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Plastic Packaging Design Trends & Outlook

Competitive market intelligence and analysis focusing on current trends impacting design in the North American plastic packaging sector.

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Overview: Plastic packaging market

Heading into 2017, plastic packaging continues to evolve, a direct result of shifting design styles and key functional and social shifts.

The plastic packaging market is booming across North America and so is the demand for high-quality packaging that offers protection and long shelf life for the packaged goods.

To that end, rigid plastics have proven to be a perfect option for packaging. They are non-corrosive, lightweight, inexpensive and easily molded.

Rigid plastic packaging has certain inherent properties that makes it ideal for packaging food and beverage products. They are sturdy, durable, easy to transport, and are not brittle like glass.

This adaptability has made rigid plastic packaging a key option for the food and beverage market. It is produced by thermoforming and, in some products, injection molding.

Over the last decade, U.S. companies that supply plastic packaging have posted an economic growth of 86 percent, above the FTSE average of 38 percent.

One of the main factors behind the recent growth spurt of the packaging industry is the continuing success of rigid packaging companies in the U.S. This success has been driven by strong innovation and the number of food and beverage companies who have made the switch from their traditional packaging options to rigid plastic.

Applications for food and beverage packaging are one of the largest uses of plastics globally and are expected to grow. In fact, demand for rigid plastic food containers is forecast to advance 5 percent annually to $5.4 billion in 2017, according to the Freedonia Group.

Growth in rigid plastic container demand will outpace the overall food container average based on its advantages over glass, metal, and paperboard alternatives. There are a number of reasons for this increase in demand such as plastics-processing technology improvements including advances in co-extrusion techniques that provide oxygen barrier systems, heat resistance, and other performance characteristics.

According to Plastics News Economics Editor Bill Wood, total retail sales in the U.S. (the best proxy for demand for plastics packaging products) have increased by almost 3 percent during the first three quarters of 2016 after growing by the anemic pace of just over 1 percent in 2015.

“The growth rate in the retail sales data is also accelerating,” Wood explained.

These trends reflect the gradual acceleration in the household income data that has emerged in recent months, and they portend a gradual acceleration in future demand for plastics products.

“While it is still a bit too early to proclaim an official end to the recent, year-long down-trend in the plastics data, I am confident that the outlook for the coming year is improving,” Wood added. “After a year of little or no growth over the last year, the data will likely return to the trend of at least 3 percent growth in 2017.”

Plastics News’ 2016 survey of thermoformers found that the leading thermoformed packaging end market is food packaging, followed by consumer products, medical/pharmaceutical, electrical/electronics and industrial packaging.

The growing use of thermoformed plastics, mostly in the rigid packaging market led by the food industry, is a key market driver. These plastics have significantly impacted several key markets as a substitute for glass, metal and paper packaging in addition to blow molded and injection molded plastics.

According to Duncan Hardy, head of business development at R&D Leverage, the biggest areas of growth opportunity includes the continued evolution of private brands.

“Savvy retailers like Safeway, have been steadily building a wellness platform,” he said.
“Packaging design can determine which brands are uniquely differentiated on the shelf and tell a relevant brand story that connects consumers to growing private brands.”

The growth is more rapid in the food and beverage industry, and that growth has been fueled by the demand for rigid plastic packaging in recent years, signaling key shifts for designers.

According to Dr. Susan E. Selke, director of the School of Packaging at Michigan State University, there are several key trends worth watching in 2017.

“A key trend to watch is more e-commerce with its special demands on packaging and design as well as the potential for over- or under-packaging,” she said. “There also will be more interest in ‘environmentally friendly’ or ‘sustainable’ packaging. Continuing growth in pouches replacing more rigid or semi-rigid packaging forms.”

Today’s packaging designs and materials are constantly being influenced by factors such as changing retail environments, increased need for health and safety precautions, and most important the consumer. The industry has responded through technical evolutions in packaging to meet these needs and continue to provide value to the consumer.

By offering quality, convenience, safety and savings, plastic packaging meets the needs of customers and consumers alike.

Rigid plastic packaging design trends, like all trends go through the cycle we are all familiar with: trends arrive and then disappear only to return again. Design is the catalyst driving this cycle. The role of design is to address the demands of the consumer, creating solutions and refreshing ideas. So by reading the design trends we take the pulse of the general public.

