

# How Many Times Can Plastic Be Recycled?



Plastic can be recycled one to 10 times, depending on the type, although most can be recycled only once. Postconsumer plastic is often turned into synthetic fibers, plastic lumber, insulation, and containers—whatever it becomes, though, will inevitably be a lower-quality item than the original product, hence why it's called “downcycling.”

Because the heating process shortens polymer chains, thus degrading plastic quality, a water bottle can't simply reincarnate as another water bottle—or *anything* food-grade, per stringent packaging requirements. However, [some plastics have more recycling potential](#) than others.

According to the [ASTM International D7611 Standard](#), plastics can be classified into seven types, identifiable by a resin

code in the center of the familiar embossed triangle. Here's a rundown of the recyclability of each.

## **Plastic #1 PET**

Polyethylene terephthalate, abbreviated PET or PETE, is commonly used for drink bottles and food containers. Although the recycling rate for PET plastic bottles in the U.S. is a meager 29.1%,<sup>1</sup> this category is regarded as highly recyclable compared to other types—it's picked up by most curbside programs and able to withstand the recycling process several times, depending on what it becomes in its post-consumer life.

When PET plastic is turned into a non-food container, it may be able to endure a second or third round of recycling, but when it's spun into polyester fiber—most often the case<sup>2</sup>—then it becomes more difficult to recycle because large-scale post-consumer textile recycling doesn't currently exist.

## **Plastic #2 HDPE**

High-density polyethylene is used to make bottles for beverages, personal hygiene products, motor oils, and laundry detergent. According to the Environmental Protection Agency, it's recycled slightly more frequently than PET plastic (29.3% versus 29.1% of the time<sup>1</sup>). HDPE plastics are picked up by most curbside recycling programs and often turned into pens, plastic lumber, plumbing pipes, and toys. Its thickness and durability make it easier to withstand the recycling process repeatedly.

In an experiment testing the recyclability of HDPE, ESE World B.V., a European manufacturer of waste and recycling storage systems, reportedly found that HDPE can be recycled 10 times; however, the study was conducted under highly controlled conditions that don't mimic mainstream recycling systems.<sup>3</sup>

## Plastic #3 PVC

Polyvinyl chloride—the stuff faux leather, vinyl flooring, and shrink wrap is made of—is not as commonly recycled. It's more challenging to break down for reprocessing because it's composed of so many different compounds and additives and, as a result, only about 65% of the U.S. population has access to PVC bottle recycling, and even less, 47%, have access to PVC non-bottle recycling.<sup>4</sup> Some sophisticated processes can separate these compounds and make new PVC for things like pipes, carpet backing, and fencing, but the difficulty and complexity of this process make it unlikely that the compounds would be strong enough to withstand recycling more than once.

## Plastic #4 LDPE

Low-density polyethylene is the dreaded “single-use” soft plastic that often winds up in the ocean, where [marine life tragically mistakes it for food](#). Grocery bags, sandwich bags, and cling wrap are made from it, and these items are not commonly accepted by curbside services, but an increasing number of supermarket drop-off programs are cropping up around the country. Typically, LDPE can be recycled only once because the quality is so degraded it can only be used for carpet treatment, trash can liners and similar single-use items.

## Plastic #5 PP

Polypropylene is what hard prescription bottles, deodorant containers, medical equipment, and bottle caps are made of. According to AZoCleantech, a trade publication for the clean technology industry, PP can be recycled four times<sup>5</sup>—into clothing fibers, brooms, garden rakes, and the like—however, only about 1% of it gets recycled despite 70% of Americans having access to PP bottle, jug, and jar recycling and 48% having access to PP cup, bowl, and tray recycling.<sup>4</sup> Though it

isn't as widely accepted by curbside services as, say, PET and HDPE, PP can be mailed into Preserve, a company that recycles #5 plastics via its [Gimme 5 program](#).

## Plastic #6 PS

Polystyrene, the category that contains Styrofoam, is widely considered the least planet-friendly plastic. This is the material that disposable cups, takeout food containers, egg cartons, and packing peanuts are made of. Traditional PS is not recyclable because it's formed from a liquid hydrocarbon that can't be broken down by standard recycling methods; however, *expanded* polystyrene (EPS), a rigid cellular plastic used for building insulation and electronics packaging, is.

EPS is not accepted by most curbside recycling services, but you can search for a local drop-off location [on Earth911](#). Postconsumer EPS is often made into plastic lumber and molding trim, so it can be recycled typically only once.

## Plastic #7 Other

Resin code #7 is used for miscellaneous plastics like polycarbonate (PC), used for CDs, laptop screens, and shatterproof windows, and polylactide (PLA), a biodegradable "plastic" made from corn starch or sugar cane. Not many curbside services will pick up #7 because it's such a catch-all category. (Some do, though, so check with your local solid waste management office.) Certain types, like PC, can be recycled, but others, like PLA, can't be. The good news is that PLA is compostable—just look for the PLA code under the chasing arrows.

### Tips for Reducing Plastic Pollution

- Know the seven resin codes and which can be recycled.

Recycling something that isn't recyclable or sorting incorrectly can contaminate a whole batch of otherwise good recycling and cause it to be rejected. Make a note near your home recycling of which plastics your curbside service accepts.

- The most eco-friendly next step is to [reuse your plastic waste](#), so turn bottles and jars into storage containers, seed starter pots, and more.
- Always remove caps before recycling bottles and dispose of them properly.
- Choose transparent plastics over colors—they're generally preferred and have the highest material value because they can be dyed. The next best color is white.

*For full references please use the source link below.*

**By Olivia Young | [Treehugger](#)**

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Introduction

Olivia Young covers a wide range of environmental topics, from low-impact travel to conservation. She is passionate about tiny living, climate advocacy, and all things nature-related.

Experience

Olivia Young is a freelance journalist who has written for Business Insider, Matador Network, The Field, and The Zoe Report, where she covered sustainability in the beauty industry for two years. Before that, she worked as a publicist for outdoor brands.

Olivia is an avid hiker and part-time van lifer whose passion for sustainability was prompted by seeing the effects of

climate change firsthand while traveling. Over the years, she has learned about environmental issues through the obsessive consumption of books and documentaries. She has been vegan since 2017 and strives for a zero-waste lifestyle daily.

## Education

Olivia earned her bachelor's degree in Journalism from Ohio University in 2013.