

HEALTH AND BEAUTY RELIES ON SUSTAINABILITY FOR INNOVATION

Sustainability influences the materials and design for the latest and greatest beauty and health packaging.



Colgate Toothpaste in PET Ushers in a 'Frictionless Future'

The use of a recyclable, clear PET toothpaste bottle is enabled through the use of slippery coating on the inside of the container that allows the viscous product to be dispensed easily and completely.

By Anne Marie Mohan

Colgate-Palmolive is inviting European consumers to make toothbrushing part of their beauty ritual, with its new Elixir line of three toothpaste formulas in a striking PET package that breaks from category norms in every way. Says Colgate-Palmolive Co. Worldwide Director of Oral Care Packaging Liz Mellone, "Colgate Elixir is toothpaste reimagined—breathtaking design with beauty-inspired ingredients in a unique packaging technology that is recyclable and designed to let people enjoy the toothpaste to the last drop."

According to Mellone, the three innovative toothpaste formulas—White Restore, Cool Detox, and Gum Booster—were co-developed in tandem with the package, a clear, inverted, 80-mL (2.7-oz) PET bottle with a clear overcap. The sleek and stylish container is a significant departure from, and a more eco-friendly alternative to, traditional toothpaste tubes, which are made

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from a multilayer construction of plastic and aluminum that renders them non-recyclable.

What makes the use of PET possible in the Elixir application is a breakthrough coating technology from LiquiGlide that eliminates the friction between the inside of the package and the product, allowing the toothpaste to flow freely from the container, evacuating the toothpaste completely. Explains LiquiGlide CEO Dave Smith, "The reason toothpaste isn't in PET packages, other than Elixir, is because it sticks and won't come out easily. The LiquiGlide coating enables PET squeeze bottles to work for standard toothpaste."

An MIT innovation

The frictionless coating technology was co-invented by Smith and Professor Kripa Varanasi at the Varanasi Lab at MIT. In 2012, the two co-founded LiquiGlide with what they say was "a vision to eliminate the no-slip boundary condition to minimize material, water, and energy waste and enable new and better products, processes, and technologies across industries."

Explains Smith, "We're not inventing new materials, we're combining them in a way to create this stable, slippery effect, and the right choice of materials depends on the product properties. The platform is flexible enough that we're able to make coatings from safe, common materials that won't alter or compromise the product." For example, for food applications, LiquiGlide develops coatings from FDA-approved food ingredients; for skincare products, like lotions and creams, coatings are formulated from common,

dermatologically-safe, skincare product ingredients. The thickness of the coating varies depending on the needs of the application and can range anywhere from a micron to tens of microns.

In 2012, LiquiGlide released a video of the ketchup being dispensed from a bottle coated with its super-slippery lubricant. Despite the overwhelmingly positive reaction to technology, it has taken a while for it to become commercialized. "Breakthrough innovation can be challenging for CPG and health and beauty, which are traditionally conservative and slower-moving industries," says Smith. "However, brands like Colgate and others recognize the importance of creating value, differentiating from the competition, and taking serious steps to achieve their sustainability goals. These are the types of brands that are ready for a frictionless future."

PET plus LiquiGlide a natural choice

According to Mellone, LiquiGlide came to the attention of Colgate-Palmolive when its Strategic Innovation Group was searching for next-generation technology and

Colgate-Palmolive is inviting European consumers to make toothbrushing part of their beauty ritual, with its new Elixir line of three toothpaste formulas in a striking PET package.



dispensing. “Together with the MIT Industrial Liaison Program, we conducted a summit, which ultimately led to the connection with LiquiGlide and this partnership,” she shares. “Previously PET was not suited for viscous products such as toothpaste. The PET bottle married with the LiquiGlide technology is unique and enabled us to use PET with more viscous toothpastes. The clarity and recyclability of PET as well as its great barrier properties for toothpaste made it the natural choice.”

The bottle design, led by Colgate-Palmolive’s Global Packaging & Design Team, was developed from a human-centric perspective, Mellone explains. “Functionally, it’s quite important for the bottle to intuitively work as a toothpaste package in terms of form, squeezability, and nozzle design,” she says. “Aesthetically, clarity was critical to both showcase how the product dispenses and to highlight the toothpaste aesthetics. Moving into a rigid format enabled us to achieve a ‘counter-worthy’ appearance throughout the entire usage cycle of the product.”

The cap was designed with an opening that allows the viscous product to dispense onto a toothbrush while also enabling air into the bottle for a smooth outflow of the toothpaste. The cap is made from a thick-walled PETE, which ensures the entire package is recyclable.

While Colgate-Palmolive does produce its own packaging in many instances, for the Elixir project, the company partnered with an unnamed external supplier for the bottle and cap. The bottle is produced through a single-state ISBM (injection/stretch blow-molding) process and is assembled with an injection-molded polypropylene shoulder shroud.

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The coating, which is added to the inside of the bottle before filling, is applied by Colgate-Palmolive using new equipment from Sprimag. According to Smith, the coating formula developed by LiquiGlide and licensed by Colgate-Palmolive, comprises a natural, plant-based oil and common toothpaste ingredients.

Adding to the container's premium appearance, it uses a combination pressure-sensitive label printed in four colors, with dual matte and gloss varnishes as well as two cold-foil applications, with a reverse-printed back label.

The Colgate-Elixir line was launched in April 2021 in several European countries, including the U.K. and Germany, and will be rolled out in other European countries throughout the year in various retail environments, with a focus on e-commerce.

Says Mellone, "We are quite excited about this technology and what it enables from a user experience standpoint, and we are looking at other ways to apply it."

Home Compostable Bags for Zero-Waste Beauty Brand

As part of its holistic strategy to ‘stir up a clean + conscious change,’ D2C superfood beauty company LOLI uses less than 0.5% plastic in its packaging, opting instead for glass jars, paperboard, and compostable courier bags.

By Anne Marie Mohan

Marketing itself as being “waste-free, water-free, toxin-free, trash-free, and slavery-free,” LOLI Beauty, or Living Organic Loving Ingredients, has left no stone unturned when it comes to building a sustainable brand. New York City-based LOLI describes itself as the world’s first zero-waste superfood skincare brand and was launched in 2018 with a mission to “stir up a clean + conscious change.” From ingredient sourcing to production to packaging and shipping, LOLI has diligently selected those strategies that will result in the least impact to people and the planet.

