The Path to Bottle-to-Bottle PET Recycling Made Easier With Our CleanFlake™ Portfolio.
Label material advances allow brand owners to improve recyclability

Advances by Avery Dennison have leveled the playing field for PET recyclability and shelf-impact. Traditionally there has been a trade-off between the two; however, the CleanFlake™ Portfolio is designed specifically for the PET (polyethylene terephthalate) recycling stream. PET is a popular plastic package for food and non-food products because of its strength, thermo-stability and transparency.

Bottle-to-bottle recycling reduces landfills, enables up-cycling into food-grade rPET and capitalizes on the renewable energy in a PET bottle. Brand owners, packaging designers, raw material suppliers, converters, retailers, consumers and waste management companies collectively impact sustainability. While the overall goal is to make it easier to recover more materials, brand owners look beyond package design. They recognize sustainability can offer a significant point of differentiation as retailers’ demands and consumer awareness about the environment and natural resources carry increasing influence towards the brands that are put on store shelves and in shopping bags.

“NAPCOR applauds Avery Dennison and its customers for addressing a critical impediment to the efficient recycling of PET containers,” said Mike Schedler, National Association for PET Container Resources (NAPCOR) Director of Technology. “The popularity of pressure-sensitive and shrink labels makes it imperative that they be successfully removed as part of the standard PET reclamation process to increase their recyclability. We hope other label manufacturers and brand owners follow Avery Dennison’s lead.”

Promoting Sustainability, Creating Shelf Appeal and Capturing Share

Whether it’s a private label or a national brand, consumers will only spend about 2.5 seconds at the shelf deciding what product to buy. So what influences them the most? Increasingly, it’s brand recognition generated by compelling graphics and curvaceous containers. These two elements are the primary differentiators for in-store purchasing decisions.

But applying eye-turning graphic labels to shapely containers isn’t easy. Avery Dennison understands the consumer products market for PET packaging and the ongoing necessity to deliver innovative labels that perform on the shelf and reduce environmental impact. Developing solutions to meet the unique requirements of building a more sustainable value chain are behind its latest CleanFlake™ label constructions, which are designed to improve recycling efficiencies and the overall quality of post-consumer plastics.

Pressure-sensitive and shrink labels normally limit PET recyclability into food-grader PET due to adhesive contamination. However, Avery Dennison has developed a “switchable” pressure-sensitive label adhesive, SR3010, which can be “turned on” or “turned off” depending upon the environment or external stimuli. The water-based adhesive adheres to the PET bottle until the very end of its lifecycle, when the cohesive bond is broken at the recycler in the sink/float process, enabling the pressure-sensitive label facestock and adhesive to cleanly separate from the PET flake.

No residual adhesive remains on the PET flake, which could contaminate, discolor or otherwise diminish the value of the rPET. The “switchable” functionality is unique to SR3010 and not found in Avery Dennison’s general-purpose emulsion adhesives. The formulation of SR3010 is more complex, requiring a switching
mechanism and specialized components to turn the adhesive “on” and “off.”

But SR3010 isn’t the only way to improve recyclability. Avery Dennison’s CleanFlake™ Roll Fed Shrink Labels are the perfect plug-and-play solutions to increase sustainability and decrease waste. These labels use no adhesive, so they can be separated using two gavimetric processes—the sink float process or air elutration. During the sink float process, the label is cleanly separated from the PET flake in a warm caustic bath. The air elutration process allows air bursts to separate the label from the PET flake according to density.

**APR-Approved Solution**

Our CleanFlake™ Portfolio is a bottle-to-bottle recycling solution that offers a roll-fed shrink and two pressure-sensitive label options—clear and white facestocks. *Both film stocks have a density of less than 1.0 and have passed the Association of Postconsumer Plastic Recyclers (APR) recycle protocol for PET containers with plastic pressure-sensitive labels.*

Our 100-percent recyclable clear and white facestocks, and clear 40 and 50 MDO shrink films deliver the same quality, clarity and performance of traditional pressure-sensitive and roll fed shrink films. Compatible with flexo, gravure and offset printing techniques, brand owners have a simple, yet immediate, label replacement strategy that makes their PET product packaging recyclable and reusable safely.