Consumers today have a plethora of information, choice and messages. They have virtually everything available at their fingertips. As a result, consumers are seeing simplicity, because they have so many distractions vying for their time. And this is the anecdote that is driving packaging design.

As a result, plastic packaging designers are tasked with discovering and articulating what is important to consumers. As a result, they must now be experienced designers, directing the customer through the storm to a singular experience — because experiences are what today’s customers are after. Packaging designers are now in charge of directing the experience, which leads to a connection with the product and a brand.

The task of the plastic packaging designer in 2017 is clear: articulate the value of the product in simple, approachable terms and connect with the consumer. This is best achieved by focusing on the essential, eliminating the rest.

Today’s consumer also is becoming increasingly more refined and desensitized to marketing messages, which provides both a challenge and an opportunity for brands. Packaging design is arguably as important in terms of product differentiation as logo design, and this hotly contested design space can often foster breakneck innovation.

Consumers are demanding the convenience of on-the-go packaging as well as products that are packaged with environmental concerns included. Recyclability is not only necessary, it is expected among consumers.

Moreover, see-through packaging is gaining traction as a way to demonstrate key pluses such as freshness and product look. Design trends include transparent window patches to achieve this function in packaging.

Technology is evolving today and consumers are expecting more and more from packaging, including function, self-opening, self-sealing, self-cleaning, self-dosing and even self-regulating. To that end, consumers seek product packaging that compliments their personal and social needs. As a result, packaging can no longer simply deliver a product.

Convenience is a selling point, particularly for food and beverage packaging. Key features include portability, resealability, ease of opening, light weight and simply dispensing. These also are seen as benefits that can impact a consumer’s purchasing decision.
Customer preferences also have shifted, and this can be witnessed in changing purchasing patterns, according to Plastics News Economics Editor Bill Wood.

“In today’s economy, consumers still want convenience,” he said. “Consumers want convenience. They also want quality products at an affordable price.”

**Design trends**

A number of trends in rigid plastic packaging going forward will continue to impact innovation and design.

Designers of plastic packaging have to satisfy the needs and desires of consumers. Design has to be functional and convenient.

Successful brands are built around consumer observation, gleaning relevant insights and creating empathetic, differentiated solutions that connect on an emotive level to enrich and improve lives.

According to Mark Strachan, senior technology director, First Quality Packaging Solutions, designers are focusing on creating shelf-stable products in key end markets.

“This means barrier properties that are more effective,” he explained. “Polypropylene is a good moisture barrier, which then protects the EVOH barrier, which is an oxygen barrier. Customers also are seeking more sustainable products. Clarity also is a trend, and we are seeing much clearer polypropylene, which helps that material.”

Strachan also noted that the trend toward polypropylene is affecting design because it has greater shrinkage.

“You have to consider a completely different variable,” he pointed out. “These changes are not always easy to calculate like they are with the other materials. The whole design and product development process is predicated on making sure that you have the right shrinkages and the right final part. You don’t want to cut metal until you have this down.”

According to Kyra Mumbauer, senior director of Global Regulatory Affairs for SPI: The Plastics Industry Trade Association, a key driver for innovation in food packaging has been the concern about certain chemistries.

“There has been a movement away from certain substances,” she explained. “It has been a reluctant shift from some very useful materials. There is a drive to come up with new materials to meet consumer demands. This is being driven by special interest groups.”

Another important trend, according to Mumbauer, is consumers wanting clarity in packaging to be able to see the freshness and integrity of the product.

Craig Sawicki, executive vice president and chief creative officer at TricorBraun, said several trends currently are driving growth and innovation in the sector.

“I would say that the largest trend in consumer products that I’ve seen in years is concentrated products and the want for dosage or measured control,” he said. “This does have an overlap with environmental concerns specifically when it comes to products that contain mostly water. Shipping water (or mostly water) from the filler to the marketer or marketer’s distribution point then to the retailer wastes money, fuel, etc. Assuming consumer acceptance of concentrates, a huge opportunity exists for those marketers.”

Rigid packaging today includes a design that features a convenient, accurate and value-added method of delivering the product will make the difference.

“Value-added being one of the more important keys,” Sawicki noted. “Consumers are reluctant to spend as much or more for an empty container and a small amount of concentrate that requires them to formulate. Having an easy way to measure and a delivery system that is durable enough to withstand multiple refills while retaining its beauty after much use can turn the corner for that reluctant consumer.”