LOLI’s line of direct-to-consumer skin, hair, and body care products includes serums, balms, pastes, masks, elixirs, oils, and other items that use organic, wild-harvested ingredients that are raw, non-GMO, and upcycled from food for zero waste.

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Says Founder and CEO Tina Hedges, “The inspiration for LOLI may have come from my Cuban/Jamaican heritage of watching Mother Nature’s ingredients being made into home remedies for beauty and wellness, but it was a moment when I experienced simultaneously a crisis of health and a crisis of consciousness that became the catalyst for my mission to make a clean and conscious change in beauty.

“When the world is experiencing water scarcity, and there will be more plastic in the ocean than fish by 2050, why are we encouraging consumers to purchase beauty products diluted with 80% to 95% water, polluted with toxic chemicals and synthetics, and over-packaged in single-use plastic? It’s time for a truly sustainable approach to beauty.”

Protecting both people and the planet

Described as “zen-inducing,” “skin-plumping,” “super-cool,” and “glow-inducing,” among other adjectives, depending on the product, LOLI’s ingredients include such natural superfoods as plum kernel oil, pomegranate, date nut oil, dragon fruit powder, and sweet orange essential oil. The company works with Fair Trade co-ops and farms around the world to find ingredients that have been discarded in the organic food supply chain. Says Hedges, “These efforts mean we are also helping to provide additional income to villages during off-seasons by repurposing ingredients previously discarded.”

Its concern for those individuals responsible for providing its raw ingredients also extends to ensuring none of the people involved in sourcing are victims

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of human trafficking. As Hedges shares, LOLI is the first and only beauty company to be a member of Made in a Free World, a charitable organization that focuses on developing and implementing high-impact solutions to human trafficking by working with the most effective partners to rescue and care for victims worldwide.

Sustainability also extends to its product development and manufacturing. LOLI's beauty formulations are created without water and are designed to be multipurpose, minimizing the number of beauty products a consumer needs. According to Hedges, the company's manufacturing partner is USDA Organic certified and uses very little to no heat and limited energy.

And its eco-consciousness does not stop there. Other initiatives include carbon-zero, same-day delivery in certain metropolitan areas and the donation of 10% of every purchase to charities that support people and the planet through its partnership with GIVZ.

One of LOLI's most significant sustainability pillars though is its strategy to be plastic negative: For every one of its products purchased, LOLI removes two pounds of plastic waste from the planet. And nowhere

LOLI Beauty uses recycled, recyclable, and refillable food-grade glass containers for its micellars (e.g., tonics, toners, and serums) and its balms and powders.



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is this zero-plastic commitment more evident than in its choice of packaging materials and processes.

Plastic-free packaging selection

As part of LOLI's plastic-negative and trash-free tenet, less than 0.5% of the company's overall packaging footprint is plastic, with no biodegradable microplastics used for its primary packaging. Instead, it uses recycled, recyclable, and refillable food-grade glass containers that can be repurposed for food storage. These include a 4-oz "hot-sauce" bottle for its micellars (e.g., tonics, toners, and serums) and a 4-oz yogurt jar for its balms and powders.

Says Hedges, "We looked at so many options, and with good intentions. So many packaging vendors provided misguided information because the technologies and understandings are changing so rapidly. We considered aluminum, but unless you can use recycled aluminum, the mining of fresh aluminum causes more damage to the environment than the weight of shipping glass. Food-grade, recycled, and reusable glass is also the safest inert packaging option to ensure no leaking of harmful chemicals into the products."

Caps for the micellar bottles are either glass droppers with aluminum overshells and silicone bulbs, recycled aluminum screw-on caps, or non-single use, recycled, and reusable plastic screw-on caps or orifice reducers. The jars are sealed with recycled aluminum foil that is heat sealed and covered with a recyclable, reusable plastic lid.

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When it came to the secondary packaging, Hedges says LOLI thought about how to replace paperboard cartons and searched the world (literally) for a garden-compostable solution. It found that solution nearly 9,000 miles away, in New Zealand, from The Better Packaging Co., co-founded by biochemists Kate Bezar and Rebecca Percasky.

Better Packaging offers the comPOST line of completely biodegradable and home-compostable bags made from corn starch, corn-based polylactic acid (PLA), and polybutyrate adipate terephthalate (PBAT), a “drop-in” petroleum-based biopolymer whose properties resemble those of low-density polyethylene. Says the company, due to the inclusion of PBAT, the bags, while biodegradable and compostable, are not 100% renewable. “We are limited at the moment by the availability of suitable, sustainable raw materials that deliver the barrier and performance properties we need but are always testing resins made from an even greater number of plant-based materials,” it says.

The company adds that, ironically, it is PBAT that is added to the film construction to make the product

LOLI uses the comPOST Pack, a completely biodegradable and home-compostable bag made from corn starch, corn-based PLA, and PBAT, in place of a secondary carton for its products.



degrade quickly enough to meet home compostability criteria. “To our knowledge, there are no bio-based plastics suitable for making courier bags that do not have a binding agent like PBAT in them,” it says. “There is a lot of research currently to find an alternative, and there has been some success. We are currently supporting our supplier to trial a higher-percentage bio-based PBAT.”

Better Packaging adds that the combination of corn starch, PLA, and PBAT represents a 60% reduction in CO2 emissions compared with traditional plastics. The material is also non-toxic, and contains no phthalates or BPA. The comPOST line, which began with the company’s “Real Dirt Bag,” the comPOST courier bag, has expanded to six products, including garment bags, labels, and bubble mailers. The products are waterproof, tough and durable, tear-resistant, writeable, printable, “stickable,” and brandable, and have some stretch.

The material does have one disadvantage versus traditional petroleum-based materials though: it has a limited shelf life. Advises Better Packaging, “To ensure maximum longevity, compost packs should be stored in a dark, dry place. If stored correctly, they will be strong enough to send parcels around the world for at least nine months. If not, their strength will be compromised.”

When it comes to end of life, Better Packaging says the comPOST line of products will break down within months in a home compost environment, mixed with food scraps and garden waste, in a non-toxic process. The materials used to make the packaging meet Australian Standard AS 5810-2010 for Home Composting, which requires 95% degradation within 180 days. “However, we know they break down way quicker than that,” says Better Packaging.

