packaging** has been prohibitively expensive to produce and use on a large scale. **Plastic manufacturers** are now able to work and experiment with the material more than ever before, though, and its pricing is competitive enough to merit mass production. Some of the products that can be used to produce bioresin plastics include:

- Corn
- Potatoes
- Soy
- Plant sugars
- Wood fibers



Bioresin Drawbacks

Despite modern advances in bioresin technology and **biodegradable packaging**, the materials are not necessarily as resilient as other types of plastic. For example, bioresins have a relatively low heat deflection temperature—they start to warp at relatively low temperatures. Different types of bioresin **plastic packaging** can warp at temperatures as low as 110, 135 or 140 degrees Fahrenheit, demonstrating that despite the advances in cost-efficient production, these eco-friendly materials have not yet been perfected.

In Conclusion

As you've seen, there's no such thing as something that's "just plastic." Like different breeds of a the same animal, the different types of plastic all have distinct advantages and disadvantages that set them apart.

Now that you know more about how **plastic manufacturers** work with these materials, you can see how the objects you rely on every single day are constructed with the utmost of care—and how the tiniest manufacturing flaw could irreversibly compromise a product that seems so simple.

To learn more about the types of materials that **plastic molding companies** work with on a daily basis, visit [Plastic Ingenuity](#).