The market for value-added packaging is a huge and growing one in 2016, and Sawicki noted that if current trends are any indication, short-run jobs could make an impact.
“Short run jobs are probably the easiest market to provide value-added packaging. Most times large quantities are much more sensitive to price,” he said. “Smaller, boutique type brands are all about the consumer’s convenience, aesthetics and perceived value.”

Jeff Wolff, president of St. Louis, Mo.-based Anchor Packaging Inc., noted that a key trend pushing designers today is portion sizes for rigid packaging for food and beverages.

“Busy lifestyles are driving smaller portion size with the increase in snacking throughout the day rather than sitting down for a meal with the family,” he pointed out. “Individual portions of single food items allow the consumer to mix and match proteins and side dishes to meet the various tastes in the family.”

Wolff added that there also is more blurring of the segments for take-out prepared foods.

“Consumers want to be able to find good quality and healthy options wherever food is sold and they don’t want to wait,” he said. “This trend is driving the increase in grab-and-go displays in restaurants, supermarkets, convenience stores, college campuses, and many other foodservice venues.”

According to Bob Tupta, product development manager at Mold-Rite Plastics, consumers want snacks to fit in their cup holder, beverages to travel with, tiny packages to carry in their purse and travel-size personal care products.

“This all drives innovation to create packaging that can be used easily and efficiently with the least mess possible,” he said.

Moreover, the growing importance of the 79 million strong millennial generation is impacting packaging design.

Consumers today are seeking convenience in packaging design. File photo
“This group seeks out the latest and greatest products that they feel a personal connection with. This drives unique, creative and appealing designs, more customization, and limited edition designs for seasonal or special releases,” Tupta noted. “This is also the ‘selfie’ generation. They share photos and want to look good with the packaging they are seen with, which is also driving bright colors, novel shapes and attention grabbing packaging.”

Dawn Nowicki, Mold-Rite’s vice president of marketing, noted that the ways and number of places consumers shop today requires a new approach to packaging design.

“What is effective in a grocery aisle to generate shelf appeal may not work or be too subtle for a millennial placing a grocery pick-up order from their smartphone,” she said. “Eye-catching graphics, bold colors and packaging with billboard potential are becoming the norm in modern packaging.”

A large and growing percentage of the population lives in cities (one to two person size households). Packaging needs to take into account that many walk, take public transportation, and live in small spaces. These consumers tend to shop every one to two days and are less likely to “stock up.” Nowicki noted that this is driving packaging that is portable and the right size: easy to lift and carry, compact, sturdy and lightweight.

Mumbauer also noted that another key trend is the drive toward organic products, popular with millennials. This impacts packaging designs, which must protect organic foods without preservatives.

“The impact of delivery companies like Amazon or the grocery chains that have delivery services or ingredients that can be assembled for quick meals are giving challenges to designers,” she added. “They have to develop packaging that can display multiple ingredients.”

Tupta added that baby boomers, now the second-largest population group, is another group that today is driving packaging design.

“Packaging that is appropriately sized, easy to grip and hold, open and close is also often the difference between a frustrated consumer, and a return customer,” he explained. “This is especially true for children and older adults, who have issues with dexterity and strength.”

**Examples of how packaging designers meet convenience and environmental demands**

<table>
<thead>
<tr>
<th>Packaging type</th>
<th>Convenience elements</th>
<th>Environmental elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottled water</td>
<td>Single serve</td>
<td>Biopolymer containers</td>
</tr>
<tr>
<td></td>
<td>Multi-pack designs</td>
<td>Reduced container weight</td>
</tr>
<tr>
<td></td>
<td>Easy opening drink caps</td>
<td>Shrink film rather than trays</td>
</tr>
<tr>
<td>Shopping bags</td>
<td>Stronger bags for multiple reuse</td>
<td>Eliminates plastic and paper</td>
</tr>
<tr>
<td></td>
<td>Available at stores for low price</td>
<td>Less waste</td>
</tr>
<tr>
<td></td>
<td>Attractive</td>
<td>Less environmental pollutants</td>
</tr>
<tr>
<td></td>
<td>Folding features for storage</td>
<td>Feel-good factor</td>
</tr>
<tr>
<td>Ready meals</td>
<td>Single serve</td>
<td>Cooking, disposal instructions on packaging (energy efficient)</td>
</tr>
<tr>
<td></td>
<td>Smaller portions</td>
<td>Biopolymer trays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficient, minimal packaging</td>
</tr>
<tr>
<td>Waste bags</td>
<td>Adhesive to provide temporary adhesion to interior of waste can</td>
<td>Biodegradable materials</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>Stronger with less thickness</td>
</tr>
<tr>
<td></td>
<td>Prevents odors from escaping</td>
<td>Environmentally sound odor absorbing additives</td>
</tr>
</tbody>
</table>

Source: Pira International Ltd.
Packaging design also needs to take into account labelling trends, and provide appropriate space.

