



Tackling the Recycling Challenge of Bottles

Daily disposal rates in the millions of units per hour are creating a major industry around issues of waste and sustainability

By Robert Grace

Lightweight, durable plastics bottles are one of the most convenient and environmentally challenging products in use today. The paragon of utility, they are made by processing finely tuned resin through expensive, high-tech blow molding machines, using multimillion-dollar molds. Then, however, at least in the case of water and beverage bottles, they often are used by consumers for just minutes before being discarded.

Editor's Note: This is the first in a regular series of columns about plastics circularity, sustainability and recycling.

Studies suggest that people around the world buy a total of 1 million plastics bottles per minute—or almost 1.5 billion per day. Americans alone throw away some 2.5 million bottles every hour. The Container Recycling Institute of Culver City, Calif., estimates that more than 60 million plastics bottles end up in U.S. landfills and incinerators every day, translating into some 22 billion last year.

The resulting mountain of waste is becoming unmanageable. There are many reasons for it, beyond sheer volume. These include the lack of a national bottle bill (at least in the U.S.), an inadequate recycling infrastructure, mixed-material recycling challenges and callous indifference by a portion of the consuming public that tosses its trash wherever they like.

But still, the industry is working hard to

come up with innovative ways in which to tackle the challenges posed by plastics bottles, be it in their manufacture, recyclability or reuse. Here's a brief look at some recent technological developments that aim to help the cause.

Born From Carbon Emissions

Beauty products giant L'Oréal has partnered with carbon recycling company LanzaTech and French energy company Total to produce the world's "first cosmetic plastics bottle made from industrial carbon emissions."

First, Chicago-based LanzaTech captures industrial carbon emissions and converts them into ethanol using a unique biological process. Next, Total employs an innovative dehydration process, jointly developed with IFP Axens, to convert the ethanol into ethylene before polymerizing it into polyethylene that has the same technical characteristics as its virgin-resin counterpart. Finally, L'Oréal uses this repolymerized resin to produce cosmetics packaging that boasts the same quality and



L'Oréal, working with LanzaTech and Total, says it has the world's first cosmetic plastics bottle made from industrial carbon emissions. Courtesy of L'Oréal

properties as conventional PE.

L'Oréal claims "it is a technological and industrial success proving that industrial carbon emissions can be used to produce plastics packaging." The partners say they intend to continue working together on scaling the production of these sustainable plastics.

Valérie Goff, Total's senior vice president of polymers, states: "This partnership is an excellent example of collaboration between industrial firms in developing the plastics of the future produced from recycled carbon and meets a strong demand from our customers."