Amazon-friendly compostable pack

LOLI's partnership with Better Packaging began with a cold-call email from Hedges to the co-founders. "From our very first call, we realized we were on the same mission to stir up a conscious change," Hedges shares.

LOLI is using several varieties of comPOST Packs along with ComPOSTubble Pockets, in place of secondary cartons for its glass bottles and jars. ComPOSTubble Pockets are sealed on three sides and open on the top, with no flap, and are available in two sizes designed to fit inside Better Packaging's comPOST Packs for an additional layer of protection. For shipping products direct to consumers, LOLI packs them in the bubble mailer, inserts the mailer into the comPOST bag, and then puts the bundle into a corrugated shipper made from 100% recycled FSC paperboard, printed with vegetable inks, and made with wind energy. Says Hedges, "In some cases, like with our holiday kits for wholesale, we even use the comPOST packs in place of a set-up box.

"The Better Packaging Company has been our go-to supplier for all our bags. We love their commitment, their vision, and even their branding. We feel so comfortable working with them as we know they have truly done their homework and are the experts. What's super exciting is

Glass bottles and jars are placed in comPOSTubble compostable bubble mailers before being packed into compost packs, for extra protection against damage.



that we have now even found a way to launch Amazon fulfillment with our partnership with The Better Packaging Company. Previously, we weren't comfortable with Amazon's requirement to package glass in plastic bubble wrap. Now, with The Better Packaging Company's comPOSTubble Pockets, we're about to launch on Amazon in a sustainable manner that meets our clean + conscious standards."

To sell its products through Amazon, LOLI has a wholesale relationship with Carbon Beauty—a natural beauty and wellness boutique. "We send our glass bottles and jars and the comPOSTubble Pockets to Carbon Beauty's warehouse, and they assemble the product in the pocket and send it to Amazon for fulfillment," explains Hedges. "This was part of our agreement with Carbon Beauty: We wouldn't launch on Amazon until we could find a compostable replacement for the mandatory plastic bubble bags." She adds that once Amazon receives the product in the bubble wrap, it places it in a corrugated box for shipment.

LOLI is currently using The Better Packaging's messaging on the bags, which includes the compostable symbol, copy that indicates the bag is compostable, and a website URL, www.bcollected.org, that provides a network of collection points for Better Packaging. "We think they do a great job in telling the story and helping guide the consumer," Hedges says.

Shipping labels, from Elevate Packaging, are also garden compostable and meet EU standards for home composting. If dunnage is required in its shipping boxes, LOLI uses GreenWrap from EcoEnclose, a paper-

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based alternative to bubble wrap that is naturally biodegradable, compostable, SFI-certified, and fully recyclable.

Winning consumer loyalty

LOLI began as an e-commerce company only, but as its message expands, so too will its distribution, moving into wholesale. “We launched as a direct-to-consumer brand first, mostly because we knew that back in spring of 2018, the concept of ‘zero-waste beauty’ was very new, and we would need to educate the consumer on why upcycled, waterless, and sustainably packed beauty was needed,” Hedges explains. “We did a lot of product market testing and listened to what resonated with our community and early adaptors. The world is now ‘woke’ and understands the wasteful ways of the beauty industry. So, we’re ready now to dip into wholesale with a few key partners.”

So far, in the D2C world, consumers have been won over by LOLI’s holistic sustainability strategy, Hedges shares. “Our consumer is so loyal to our mission and loves that we take care in every detail, down to our garden-compostable bags.”

Dove's Sleek New Refillable Deodorant Pack

The global health and beauty brand launches new deodorant packaging that is circular by design, with a reusable stainless-steel case that can be refilled with deodorant sticks.

By Anne Marie Mohan

Reusable packaging has come a long way—in strategy, sophistication, and sustainability. Launched in January by Unilever, the new Dove refillable deodorant system exemplifies this new approach, comprising a sleek, stainless-steel outer case guaranteed to last a lifetime, paired with refills in recycled-content, recyclable packaging. The innovation is just one of 100 projects Dove is working on across the globe to meet its goal to ensure all its packaging is plastic-free, is made from 100% post-consumer recycled plastics, or is reusable/refillable. It also represents Unilever's first refill launch on a mass scale.

The system was engineered by Unilever in collaboration with A Plastic Planet—a grassroots organization founded to “turn off the plastic tap”—and Dutch design consultancy VanBerlo, which began the project in 2018. The refillable Dove deodorant package has a design similar to that of the

Dove's Sleek New Refillable Deodorant Pack

minim™ reusable package prototype, developed for Unilever's Dove, AXE, and Rexona brands as part of the Loop reusable shopping platform, but it has been “optimized for personal use,” says Augusto Garzon, Dove Global Vice President of Deodorants, Unilever.

The ergonomic, rounded-corner, stainless-steel case is compact, at 2 7/8 in. H x 2 3/8 in. W x 1 1/4 in. deep, and has a minimalist design, with silver on the base and white on the overcap, with the iconic Dove logo in silver. Garzon explains that the screw mechanism typically used for deodorant packaging was eliminated, as “it's often those smaller components that can be most prone to damage over time.” Instead, the case is fitted with a recyclable PET insert, selected for its engineering properties. Says Garzon. “As the refillable case is unlikely to ever be disassembled, it should last the consumer a lifetime.”

First-time buyers purchase a starter kit that contains the reusable case and one 1.13-oz deodorant stick refill, packaged in a carton made from 100% FSC-certified paper from responsibly managed forests. After the initial purchase, consumers can buy two-pack refills of the deodorant—Dove's 0% Aluminum formula, in Cucumber & Green Tea, Coconut & Pink Jasmine, and Sensitive varieties—also in a carton made from FSC-certified paperboard.

To ensure the deodorant formulas stay fresh and hygienic, the refill sticks use primary packaging made from 98% recycled polypropylene that is also 100% recyclable (in those communities that have appropriate recycling facilities). According to Garzon, the PP packaging uses 54% less plastic than the current Dove 0% Aluminum Deodorant Stick.

Dove's Sleek New Refillable Deodorant Pack

To use the refill, the consumer places the deodorant stick on the base of the case, then twists the top until they feel and hear a click. "Remove the refill cover, and it's ready to use!" says Garzon.

