

DEMYSTIFYING RECYCLING PLASTIC

You may have seen the [plastic resin chart](#), but what do those numbers actually mean, and why should they be important to you?

The industry calls it the “resin identification coding system.” It indicates the type of plastic your product is made from and is ultimately your guide to recycling that plastic.

While the codes were initially developed to meet the needs of recyclers, they create a uniform system that is now used by curbside communities and other plastic recycling programs. Today, more than 80 percent of Americans have access to a plastics recycling program.

So, let’s break down the system into simple, non-industry terms. Once you have a handle on what materials make up your plastic, you can make a better decision from purchase to disposal.

Plastic #1 – PET, PETE



Nearly eight out of every 10 plastic bottles will end up in a landfill.

Polyethylene Terephthalate

Where You’ll Find It:

- Bottles for water, soft drinks, juice, sports drinks, mouthwash, ketchup, beer and salad dressings
- Food jars, such as peanut butter, jelly, jam and pickles
- Microwavable food trays

Why They Use It: Plastic #1 is a clear plastic that is ideal for beverages because of its moisture-barrier properties. This material has smooth surfaces and is made for high impact. So drop it, roll it or throw it – the resin will hold its shape and protect the substance inside.

The Lowdown on Recycling: Plastic #1 is one of the most common and highly recycled resins. Most curbside programs will accept this plastic in bottle form. Plastic #1 is also the main resin targeted with

container deposit laws, also called bottle bills. A container deposit law requires a minimum refundable deposit on beverage containers in order to ensure a high rate of recycling or reuse. Currently, 11 states have bottle bills in place.

Need-to-Know Info:

1. Recycling a single [plastic bottle](#) can conserve enough energy to light a 60-watt light bulb for up to six hours.
2. Recycled plastic bottles can be made into products such as clothing, carpeting, detergent bottles and lumber for outdoor decking.
3. According to the EPA, while overall recovery of plastics for recycling is relatively small – 2.1 million – recovery of some plastic containers has reached higher levels. PET bottles were recovered at a rate of 27 percent in 2008, according to a [recent report](#).

Plastic #2 – HDPE



In 2007, more than 830 million pounds of plastic bags and film were recycled, a 27 percent increase from 2005. Photo: Amanda Wills, Earth911.com

High Density Polyethylene

Where You'll Find It:

- Shopping bags
- Milk jugs
- Bottles for shampoo, dish and laundry detergent, household cleaners
- Water and soda bottles
- Cereal box liners
- Shipping containers

Why They Use It: Plastic #2 is translucent and relatively stiff. These properties create a strong barrier, are suitable for high temperatures and the material is virtually crack-resistant. It is also well-suited for products that have a longer shelf-life. Its chemical resistance make it ideal for bleaches and detergents.

The Lowdown on Recycling: [Plastic bags](#) are generally made from plastic #2. The material can hold up to 2,000 times its own weight, making it the perfect product for transport. However, because of their light weight, plastic bags are often hard to recycle and left out of curbside programs. But most major grocery store chains have in-store recycling bins for plastic bags.

There is a high demand for this material, and in most areas, demand exceeds the available supply, because many consumers are not aware that collection programs are available in stores. The trick is actually remembering to take those excess bags with you the next time you go shopping.

Need-to-Know Info:

1. According to the EPA, only about 12 percent of bags and film were recycled in 2007.
2. Recycling or reusing 1 ton of plastic bags saves the energy equivalent of 11 barrels of oil.
3. Recycled plastic #2 content can be found in plastic lumber, buckets and crates, bottles for non-food items (shampoo, detergent, motor oil) and even curbside recycling bins themselves.

Plastic #3 – PVC, Vinyl



PVC is considered a difficult and expensive material to recycle. For this reason, much of it ends up in landfills.

Polyvinyl chloride

Where You'll Find It:

- Blister packs
- Clamshell containers
- Bags for bedding, medical shrink wrap, deli and meat wrap
- Pipes, siding, window frames, fencing, decking and railing

Why They Use It: PVC is very strong and high-impact. Along with its brilliant clarity, plastic #3 is also resistant to grease, oil and chemicals.

The Lowdown on Recycling: PVC is not commonly recycled or recyclable, nor is it biodegradable. More than 7 billion pounds of PVC are thrown away in the U.S. annually, and only 18 million pounds – barely one-quarter of 1 percent – is recycled. The relatively new mechanical recycling process known as Vinyloop® technology, developed by Solvay Research & Technology, allows the complete separation of PVC material from the non-PVC materials that are often combined with it.

Need-to-Know Info:

1. PVC requires 20 percent less energy to produce than other plastics. It is also thought to save on fossil fuel use, as its principal raw material (nearly 60 percent) is chlorine-derived from common salt.
2. To make vinyl products flexible, controversial plasticizers known as phthalates are used, accounting for nearly 90 percent of total phthalate consumption. This translates into more than 5 million tons used for vinyl every year.
3. Energy-intensive chlorine production for PVC consumes an estimated 47 billion kilowatt hours per year – almost equal to the annual total output of eight medium-sized nuclear power plants.

Plastic #4 – LDPE



The U.S. EPA estimates about 31 percent of all municipal solid waste in 2005 was generated from packaging-related material.

Low Density Polyethylene

Where You'll Find It:

- Bags for dry cleaning, newspapers, bread, frozen foods, produce and household garbage
- Shrink wrap and stretch film
- Coating for paper milk cartons and beverage cups
- Container lids
- Squeezable bottles

Why They Use It: LDPE is predominantly used in film and packaging. Its toughness, flexibility and transparency made it ideal for use in products where heat sealing is necessary. It is resistant to acids, bases and vegetable oils as well.