**Increasing PET Recycling**

According to a market study by Smithers Pira, the global consumption of PET packaging will reach an estimated 19.1 million tons by 2017. PET consumption will continue to rise as brand owners look for creative ways to bring products to market. However, driving the need for sustainability is stronger legislative and resource protection programs. As such, the potential exists that a full reclamation infrastructure will not yet be established to effectively process these materials.

It is clear that reclamation facilities are vital to the industry. The need for more facilities is obvious, but those that are online today must be effective at sorting and processing. To make bottle-to-bottle recycling a workable venture, residual contamination of the PET recycling process due to label materials must be resolved.

These facilities purchase post-consumer bottles, sort and clean them to produce a viable flake for remanufacturing. The contaminated recycled PET can lead to color issues, loss of intrinsic viscosity, loss of clarity, extruder drip and black specs. Unfortunately, the end result is the contaminated materials are only suitable for down-cycling into lower-grade products. A greater reinvestment in technology is needed that makes it possible to up-cycle the regrind into something of greater value or use, thereby reducing waste and the need for virgin material.

**Improving PET Quality**

Contamination in the PET recycling process has been a long-standing issue for everyone involved in recyclable packaging. All plastic label options, from pressure-sensitive to shrink sleeve, impact PET packaging design and recycling. The APR recommends the use of plastic labels with a specific gravity of less than 1.0. These are preferred because they are easily removed in conventional water-based density separation systems. APR recommends avoiding label systems that sink in water since the substrate, inks, decoration, coatings and the top layer are contaminants in recycled PET flake.

Once separated, the PET bottles and their labels move onto grinding. Labels that stay on through the granulation and elutriation process can be separated from PET flakes for best quality.

At drying temperatures from 165 degrees centigrade or lower, label materials tend to clump and stick in dryers, requiring costly and unscheduled maintenance. It is also critical that the label be fully removed from the flake for subsequent processing. Finally, care must be taken to select caustic-resistant ink systems to avoid bleeding into the wash by being processed.
A Sustainable PET Recyclable Solution

Finding a solution that can maintain the integrity of the PET recycling stream is vital to the sustainable practices for brand owners and converters, the goal of which is to reduce, reuse and recycle. According to the APR and the American Chemistry Council (ACC), the PET container-recycling rate has more than doubled within the past 8 years—reaching above 30.8 percent in 2012. However, despite the increase, there was still a 4 percent decrease by weight in the total number of PET bottles and jars available for recycling.

So, while the recycling rate represents an ongoing commitment to recycling, the need to recycle more is clear. The challenge for packaging decision makers is to leverage this commitment by designing PET packaging in a way that enhances recyclability, especially for closed-loop, bottle-to-bottle operations.

Brand owners are increasingly aware of the global significance of maintaining the integrity of the PET recycling stream. To address the issue, reclaimers encourage the use of plastic label materials with a specific gravity of less than 1.0, as well as attributes like perforations on full-wrap shrink labels that aid in their removal and improve the overall recycling process.

Another option for a long-term solution is using a label that floats when processed, is compatible with the existing label stream and PET recycling infrastructure, and is consistent with the Design for Recycling Guidelines established by the APR. The guidelines can be downloaded at http://www.plasticsrecycling.org/technical-resources.

For more information about how to deliver improved sustainability with outstanding shelf impact, go to label.averydennison.com.

Worldwide Recognition for Innovative Solutions

LabelExpo, Global Green Award 2012  
LabelExpo, Global Green Award 2013  
Society of Plastic Engineers, Environmental Award in the Design for Sustainability 2013  
KoreaStar Awards 2012  
AsiaStar Awards 2013  
Worldstar Packaging Awards 2012

Association of Postconsumer Recycling (APR)  
Sustainability Award (PSL) 2013  
Association of Postconsumer Recycling (APR)  
Sustainability Award (Roll Fed Shrink) 2014  
Flexographic Technical Association, Environmental Excellence Award 2014  
Environmental Leader Product of the Year Award 2014

About Avery Dennison

Avery Dennison (NYSE:AVY) is a global leader in labeling and packaging materials and solutions. The company’s applications and technologies are an integral part of products used in every major market and industry. With operations in more than 50 countries and 30,000 employees worldwide, Avery Dennison serves customers with insights and innovations that help make brands more inspiring and the world more intelligent. Headquartered in Pasadena, California, the company reported sales from continuing operations of $6 billion in 2012.

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