Commenting on the packaging, Sjoerd Hoijinck, Design and Innovation Director at VanBerlo, says, "Cutting consumption and crossing over to circular business models by design, Dove refillable deodorant gives you back an experience not unlike a Swiss army knife, a quality object that is personal and ages well over time."

For its part, global campaign organization A Plastic Planet contributed to the project by providing insights to Unilever on how to communicate the new concept. "We have been very involved in helping craft the overall messaging of the idea, who the audience would be, and how it could influence other Unilever brands," explains Sian Sutherland, co-founder of A Plastic Planet. "Our role, past and future, will be to work closely with the wider team to see how the next iterations of this beautiful structure can have even less plastic, less impact, and more permanence,

The Starter Kit includes the refillable deodorant case plus one deodorant stick; refills are available in two-packs, in FSC-certified cartons.



Dove's Sleek New Refillable Deodorant Pack

especially on the refill system. We act as a touchstone on authenticity and integrity.

“The whole Dove team sees this as a first big step in a long journey, with a radical new way to deliver products we all love and want in a way that takes as little from our planet as possible. The first step is always the most important, but it definitely won't be the last!”

For the initial launch of its Dove refillable deodorant product, Unilever has decided not to implement in partnership with Loop, but launched online at Target.com and Walmart.com in January 2021. At presstime, the company says the product will also be available at Target and Walmart stores in February 2021, and on Amazon.com in March 2021. The starter kit, which includes the case and one deodorant refill, is priced at \$14.99; the refill kit, with two deodorant refills, is \$9.99.

Ulta Unveils First-of-its-Kind Circular Beauty Packaging Platform

Beauty retailer Ulta partners with circular shopping platform Loop to develop an online site and system for consumers to order products in durable, reusable packaging that can be returned for refill and reuse.

By Anne Marie Mohan

From its recent launch in Canada with retail partner Loblaw to its work with Burger King and Tim Hortons to develop reusable packaging for fast food, the Loop circular shopping platform has been rapidly extending its reach as of late. In early March, the global reuse platform announced it has partnered with Ulta Beauty, the U.S.'s largest beauty retailer, to reduce beauty waste. Customers across the U.S. can now shop online at loopbyulta.com for beauty and personal care products in durable, sustainable packaging that will be refilled and reused.

“As the nation’s leading beauty retailer, we have a responsibility to continuously improve and bring innovative solutions forward for the industry,” says Dave Kimbell, President, Ulta Beauty. “As we work to deliver more informed, conscious product choices to our guests, this first-of-its-kind partnership with the pioneers at Loop is an exciting step on our journey. We

Ulta Unveils First-of-its-Kind Circular Beauty Packaging Platform

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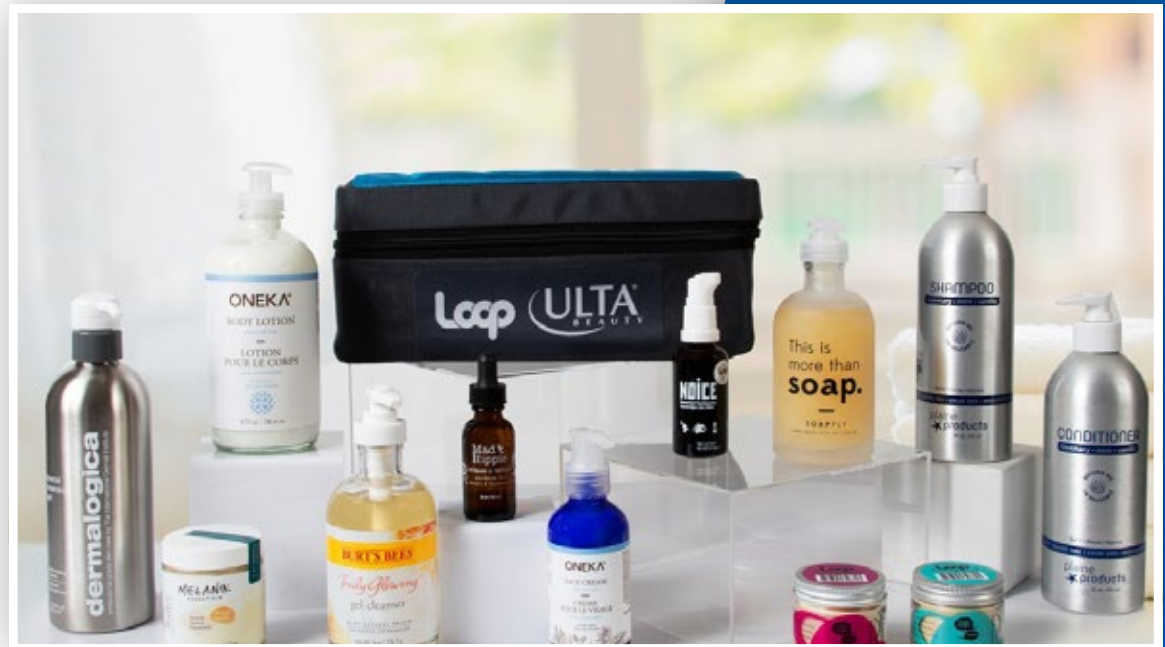
look forward to seeing our guests embrace Loop by Ulta Beauty as we all work together to create a lasting legacy for our world.”

When placing an order, Loop shoppers pay a deposit on each package that is fully refundable upon return. After use, consumers simply place empty packages back into the exclusively designed tote and schedule a free pickup online.

At launch, guests can order sustainable packaging options from brands such as Burt's Bees, Plaine Products, and Mad Hippie, among others. Oneka Elements, Dermalogica, and L'ANZA will be coming to the platform soon.

“Rethinking packaging provides the industry with the opportunity to develop new, luxurious designs that are also sustainable,” says Tom Szaky, founder and CEO, Loop and TerraCycle. “Consumers are increasingly asking for more environmentally responsible options in this category, and this collaboration provides them with a solution that is simple and convenient.”

Ulta Beauty announced its partnership with Loop within its Conscious Beauty at Ulta Beauty launch, a holistic initiative focused on delivering transparency, education,



Ulta Unveils First-of-its-Kind Circular Beauty Packaging Platform

and choice. As part of the program’s Sustainable Packaging pillar, together the companies will work to help minimize the more than 120 billion packaging units produced globally annually within the cosmetics industry (according to Zero Waste Week) and fuel actionable improvements for the industry and the world.