The Lowdown on Recycling: Because plastic #4 is often in film form, it is sometimes not accepted in curbside recycling programs. However, its material is similar to plastic bags, and some major grocery store chains will accept this plastic packaging for recycling. Reducing your plastic packaging waste starts in-store. Go for products with less plastic packaging and film.

Need-to-Know Info:

1. The average growth rate of container and packaging waste through 2010 is estimated to be about 1.8 percent annually.
2. About 3 percent of all U.S. energy consumption comes from the production of packaging materials. Using recycled material for the production of packaging goods takes less energy than creating the product from the material's natural state.
3. Packaging and containers makes up about 56 percent of all plastic waste. About 75 percent of all of the waste comes from residential households.

Plastic #5 – PP



While most bottles are plastic #1 or #2, most of the bottle caps are #5 and cannot be recycled in the same process.

Polypropylene

Where You'll Find It:

- Yogurt, margarine tubs
- Medicine bottles
- Bottle caps
- Ketchup and syrup bottles
- Reusable plastic containers, such as Tupperware

Why They Use It: Polypropylene has a good chemical resistance, a high melting point and is a strong material. Therefore, it's ideal for reusable food containers and other packaging that requires durability. But while this resin is as common as a ketchup bottle, it's still often left out of curbside programs.

The Lowdown on Recycling: According to the American Chemistry Council (ACC), [plastic #5](#) is a similar resin to plastic #2, which makes it more appealing to reclaimers who can use the material for water filtration systems, shipping pallets, sheeting and automotive battery casings and garbage and recycling bins. Polypropylene can be recycled back into its original form, or it can be made into products such as buckets, paint pails, automotive bumpers, automotive battery cases, furniture and flower pots. It is also used in many woven reusable bags.

Need-to-Know Info:

1. Sixty-two percent of California communities now have curbside access to non-bottle food container recycling. Out of the 100 largest communities nationwide, about one-third have curbside recycling programs for plastic #5.
2. Even though they typically aren't printed with a #5 symbol, most plastic [bottle caps](#) (like those on water and soda bottles) are made from polypropylene.
3. According to the ACC, at least 325 million pounds of non-bottle plastics were collected for recycling in the U.S.

Plastic #6 – PS



Polystyrene used for food service packaging represents less than 1 percent by weight and volume of all landfilled materials.

Polystyrene

Where You'll Find It:

- Food service items (cutlery, plates, cups, bowls)
- Takeout containers
- Foam packaging
- Packing peanuts
- Compact disc cases
- Aspirin bottles

Why They Use It: Polystyrene is a versatile plastic that can be in both foam and rigid forms. As a foam, it is lightweight and comprised of 97 percent air. General purpose polystyrene is clear, hard and brittle. It has a low melting point but has an excellent moisture barrier, making it ideal for short-shelf products. Its low thermal conductivity also makes it perfect for insulation purposes.

The Lowdown on Recycling: According to a [report](#) by the Alliance of Foam Packaging Recyclers (AFPR), more than 65 million pounds of expanded polystyrene (EPS) packaging were recycled in 2007, while the number grew to 69 million pounds in 2008.

While most curbside programs do not accept plastic #6 or EPS, there are several community programs that will recycle the material. If there are no programs that fit your specific needs or are near your location, AFPR offers a [mail-in program](#) for consumers. Average shipping fees range from \$1.50 to \$9, based on the total packaging weight and volume.

Need-to-Know Info:

1. According to Virginia Lyle, deputy director of AFPR, all foam peanuts have recycled content, and most shape-molded polystyrene has at least 25 percent recycled content.
2. In the early 1900s, The Dow Chemical Company invented a process for extruding polystyrene to achieve a closed cell foam that resists moisture. Commercially known as Styrofoam, the material is the most widely recognized brand in insulation today.
3. Several cities and programs are against using polystyrene foam. In fact, San Francisco initiated a [ban](#) against all food service EPS containers.

Plastic #7 – Other



Products carrying the term "biodegradable" are only compostable in a commercial composting system.

Where You'll Find It:

- [Bio-based plastics](#) made from corn, potato or sugar derivatives
- Three- and five-gallon reusable water bottles
- Some citrus juice and ketchup bottles
- Oven-baking bags, barrier layers and custom packaging

- Any plastic product that does not fit into resin categories 1-6

Why They Use It: Plastic #7 the catch-all category for those plastic products that do not fit into 1-6. These plastics are multi-layered combinations of more than one plastic resin. Its usage and properties depend on the types of resins used to produce it.

The Lowdown on Recycling: Programs for the “other” category vary greatly by location. Since it is such a broad category, many curbside programs will not accept plastic #7 at all. Bio-based plastics are often lumped into this category as well. These plastics are often touted as more eco-friendly because they will degrade faster than other resins.

However, consumers should keep in mind that these plastics are only biodegradable in a commercial composting system. Generally, the plastic will not degrade in backyard compost piles because the temperature isn't high enough.

Need-to-Know Info:

1. The presence of BPA (bisphenol A) is a [controversial issue](#) for plastic #7. BPA is typically used as an additive in plastics manufacturing, as it makes the plastic more shatter-proof.
2. Plastic #7 includes two main types: acrylonitrile styrene or styrene acrylonitrile (referred to as AS/SAN), and acrylonitrile butadiene styrene (ABS). Both are prolific and are used to make high quality, strong plastics.
3. In the few instances when it can be recycled, plastic #7 quickly downcycles to non-renewable plastic. However, some plastic #7 products are considered to be e-waste and can be properly disposed of in an electronics recycling program.