Consumers are increasingly interested in the ingredients/chemicals making up the product, as well as the story behind how the product is made; and manufacturers are becoming concerned about quality, safety and counterfeit products. This is driving intelligent packaging, utilizing technologies such as QR codes, NFC (near-field communication) and RFID.

**On-the-go**

Today, Americans are on-the-go more than ever and consumers eat and drink on the go— at work, in the car and everywhere in between. They want packaging that is easy to hold, open, use and even reseal. It can be flexible or rigid.

According to Nypro CEO Courtney Ryan, on-the-go packaging is growing, to meet consumer convenience.

“We’re also seeing a big trend toward digitization — the implementation in everyday products,” he said.

Wolff also noted that designers must consider the key demands of speed and convenience when designing rigid packaging.

Moreover, developments such as better barrier solutions, improved resin formulations, faster and more efficient processing machinery and solutions for hot-filling and aseptic filling of plastic packaging are driving consumption.

A secondary but increasingly important consideration for on-the-go packaging is style. Because these products are used in social settings, the packaging design is important for them to become lifestyle products.

Design details that tell the story of a home-cooked meal and personalized experiences are often portrayed.

The product name and package format may tell the story of ‘on-the-go’, while the graphic design supports the aspiration to be more than the usual food or drink, a lifestyle product with beauty in mind.

## Rigid Packaging Trends

<table>
<thead>
<tr>
<th>DRIVER</th>
<th>FOCUS AREA</th>
<th>LIKELY OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Weight</td>
<td>The lightweighting process will continue for yet awhile.</td>
</tr>
<tr>
<td></td>
<td>Barriers</td>
<td>Improved barriers will attract new categories.</td>
</tr>
<tr>
<td>Environment</td>
<td>Recycling</td>
<td>To improve environmental profile into the recycling rate has to improve.</td>
</tr>
<tr>
<td></td>
<td>Lightweighting</td>
<td>Lightweighting also for improving environmental profile.</td>
</tr>
<tr>
<td>Function</td>
<td>In-house production</td>
<td>Seen as more efficient by some fillers.</td>
</tr>
<tr>
<td></td>
<td>New categories</td>
<td>The basically untapped beer market would be a major breakthrough</td>
</tr>
<tr>
<td></td>
<td>Substitution</td>
<td>There is still room for major substitutions of other materials. The refillable glass bottle is one example.</td>
</tr>
<tr>
<td></td>
<td>Smart and intelligent packaging</td>
<td>New features improving convenience and quality for the consumer, like the controlled release closure.</td>
</tr>
</tbody>
</table>
Less is more

Another key trend as we head into 2017 is smaller packaging. More than 60 percent of all households include just one or two people. As a result, packages sized to serve one or two people have become a big trend in packaging.

Such formats include single-serve packaging, meals for two, multi packs of individual portions, and resealable packaging.

To meet this demand, designers are challenged with developing food and beverage packaging that offers a range of sizes while still being sturdy, compact and lightweight. This crosses over into other products, including health and beauty and home products.

From a design perspective, packaging that is the right size and easy to hold, open and close can be all the difference in pleasing a customer.

Designers also must be mindful of the needs of older consumers and should consider aging eyes with print that is larger and clearer with packaging that also features intuitive markings indicating openings.

Opportunity

Anchor’s Wolff noted that his company’s business is primarily food packaging and they see the biggest opportunity in rigid, tamper-evident packages.

“With the ever-increasing demand for to-go meals as a result of our busy lifestyles, operators need to protect the consumer and their business with the use of tamper-evident packages,” he said. “While there have been some attempts at tamper-evident packages by other manufacturers, they are often viewed by the consumer as difficult to break the seal, have very sharp edges and create waste with tear-off strips.”

Additionally, Wolff explained that consumers today have also found that some packages don’t look open once the strip is removed.