Read what Loop by Ulta Beauty brand partners have to say:

Burt’s Bees:

Says Paula Alexander, Burt’s Bees Senior Director of Sustainability, “Burt’s Bees’ partnership with Loop is a vital part of our journey to achieve net zero plastic to nature by 2025. In addition to reducing use of virgin materials and increasing recyclability, the brand is launching our first waste-free packaging, with the Truly Glowing Gel Cleanser available with Loop by Ulta this March.”

Mad Hippie:

Say Sam and Dana Stewart, co-founders of Mad Hippie, “Mad Hippie

Mad Hippie offers a Vitamin C Serum.



Ulta Unveils First-of-its-Kind Circular Beauty Packaging Platform

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is thrilled to be in partnership with Ulta on their Conscious Beauty platform. As current TerraCycle partners, we are excited to expand on that platform with Loop x Ulta as we work towards a more sustainable future for the industry.”

Meow Meow Tweet:

Tara Pelletier, co-founder, Meow Meow Tweet says, “We are so excited to be a part of Loop’s mission to make zero waste an accessible option to so many people—both brands and consumers. For us, it’s a way to get our deodorant into our customers’ hands without wasting an ounce of packaging. Not a single bit of plastic in sight! In other words, a dream come true.”

Plaine Products:

Says Lindsey McCoy, CEO & co-founder, “As Plaine Products is on a mission to get single-use plastic out of the bathroom, we’re thrilled to partner with Loop and Ulta to bring that mission to the masses and offer quality personal care products in sustainable, refillable packaging.”

Plaine Products’ hair and body care products, as well as hand wash can be found on Loop by Ulta Beauty.

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Colgate: Packaging's Day Has Come

Colgate-Palmolive has made sustainable packaging a key priority. From recyclable toothpaste tubes to aluminum bottles for mouthwash, they're locked in on eliminating plastic waste and delighting consumers.

By Pat Reynolds

“Packaging is a field whose day has come.”

That simple and straightforward statement by Colgate-Palmolive's Chief Technology Officer Patricia Verduin neatly sums up the views shared by all five of the Colgate executives I talked with recently in preparing this year's View from the Top feature.

“It's always been viewed as an applied engineering field, if you will,” Verduin continues in her assessment of packaging's status. “But I think this is an age where packaging changes the way the world buys products, whether it's making E-Commerce a great experience or it's addressing the whole plastic waste issue. More than ever before, it's changing the way people engage with our brands. From Colgate to Tom's of Maine to Fabuloso to Hill's, the packaging has to deliver against the promise of our brands and our company purpose as a caring, innovative growth company reimagining

Colgate: Packaging's Day Has Come

a healthier future for all people, their pets, and our planet.”

Working out of Colgate's Piscataway, N.J., Global Technology Campus, Verduin oversees global R&D, Packaging, and Design. “These are the arms and legs of innovation, the people who are really doing innovation with their pencils and CAD drawings and knowledge,” says Verduin. Noting that this organizational structure has only been in place for a few years, she says it's really been powerful to have all three of these functional groups together.

“It's all about having the product formulators, the brand designers, the user experience people, and the packaging engineers and developers all in the same room at the same time and all developing against a common brief,” says Verduin. “Too often in the past the practice was to make the formula and throw it over the wall to the packaging people, who, when they'd come up with a package, would toss it over to the design team for graphics. It just doesn't work that way anymore. The formulas are too complicated and the delivery mechanisms too varied.”

Colgate-Palmolive is a global company that competes in the oral care, home care, personal care, and pet nutrition categories. With sales of nearly \$16 billion, the company supplies products to more than 200 countries and territories and has 40+ manufacturing facilities worldwide, each with its own team of engineers. Like most Consumer Packaged Goods companies, Colgate places a premium on both innovation and sustainability. Somewhat atypically, however, the firm doesn't have one director of packaging innovation and another of sustainability. Instead, it has a Director of Global Packaging

Colgate: Packaging's Day Has Come

Innovation and Sustainability, the title held by Greg Corra. When asked why things are organized this way, he has this to say: "We believe packaging innovation is the key to achieving Colgate's purpose of reimagining a healthier future and that our sustainability strategy needs to underpin all aspects of our packaging strategy."

"Underpin" is a bit of an understatement. The extent to which sustainability shapes all things packaging at Colgate is evident if we look at some of the packages recently introduced by the New York-based firm. Many of these are packages for oral care products, which should come as no surprise. Colgate's largest category, oral care represented 46% of the firm's sales in 2019. Let's start with toothbrushes, since Colgate sells about 3 billion of them every year, two-thirds of them made in-house.

Replaceable heads

Just reaching U.S. consumers this winter is Colgate Keep, a line of replaceable-head manual toothbrushes featuring an aluminum handle that's designed to be long lasting for 80% less plastic waste.

This year's View from the Top feature focused on Colgate-Palmolive. Shown here left to right are Senior Global Design Manager Jadoria Britto, Chief Technology Officer Patricia Verduin, Director of Global Packaging Innovation and Sustainability Greg Corra, and Jose Luis Molinar, Global Packaging Director Personal & Home Care.



Colgate: Packaging's Day Has Come

A new replacement head can be snapped on when bristles are worn. Colgate is launching both a starter kit, which has the aluminum handle with two brush heads, as well as a two-count refill pack sans handle.

The concept of a more permanent and reusable handle made of aluminum is in itself a significant step toward putting less plastic into the solid waste stream. But our interest here is in the fiber-based packaging, which, in a category dominated almost exclusively by plastic blister-packs, is a profound departure.

“The first challenge in our brief was ‘Hey, guys, we need to get out of a plastic blister,’” says Senior Global Design Manager Jadalía Britto. “That led, of course, to a series of questions about the options. How can we use fiber? Can we use recyclable paper? How do we still get premium finish and color? We really had to challenge our external partners to help us find the answers.”

Britto says that her particular responsibility in projects like this is the look, tone, and feel of the package. “It’s all about how to treat the master brand,” she notes. “Then I work closely with our industrial designers to execute on the design intent.”

