

The End of Separation Anxiety.

# How Avery Dennison CleanFlake™ labels make plastic bottles more recyclable



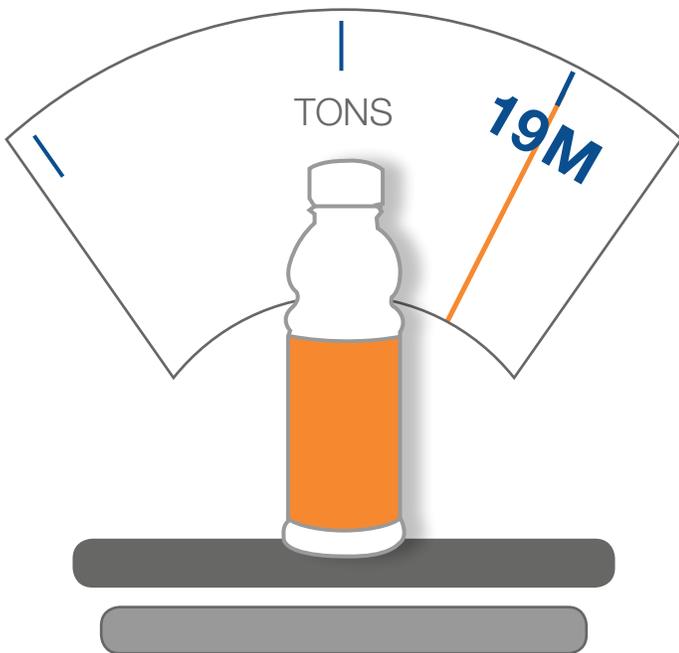
Inspired Brands.  
Intelligent World.™

Learn more at  
[www.averydennison.com](http://www.averydennison.com)

Millions of pounds of PET plastic go unrecycled every year because of contamination by labels and adhesives. An innovation from our label experts solves the label-separation problem.

Consumers and beverage makers alike love bottles made from polyethylene terephthalate, or PET plastic, the ubiquitous, transparent packages that hold beverages ranging from water to soda to sports drinks. According to a recent study by Smith Pira, global consumption of PET packaging will reach an estimated 19.1 million tons by 2017.

PET plastic bottles are recyclable. That's a good thing, because manufacturing new PET plastic requires large amounts of water and petroleum and contributes to the greenhouse gas emissions causing climate change. Using recycled PET (rPET) is much easier on the environment. Per kilogram, rPET uses 84 percent less energy and results in 71 percent less in greenhouse gas emissions than PET plastic. Put another way: for every 1,000 tons of PET plastic recycled, 53 billion BTUs of energy are conserved and 2,000 tons of greenhouse gas emissions are eliminated.



rPET vs. PET

Energy used  
 ↓ 84% less

rPet is much easier on the environment

GHG emissions  
 ↓ 71% less

Yet despite increasing recycling rates and the widespread use of rPET in a range of consumer goods, most PET plastic bottles are still made from more resource-intensive virgin PET plastic rather than rPET. That's due in part to the low number of bottle-to-bottle factories that produce 100 percent recycled PET plastic bottles. Another key reason: the labels found on most PET plastic bottles are a barrier to the recycling process.

**The problem with labels—and the CleanFlake™ solution**

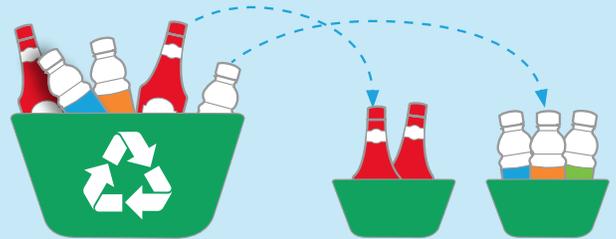
Conventional pressure-sensitive labels don't lend themselves to bottle-to-bottle recycling because they don't easily separate from the PET "flake"—the material produced when PET plastic bottles are ground up during the recycling process. As a result, label fragments, ink, and adhesive residue often discolor or otherwise contaminate the flake. Contamination means the flake can't be used for bottles or other food packaging and must instead be downcycled into products like fleece jackets, dog beds and sleeping bags. And some PET plastic doesn't even make it to downcycling. In 2010, between 24 and 32 percent of all bottles collected for recycling in the U.S.—some 40 million pounds—were lost from the recycling process altogether because of contamination.