“Flexible wraps and pouches don’t preserve the food presentation as well as rigid packaging does,” he said. “The customer wants the restaurant experience at home, so the way the food looks is a key element for a return visit and increased sales for the operator.”

There are also demographic trends that have positively affected growth in the rigid plastic packaging market and have impacted design. An aging population, for example, has stimulated demand for packaging with greater visual appeal and ease of use, with rigid plastic packaging proven effective in addressing this demand.

Mold-Rite’s Tupta noted that pharmaceuticals and nutraceuticals are expected to grow in the 4 percent to 6 percent range in the next few years, as 75 million baby-boomers continue to age, thus healthcare needs will drive demand for more preventative solutions to health care and wellness.

“Sports nutrition, particularly protein powders we expect to grow in the 8 percent to 10 percent range, again with a consumer focus on health, wellness and weight control,” he added.

The pet industry is another growth industry (4-5 percent), with 62 percent of millennials owning pets, and 54 percent of households overall owning a dog. According to a recent survey by Pet Food Industry.com, 64 percent of millennials are spending more on pet food than they used to.

Another growing market for packaging is legalized cannabis.

“The cannabis market is an emerging market we are following to understand the market needs, regulatory requirements and where we can provide solutions,” Tupta added.

Another major area of growth opportunity is the continued evolution of private brands. Packaging can help tell these uniquely differentiated and relevant brand stories connecting consumers to growing private brands.
One company’s design effort

An ongoing initiative for designers at Pretium Packaging is lightweighting.

One large jar started at 270 grams and was trimmed to 235 grams. A very high-volume jar was lightened up by 8 percent. And a large snack-food barrel saw a 16 percent reduction from 220 grams to 185 grams, with ribs added for strength.

Pretium’s Hazleton technical director Ray Eble likes to call this “the lightest snack-food container of its size on the planet.”

Three of Pretium’s seven design engineers are dedicated to its facility in Hazleton, Pa. There are two SolidWorks CAD stations at the 30,000-square-foot R&D center and warehouse located a mile and a half from the Hazelton plant in a former Novapak facility. A third CAD designer is located in New Jersey.

The R&D center also has a Stratasys FDM-type 3D printer to make prototypes. It typically runs four new models a week.

Quick turnaround also is a key for Pretium.

Pretium’s Tom Ensley likes to repeat a phrase: “It’s not that it’s hard — it just has to be fast. The customer wants it tomorrow, not two weeks from now. Whoever can do that will get added sales. But you must have capacity and be able to react. In one case, we quadrupled the volume of a product in less than two weeks, from 100,000 to 400,000 units. We needed to get extra tooling, but we were able to use some spare components we had on hand.”

That plays into one of Pretium’s special strengths, Ensley notes: “Fortunately, we have the same machines at multiple locations. It’s good from a contingency standpoint, because we can move tools around.” For example, when a customer for a grated-cheese jar found itself oversold.

Challenges

The biggest challenge impacting packaging design is evolving sustainability from being good for the bottom line, to being a strategic imperative for product development. Brands that think holistically will build consumer advocacy and drive profitability.
For processors serving the rigid plastic packaging segment, the biggest hurdles are to stay ahead of market trends, look for ways to reduce costs and assure that our products comply with existing and future government regulation.

“We work closely with our customers to design packaging to meet their requirements and fit food portions demanded by the market,” Wolff explained. “These end users are continually faced with rising food, labor and operational costs and look for savings in packaging to help offset these costs.”

Slight changes in size to reduce portion size or substitute alternative food items will require a major tooling investment and often new equipment as well.

“We also participate with several industry groups to assure that we are staying ahead of legislation, by continually reducing petroleum-based material content, improving recyclability, and making our containers consumer-reusable wherever possible,” Wolff added.

Another key challenge in packaging design is evolving sustainability from being good for the bottom line, to being a strategic imperative for product development. Brands that think holistically will build consumer advocacy and drive profitability.

Sawicki noted that designing packaging that is environmentally friendly while still retaining function remains the largest challenge. “Again referring back to the previous question of sustainability, another important aspect is that the package must remain functional and beautiful through its entire life,” he said. “When it is empty and has been used and abused for months is when the consumer decides whether they will repurchase that same product or not. If it’s broken, dirty and ugly will that consumer think ‘hey that was a great product. I’ll buy it again?’”