The package that emerged for the Keep starter kit is a peggable all-fiber tub and lid that stands 229 mm tall, 70 mm wide, and 26 mm deep (9.01 x 2.75 x 1.02 in.). Sourced from sugarcane and wood fiber, the tub is wet-fiber thermoformed by China’s LVHE Packaging Technology Co. Ltd., an impressive specialist in researching, manufacturing, and marketing biodegradable materials and products. The lid, a 400 gsm paperboard containing 60% recycled content, is heat sealed to the tub. Graphics are printed UV offset in six colors plus a matte varnish. As for putting the products into the packs, this is done for now by an

Colgate: Packaging's Day Has Come

outside contractor in a semi-automated process. The starter kit sells for \$9.99 and the replacement pack for \$4.99.

“From start to launch, including the time we had to spend exploring material options, it took about eight months,” says Britto. “We’re getting faster with getting these things out the door.”

Elsewhere in the oral care category is another brand new product called Optic White Overnight Teeth Whitening Pen. The product itself is a 2.5-mL aluminum and plastic cylinder in an injection-molded stand. Packaging, once again, is entirely paperboard, including an inner tray made of 100% compostable PaperFoam . Based in the Netherlands but with manufacturing facilities in countries including the U.S., PaperFoam mixes four bio-based ingredients into a thick paste that is then injected into a custom aluminum mold and baked at about 400 deg F. The manufacturing process is said to be energy-efficient, and the resulting part provides the cushioning properties of plastic foam alternatives but is TUV-certified as compostable in home or industrial settings and is UL-validated as recyclable.

The other packaging component for the whitening pen is a 24-point SBS sleeve with two locking tabs. The inner tray holding the pen and stand slides into this sleeve. Supplied by Multi-Pack Solutions, it’s offset printed in seven colors with a foil stamp plus varnish. “We definitely focused on a recycled paperboard,” says Britto. “And the cold foil accents bring a nice element of premiumness without interfering with recyclability.”

When asked if the team ever thought about a clear package for the whitening pen, considering how consumers respond to product visibility, Britto says, “I

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wouldn't say we never considered it, but from the perspective of graphic impact it would have had its limitations. This printed paperboard says Colgate Red. Also, when I thought about E-Commerce, I wanted the package to stand out in a sea of blues and whites. I really wanted that color. And I wanted that curved shape, even though it complicates a number of things compared to a simple rectangular carton. We almost bailed on the curve at one point, but we pushed ahead and solved it because it delivers on the premium experience that we were after."

Colgate's Whitening Pen debuted in E-Commerce channels. A good example of a SIOC (Ships in Own Container), its packaging is entirely paperboard, including an inner tray made of 100% compostable PaperFoam.

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Ships In Own Container

Since the whitening pen debuted as an E-Commerce item, Colgate Director of E-Commerce Bruce Cummings was a key contributor on the team behind its development. "Early on, we considered a carton into a corrugated box," says Cummings. "But by launch we'd come up with the red mailer, which is lighter and has that easy-open tear strip. Then comes the Colgate-Red sleeve, out of which the inner foam tray smoothly slides out. Compact and compelling, it's an experience that resembles an elegant process of unboxing."

Cummings says the team would have gone with a paper mailer rather than the polypropylene air-filled wrap had COVID-19 not messed with the supply chain as it did. "The idea is that once the unboxing experience is



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complete the consumer can put all of the packaging into the paper recycle stream,” notes Cummings. He adds that the paper mailer is now in the works.

This package is an example of a SIOC (Ships In Own Container) that is sent from Colgate’s contract manufacturer to the Amazons of the world in a corrugated case of 24 units. Each unit, of course, consists of pen in holder, inner foam tray, instruction booklet, outer paperboard sleeve, and mailer. The Amazons of the world apply the last piece of packaging onto the mailer: a thermal-transfer-printed pressure-sensitive label that has all the information needed to get the unit to Mr. Smith at 810 S. Main St.

Another nice example of a Colgate SIOC for the E-Commerce channel is what Cummings refers to as the Smile Box. Like the mailer used for the whitening pen, both Colgate Red and the smile component are used prominently on this corrugated packaging that holds three cartons of toothpaste. Currently the package is a single-wall B-flute corrugated printed flexo in one color Colgate Red by WestRock. This represents a downgauging compared to the original structure, which was a C-flute. And according to Cummings, a third iteration is currently being evaluated. This kind of ongoing optimization, he notes, is fundamental to Colgate’s approach to packaging regardless of which channel it’s designed for.

“I like to say that we need to continue versioning so that we can arrive at better solutions,” says Cummings. But as much as downgauging and cost-optimization are vigorously pursued, he emphasizes this: “We never

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compromise where quality standards are concerned. We don't want people getting a tube that leaks or a dog food pack that's been punctured."

Aluminum bottle

A very different kind of container was developed by Colgate for a brand new mouthwash called Swish. It's an impact-extruded aluminum bottle from Trivium Packaging with a 38-mm threaded closure. It's designed to stand apart from the ubiquitous plastic containers in which mouth wash is so typically found, and the messaging printed on the sidewall proudly proclaims "Refreshingly thoughtful: forever recyclable aluminum bottle." Available in stores and online, the 16-oz bottle sells for about \$6.00.

"It's a beautiful package, isn't it?" says Verduin, though in the next sentence she confesses it brought her a few extra gray hairs. One challenge the development team faced involved the essential oils in some of the flavorings. As originally formulated, these oils reacted unfavorably with the internal coating of the container, so the product formulas had to be modified.

Jose Luis Molinar, Global Packaging Director Personal & Home Care, views the launch of Swish from a filling line perspective. He describes the project as "a smart combination of existing assets, new assets, and a commitment to making it happen.

"We are filling this on an existing line used for plastic bottles in our factory in Tennessee," he continues. "But two things have to be done differently. The automated unscrambling and feeding system used for plastic could damage

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the aluminum bottles, so we are feeding them into the filling system manually. Also, because the bottle won't withstand the top-load pressure of the rotary capper that was on the line, we needed to install a new capper." The ROPP rotary capper is from Zalkin.

The push for monomaterials

Intriguing as the above initiatives may be, the area of emphasis staked out by Colgate that may be the most fascinating—not to mention challenging—is the development of monomaterials that score sustainability points because they fit neatly into an already established recycle stream. Notable progress has been made in pouches for Hill's Pet Nutrition pet food treats and in toothpaste tubes. Since Colgate is the world's biggest toothpaste producer, let's begin with the tubes in which all that toothpaste is packaged.