To solve this problem, our scientists at Avery Dennison created CleanFlake labels. CleanFlake labels combine a thin, light film label and a unique, water-based "switchable" adhesive. The adhesive holds fast to the flake until its cohesive bond is broken during the bath that is part of the recycling process. When that bond breaks, CleanFlake label fragments separate cleanly from the flake and float to the top of the bath, leaving behind no residue or other contaminants. (It's essential for label converters who print on CleanFlake labels to use non-bleeding inks that also conform to recycling guidelines so that the inks wash away cleanly as well.)

CleanFlake labels make recycling PET plastic easier by coming off cleanly during the recycling process. Combining a unique, water-based adhesive with a thinner, lighter film label, CleanFlake labels separate from the bottle more readily and leave no residue. CleanFlake does its magic during the recycling bath.

## How CleanFlake™ Works

CleanFlake works with the recycling process to enable **bottle-to-bottle recycling.**



1. PET containers are collected and sorted.

ground up



the adhesive "switches off"



2. The PET containers are ground up into "flake."

3. The flake is placed in a caustic bath. Here, the adhesive in CleanFlake "switches off." Water breaks the adhesive's cohesive bond, allowing it to separate cleanly from the plastic.

zero residue = zero contamination



4. The low-density film labels float to the surface, while the heavier plastic sinks and is collected for reuse. There is zero residual adhesive—and no contamination—of the bathwater used to clean them.

shiny and new



5. Voilà! New bottles made from recycled PET, ready to use.

Once the labels have separated, the flake can be thoroughly rinsed and used to make new bottles that meet U.S. Food and Drug Administration standards for food-grade packaging. Because CleanFlake labels are a plug-and-play solution that is compatible with printing and labeling processes, they require no investment by companies that use them.

### Awards and approval

CleanFlake labels have been tested by an independent lab to confirm that neither their label stock nor their adhesive adversely affect the quality of rPET flake. Our own lifecycle analysis showed that if 50 billion square inches of typical pressure-sensitive labels were changed to CleanFlake labels, plastic-bottle solid waste would be reduced by 75 percent. That amounts to more than 53,000 tons of waste, equivalent to the annual waste generated by more than 30,000 U.S. households.

CleanFlake labels conform to the Association of Postconsumer Plastic Recyclers (APR) Design Guide™ for Plastics Recyclability and to similar guidelines set by KOPRA in Korea. The first pressure-sensitive label to be approved in Europe, CleanFlake has been okayed by the European PET Bottle Platform (EPBP) and recognized in the EPBP's design guidelines. CleanFlake is also recognized as a separate self-adhesive label category in RecyClass, a recyclability tool designed by Plastics Recyclers Europe (PRE), which enables brands to evaluate the recyclability of their packaging.

Since their introduction in 2012, CleanFlake labels have received multiple awards for sustainable innovation, including the Flexographic Technical Association Sustainability Excellence Award; the Label Industry Global Award for Sustainability; the GPEC Environmental Award from the Society of Plastics Engineers; the Koreastar, Asiastar and Worldstar packaging awards; and the Environmental Leader 2014 Product of the Year Award.

### Label it a success

By making it easier to produce food-grade-quality rPET, CleanFlake labels are helping processors bring more recycled PET plastic to market and enabling more bottle-to-bottle recycling. They are also helping label converters and beverage companies promote the sustainable practices that consumers increasingly demand.

Learn more about CleanFlake at [averydennison.com](http://averydennison.com). ■