Leo Brozell, director of innovation at Mold-Rite Plastics, noted that processors are consistently challenged to produce packaging of the lightest weight and lowest cost. “It’s very difficult to provide any unique value added features or delight the consumer with such a strong bias toward cost cutting,” he said.

Outlook

Industry leaders indicate that the demand for plastic packaging will continue to grow with the ongoing demand for the time-saving convenience of prepared foods to go.

“As all foodservice segments expand their takeout food offerings, they will look for competitive, cost-effective options to preserve the food presentations and choose packages good for the environment,” Wolff concluded. “Education on the sustainable options to minimize the packages going into landfills, new technology, and new material blends to reduce the use of oil-based resins will continue to be driven by plastic packaging manufacturers.”

Michigan State’s Selke noted that for as long as she’s been involved in packaging, it seems that plastics have been the most rapidly growing packaging material.

“I don’t think that’s going to change, as plastics continue to offer benefits in terms of both cost and system-wide environmental impacts, in many circumstances,” she explained. “I think we will continue to see innovations both in terms of new plastic packaging materials, new ways to modify existing materials, and new ways to form those materials into packages for products that consumers will want to purchase.”
According to SPI’s Mumbauer, the packaging sector has a lot of room to grow and there is so much potential for growth.

“This is because of the phenomenon of consumers buying much more products via companies like Amazon or Pea Pod,” she said. “I also like to tell the story of the FDA report that was released on food security and the implications of climate change. As agriculture changes with climate change and food distribution patterns adjust, we are going to need packaging to do some of the job of protecting food and ensuring food security and getting food where it needs to go even when our distribution patterns are in flux.”

Mumbauer added that there are a lot of important roles for food packaging to play, and there is a lot of room for packaging to grow and innovate in the years to come.

“One of the issues I have been addressing is the narrative about packaging as a necessary evil that we accept because it is convenient,” she said. “Nothing could be further from the truth and we need to shift that. It plays an important role in the food distribution and supply chain.”

Heading into 2017, it is expected that rigid plastic packaging designs will continue to evolve to embrace the size and shape of consumer demands.

First Quality’s Strachan said the packaging sector continues to perform well, particularly in food.

“We are going to see continued reshoring of products that have been made in China, particularly in the food and baking sectors,” he said. “This is to have greater control over the materials that are used in our packaging. I am optimistic.”

According to TricorBraun’s Sawicki, the outlook for the segment continues to be excellent.

“The absolute must for a competent packaging designer is to understand all aspects of the product,” he said. “Knowing materials, manufacturing processes, filling, retailing parameters and meshing that knowledge with an understanding of the consumer and their wants and needs is the only way to design.”

Mumbauer also noted that the industry must continue to educate consumers on “why we have packaging and that we have scientists working to ensure it is safe for use will serve us all very well. It will alleviate the exaggerated fear of food packaging versus the risk posed by spoiled or contaminated food.”

Mold-Rite’s Nowicki noted that according to research reports that she has seen, she expects the global plastic packaging market to grow at a CAGR of around 5 percent each year through 2020, driven by rising demand in the healthcare sector and the food and beverages market.

“Consumer behavior and attitudes are driving packaging design toward lighter materials, durability and packaging aesthetics,” she added.

As materials, processes and even retailing changes (ie: the internet and social media), continual education is absolutely necessary. Although that is challenging, Sawicki pointed out that learning to stay fresh also is exciting. As a result, what’s good for brand owners and consumers is also good for manufacturers and investors in the sector – which is why rigid plastics is such a busy area for corporate M&A activity.

In 2017, successful plastics packaging design will seize upon the opportunity to think proactively and will drive innovation to address a rapidly changing global economy. Successful design also will enable customers to provide more holistic solutions that incorporate a differentiated brand story. As a result, product and packaging can be presented in both an engaging and responsible way.

Design also will leverage technology to develop new materials and processes to grow brands responsibly. The particular attractions of rigid plastic packaging have ensured that it is consistently one of the top segments for growth in the overall packaging industry, and that trend will continue in 2017.

Plastic packaging: Global growth

The global plastic packaging market is forecast to grow at a CAGR of around 5 percent each year through 2020, driven by rising demand in the healthcare sector and the food and beverages market.
For packaging designers, the adaptability of plastic packaging allows it to meet a variety of needs.

As packaging moves from the design phase through the life cycle to recovery and disposal, the array of plastics and their properties allow designers to make many choices, including color, weight, size, shape, utility, printing, protection and so on.