When the Tom's of Maine brand reached store shelves earlier this year in a monomaterial recyclable tube, it was the culmination of a five-year effort. The Colgate technology represents the first oral care or

A SIOC designed specifically for E-Commerce, the Smile Box holds up to four cartons of toothpaste.

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personal care tube to earn recognition for recyclability from the Association of Plastic Recyclers.

Popular in a variety of product categories, laminated tubes for toothpaste alone number an estimated 20 billion annually around the world. In most of these tubes, a layer of aluminum is included in the multilayer lamination to protect the toothpaste's flavor and fluoride. It's this laminated combination of dissimilar materials that makes it just about impossible to cost effectively recycle such materials through established methods.

To make a recyclable tube, Colgate first eliminated the layer of aluminum, says Director of Packaging Innovation and Sustainability Corra. "The other innovation," he says, "was changing the resin specification from a mix of LLDPE and HDPE to mostly HDPE. The tricky part was getting the specs of the resins for the multiple layers to work well to make a flat sheet. Remember, our goal was to be able to make these tubes at scale. Had we only been after a prototype or a lab sample, it would have been another story. What we needed was a nice flat sheet that we can print on and form into tubes at our current rates. So that was the key innovation on the lamination side. And then on the shoulder of the tube it was a matter of switching from a much higher melt index to a lower melt index so that we're compatible with the well-established HDPE recycle stream." As in the past, the injection-molded shoulder is heat sealed to the tube body.

The development team at Colgate's Piscataway Global Technology Center tested a dozen different combinations, using from six to 20 layers, to find the

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recipe that allows people to comfortably squeeze out all the toothpaste, protects the integrity of the product, and meets the demands of high-speed production. The product protection component now that aluminum has been eliminated is EVOH. Corra notes that either of two approaches can be taken. The entire tube material can be coextrusion blown in a single pass or multiple layers of blown HDPE can be extrusion laminated to a blown coextrusion that includes EVOH.

One other dynamic to keep in mind is how vertically integrated Colgate is when it comes to the toothpaste tube business. In other words, they don't just fill and cap the tubes, they make a whole lot of the tubes, too. "That made it interesting," notes Corra, "because as the developer of the new package we couldn't just beat a supplier down on cost or delivery. The supply chain boss who owns that tube-making equipment is my colleague. But it wound up being a very good partnership. Our China factory that does the lamination is one of our centers of excellence for tube forming, and the people there were all in when it came to getting it right."

When asked about the relative cost of the recyclable tube, Corra says that parity is the goal. "We have a long track record of cost-optimizing tubes and we fully believe in our ability to get the cost of this one where we need it to be," he says. "That was always in the design brief, as was scalability. Remember, in time we'll be making billions of these."

Colgate chooses to share its technology

Notably, so will the competition. In spite of all that Colgate has invested in bringing

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this tube to market, it is sharing the technology openly with any and all who choose to use it. John Standish, Technical Director at the Association of Plastic Recyclers, applauds this move. "With Colgate sharing technology, others will be able to offer recycle-compatible tubes faster and at lower development time and cost," says Standish. "It's a great pioneering effort from Colgate that shows real industry leadership."

Corra and colleagues believe that sharing the monomaterial technology is the best way to ensure the long-term market viability of this solution. "Having gotten a recyclable tube over the finish line, it only makes sense to help others get there," says Corra. "If our tube is going to be recycled, it's going to be because all tubes are recyclable. We get that. We also understand clearly that developing sustainable packaging is a marathon, not a sprint. We have a lot of work to do, and it's not just in changing consumers' behavior so that they are actively engaged with the idea of recycling these tubes. We also are working with the Municipal Recycling Facilities so that when consumers do put packaging

Key contributors to the work Colgate has done on the monomaterial recyclable tube project include (left to right): Tom Heaslip, Worldwide Director, Category Packaging; Jennifer Noll Waxman, Director E2E Program Management; Jennifer Boada-Rodriguez, Senior Technical Associate; Anne Bedarf, Packaging Sustainability Manager; and Jun Wang, Senior Technical Associate.

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materials into the correct bin, those materials actually find their way to the right place so that they can in fact get recycled.”

Since the Tom's of Maine launch, Colgate now has brought the monomaterial tube to a 75-mL Colgate Smile for Good brand in Europe and both 90- and 120-g sizes of its Natural Extracts brand in Latin America. By the end of this year North America will see the new material in the Colgate Optic White brand in sizes above 3 oz and in the 4.2-oz Colgate Kids Zero brand. Corra says the firm has started up this technology in five of its manufacturing plants and continues to adapt its manufacturing and supply chains so that by 2025 it can achieve its goal that all of its toothpaste will be in the recyclable tube.

Meanwhile, in Topeka

Also busy working on a monolayer recyclable package are the packaging developers at Colgate subsidiary Hill's Pet Nutrition in Topeka, Kans. In the most recent edition of the Flexible Packaging Association's annual competition, the bottom-gusseted standup pouch they designed for 8-oz Hill's Pet Nutrition pet food treats won a Gold Award for Packaging Excellence plus a Silver Award for Sustainability and another Silver for Technical Innovation.

As we saw with toothpaste tubes, flexible packages for pet treats are also multilayer structures that include such things as aluminum, polyester, or nylon. But while these materials are terrific at delivering performance characteristics like toughness, barrier, machineability, and economics, they make recycling challenging because they consist of too many incompatible materials.

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By contrast, the material from which the Hill's pouch is made, Thrive-Recyclable from Plastic Packaging Technologies, is described by PPT as monomaterial PE. According to Dave Potter, VP Technical and Engineering at PPT, it's a two-layer lamination, and the two substrates are married by way of a solvent-free adhesive on a Nordmeccanica www.nordmeccanica.com laminator. The outside layer is a clear 1-mil high-density polyethylene supplied by Jindal Films. PPT reverse prints this substrate in eight colors on a W&H flexo press. The inner layer is a five-layer blown coextrusion of PE resins. Included in the coextrusion, which PPT purchases from Charter Next Generation, is EVOH for gas barrier purposes. Sealant layers are included, too. Also important in this coextrusion is the presence of a compatibilizer technology from Dow called RETAIN. Without this Dow component, EVOH is not compatible with the PE recycle stream. But with it, the two incompatible materials mix and distribute evenly.