LanzaTech: www.lanzatech.com

L'Oréal: www.loreal.com

Total: www.total.com

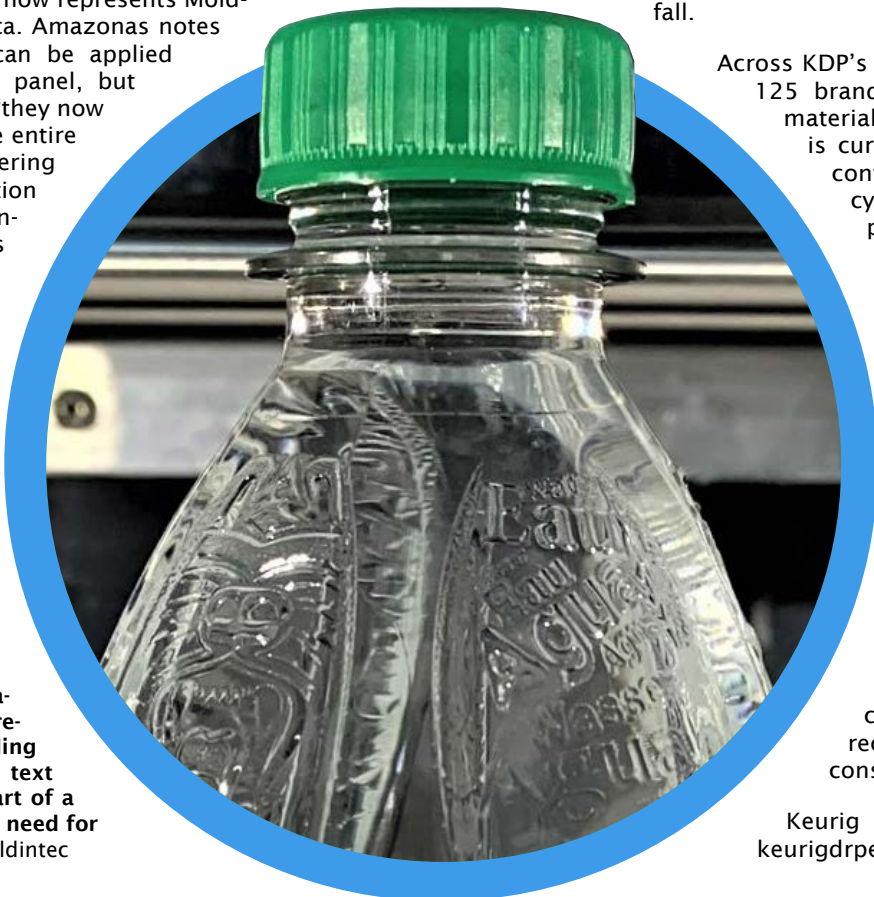
No Label Bottles Boost Recyclability

Moldintec, a Buenos Aires-based supplier of tooling for polyethylene terephthalate blow molding, aims to increase the recyclability of PET bottles by commercializing a laser machining technology that combines surface decoration with structural design features. The goal is to provide brand owners with a way to eliminate labels, which are the source of sticky paper fibers, ink-bleeding and silicone-based glues that significantly impact post-consumer recycled (PCR) quality. Plastics labels can be particularly troublesome since some are difficult to separate from the flake.

Consultant Marcio Amazonas, general manager of AMZ Resulting LLC of Atlanta, is a former account manager for Plastic Technologies Inc. and an 18-year veteran of the Coca-Cola Co. He now represents Moldintec in North America. Amazonas notes that labels usually can be applied only to a cylindrical panel, but with this technology "they now may be applied to the entire skin of the bottle, offering endless communication opportunities, potentially increasing sales and productivity."

He says the label-less technology will serve a niche market and is being applied initially to water bottles. Moldintec notes that its laser machining technology now allows processors

Moldintec's laser machining technology creates blow mold tooling that yields detailed text and images on any part of a bottle, eliminating the need for a label. Courtesy of Moldintec



to stamp the bottle with brand logos at high resolution, and with high-definition text and images on 3D surfaces "without limitations."

Moldintec srl: www.moldintec.com

First Snapple, Now Core Hydration

Keurig Dr Pepper is continuing its transition away from virgin resin in bottles. The \$11 billion drinks giant recently announced its Core Hydration bottles are now made from 100 percent post-consumer recycled PET (rPET), excluding the cap and label. This follows its move last October to similarly shift its Snapple-brand drinks into recycled plastics bottles.



Keurig Dr Pepper says all Core Hydration-brand bottles are now made of 100 percent recycled PET, same as Snapple-brand bottles. Courtesy of Keurig Dr Pepper

Together, KDP says, those changes will allow it to reduce use of virgin plastics by some 46.3 million pounds annually.

"Transitioning to recycled plastics bottles for two of our key brands is a critical next step in Keurig Dr Pepper's commitment to a circular economy," Monique Oxender, the firm's chief sustainability officer, said last fall.

Across KDP's portfolio of more than 125 brands, 20 percent of the materials used in packaging is currently made from PCR content. The move to recycled plastics in Snapple and Core bottles will increase that total by approximately 4 percentage points, moving the company closer to achieving its goal of 30 percent PCR packaging across its portfolio by 2025.

Additionally, each Snapple and Core rPET bottle will feature a How2Recycle label, a standardized labeling system that clearly communicates recycling instructions to consumers.

Keurig Dr Pepper: www.keurigdrpepper.com



Carbios uses an innovative depolymerization process to convert waste polyester textiles and colored bottles back into purified monomers, which can be used to make clear bottles. Courtesy of Carbios

New Life for Used Textiles

Carbios of Clermont-Ferrand, France, has developed a closed-loop process that combines enzymes and plastics to transform polyester textile waste back into two purified monomers—terephthalic acid (PTA) and monoethylene glycol (MEG). Those materials then can be repolymerized into PET that can be used to produce clear PET bottles with virgin-like properties.

The technology allows the commingling in the same waste stream of polyester textiles, PET bottles and traditionally difficult-to-recycle trays, including colored products. Carbios uses its depolymerization process to produce bottles made entirely of recycled purified terephthalic acid from textile waste that has a high PET content.

“I am proud that we successfully transformed polyester textile waste into clear bottles, which have identical properties as those made from virgin PET,” says Alain Marty, chief scientific officer. “This major innovation allows us to expand our sources of supply which, until now, consisted

primarily of PET waste.” He estimates that up to 42 million tons of polyester textiles currently considered waste will now be able to be recycled.

Carbios, operating at pilot scale, plans to launch a demonstration plant in France in September, and a commercial-scale production facility by early 2025.

Carbios: www.carbios.fr

ABOUT THE AUTHOR

Robert Grace is a writer, editor and marketing communications professional who has been active in B2B journalism since 1980. He was founding editor of and worked for 25 years at *Plastics News*, serving as editorial director, associate publisher and conference director. He is now both editor of SPE's *Journal of Blow Molding* and a regular contributor to various outlets. A long-time member of the Industrial Designers Society of America, he runs his own firm, RC Grace LLC, in Daytona Beach, Fla., and can be contacted at bob@rcgrace.com.