PPT had to bring in all new Totani pouch converting equipment for this material. The big challenge is heat management. In a more traditional structure, where a 48-ga polyester is the outer layer, the material has a much higher heat resistance. You drive the heat through that outer layer of polyester to activate the polyethylene sealant layers, which have a lower seal initiation temperature. Then, once the seal is made, the sealing jaws are still able to open without sticking to the outer layer of polyester. But with this new structure, the outer layer is polyethylene. That makes it tricky to deliver enough heat for the inner sealant layers to be activated without also melting the outer layer of polyethylene. So this wasn't just a matter of materials development. It required modification

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of existing pouch-making equipment by adding cooling bars and so forth. It's an entirely new film technology where materials, equipment, and process all had to come together.

This intersection of new packaging materials and the converting and packaging machinery on which they must run is a place that Colgate's Molinar knows all too well. He oversees global packaging for personal care and home care, where containers fly through high-speed packaging lines at 500-plus per minute. "Every single gram you take out of a container complicates the process window," he observes. "Every time we want to modify the filling temperature of a liquid product so that we can cool faster and thus fill faster, it creates a strain on container stability. But opportunities lie in this tension between the limitations of equipment and the performance characteristics of emerging materials. Nowhere do you see that more than in the challenges we face with monomaterials. It's an interesting challenge to say the least, and an important one, too, since in categories like home care and personal care we use a lot of pouches that are various combinations of polyester and polyethylene. That's why we're working so closely on this monomaterial challenge with all three of the packaging machinery OEMs that supply us with our form/fill/seal equipment."

Two other observations Molinar makes when it comes to packaging equipment touch on flexibility and digital

Swish mouthwash in its impact-extruded aluminum bottle stands out from the ubiquitous clear plastic bottles that dominate the category. Messaging on the sidewall emphasizes that the package is a "forever recyclable aluminum bottle."

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printing. “Considering how E-Commerce and the whole direct-to-consumer idea is growing, we must be able to accommodate more and more different packaging configurations,” says Molinar. “Quick-change ability for varied case counts, for example, will be essential. Also being explored is greater flexibility on lines where the bottle shape changes frequently, and our team of engineers is looking at ways to accomplish this through magnetics rather than making a mechanical change as has typically been done in the past. As for digital printing, of course it will play a more prominent role as the notion of one size fits all gets replaced by the growing demand for personalized and customized packaging.”

Returning to the topic of emerging materials, the question of cost is of course a crucial consideration. When asked about the economics of the new monomaterial used for the Hill’s Pet Nutrition pouch, PPT’s Potter is reluctant to throw out a number because there are so many variables involved, including the size of the package, what barrier properties are needed, and how many pouches are ordered. But when pressed he says materials in the Thrive line will carry a premium of anywhere from 15 to 25% compared to the multilayer alternatives they are designed to replace. It remains to be seen how many brand owners will pay such an upcharge. But Potter likes his chances for two reasons. First, brand owners of all stripes are more serious than ever about setting sustainable-packaging goals and then meeting them; using this material could go a long way toward helping them accomplish their objectives. And second, recycle-ready solutions for flexible packaging offered to brand owners in the recent past have come with an upcharge more like 35 to 50%. That could make the premium they

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pay for Thrive materials seem downright manageable.

One other notable package developed by the talented Topeka team is a corrugated SIOC designed for getting 35-lb bags of dried pet food through the E-Commerce channel. Director of E-Commerce Cummings describes its evolution.

“Because Amazon only stocks certain sizes of corrugated boxes, for a period of time they were putting our 35-lb bags into a large box with considerable dunnage. So we designed our own corrugated box, which was considerably smaller and had very attractive graphics. But now we’ve evolved again to a corrugated box that features hand holes. It’s less ink and it’s slightly downgauged. But it’s the hand holes that have generated a ton of positive feedback, which only stands to reason. Getting 35 pounds off the front porch takes some effort. Was the beautifully decorated box more aesthetically pleasing? Sure. But the revised box still delivers big on branding, on trust,

First to appear in Colgate’s monomaterial recyclable tube was the Tom’s of Maine brand, but now Smile for Good in Europe and Natural Extracts in Latin America have also been converted. By end of this year, Colgate Optic White in sizes above 3 oz will take advantage of this technology. The goal is to have all of the firm’s toothpaste in this recyclable tube by 2025.

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and, perhaps most important, on delivering functional consumer value.”

Cummings says that Amazon was so impressed with the functionality of this package that it holds it up as a model of what other brand owners might consider doing. Go to pwgo.to/5807 for a video on this clever E-Commerce packaging concept.

Impact of the pandemic

As for COVID-19, Corra notes that some of the course corrections required by the pandemic highlighted the resiliency of Colgate's packaging supply chain. “As the virus hit we started discovering that we couldn't get as many pumps as we needed, so we quickly qualified a different closure that was more of a flip-cap style to keep liquid hand soap in full production,” he points out. “And look what we did and how quickly we did it with the bar soap we donated for the World Health Organization's #SafeHands Challenge.” For more on this initiative, see Lead Off column on page 7.

Molinar says that one change brought about by the pandemic will remain a permanent fixture at Colgate: expanded use of remote connectivity. “At the height of the pandemic, we had to install in a facility in Brazil a new shrink sleeve labeler fabricated in the Netherlands,” he says. “So we relied heavily on teleconferencing and virtual reality goggles to get the factory acceptance test done. It was fantastic the amount of information we were able to exchange. We all agreed it was one of the best FATs we'd ever experienced. We'll be sure to build on this in the future.”

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Also fixed in Colgate's future are the challenges it will face in an era when E-Commerce will continue to grow briskly and consumers are increasingly vociferous in their demand for more sustainable packaging. "We have a million challenges, but I think those are the two big ones," says Verduin.

The E-Commerce challenge, she says, is all about packaging and production lines that are versatile enough to crank out product that is thoughtfully omnichannel. "Remember, our channel has been brick and mortar for many years, and our lines are optimized that way. Now it's clear we need to build in more flexibility."

And sustainable packaging? "The key is getting the right balance between delivering a great consumer experience and doing the right thing for the planet," says Verduin. "We've set some tough goals for the year 2025, including making sure that all of our packaging is either recyclable, reusable, or compostable. But if you don't set lofty goals, how can you ever deliver what's really called for?"