The most common resin options include polyethylene terephthalate, high density polyethylene, polyvinyl chloride, low density polyethylene, polypropylene, polystyrene and several other options.

Polypropylene, polyethylene and PET remain the primary materials in use today.

PET has overtaken PE as the leading polymer for rigid packaging overall accounting for a projected share of just over a third of global rigid plastic packaging market consumption. While PE is losing market share, PET and PP are continuing to gain share. PVC is now only a minor polymer for rigid plastic packaging, and both PS, and more particularly EPS, have also lost ground to PP.

PET has excellent performance properties, such as good transparency and its resistance to breakage. The material also is providing growth opportunities for new beverage end use, such as beer in PET bottles. Drivers to the growth include a growing events market, improved barrier technologies and emerging markets.

While PET leads the race, bioplastic and barrier polymers such as EVOH are gaining a share of the rigid packaging market. PET and PE dominate in blow molding, while injection molding is dominated by PP, followed by PE.

Lightweighting, achieved through the reduction of the amount of raw materials utilized, creates lighter packaging which reduces cost and increases sustainability and profitability for processors.

Processors also are reducing the weight and using materials that are either biodegradable or derived from sustainable sources.
Materials trends

Polyethylene resin makers in the U.S. and Canada are hoping to sell some of their new production capacity into the caps and closures market – where sales of HDPE have grown almost 30 percent in the last four years.

The path of regional sales of polypropylene and LDPE into caps and closures has been a bit more bumpy in recent years. That end market accounted for 1.11 billion pounds of North American PP sales in 2015 – up almost 3 percent from the prior year, but down more than 10 percent vs. the 2012 level of 1.24 billion pounds.

Like HDPE, North American sales of PP into caps and closures were growing in 2016, up 4.5 percent in the first half of the year. Caps and closures accounted for 7.8 percent of domestic PP sales in 2012, but by 2015, that share had slipped to 6.6 percent.

High North American PP prices through much of 2016 have made the region attractive to foreign resin makers, according to Ashish Chitalia, senior research analyst with the PCI Wood McKenzie consulting firm in Houston.

“High margins and prices justified un-bagging facilities in North America, making it possible to import significant volume of polypropylene into a region that’s dominated by railcar transportation for polymers,” he said.

The increase in imports has led to an overall increase in inventory levels in the region, Chitalia said, prompting “an aggressive price reduction” by domestic integrated PP makers. “This was the strategy to keep imports away from North America and control inventory levels,” he explained.

In the last few months, lower North American PP prices and global maintenance turnarounds combined to reduce imports from the levels achieved earlier in the year. Those low prices, in turn, triggered an increase in domestic demand, allowing PP prices to increase.

“This time, though, polypropylene producers will be wary of a looming threat from an over-supplied market, which can fill up inventory quickly,” Chitalia said. “Recent increases in prices indicate a ‘full circle’ and hopefully allowed producers to test the waters on how far they can go with margin expansion while keeping large volume imports at bay.”

The tidal wave of new polymer production in the U.S. will be heavily oriented towards polyethylene (PE) as it is based on shale gas-derived ethane feedstocks, according to ICIS senior consultant James Ray.

Shale-related production has grown quickly, using horizontal drilling and hydraulic fracturing, known as fracking. Ray called shale oil and natural gas “a game changer.”

Demographics remain a key trend and millennials have major buying clout. This is impacting design and materials choices.
Taras Konowal, business development manager for North America for H. Müller Fabrique de Moules SA of Conthey, Switzerland, points out that millennials favor more regional suppliers. Millennials like to try different ethnic flavors. And they want “micro-regional” foods.

“Millennials want to see what they’re eating. That’s a big reason why clarified resins, like PET, keep gaining favor,” he said.

Moreover, PET thermoformed packages are the fastest growing segment of the rigid plastic packaging market, according to a study by SPI and NAPCOR. These packages are defined as PET (resin identification code No. 1), other than bottles and jars, made from PET sheet of .008 inch thickness or greater.)

Demand for PET has been steady in 2016, capped off by recent slips in material prices.

NAPCOR estimates that in 2016 more than 2 billion pounds of PET thermoforms will be introduced into the marketplace in the U.S. and Canada, making PET thermoformed packaging a significant contributor to the plastic recycling stream.

Recent news from Niagara Bottling LLC of Ontario, California, should have a positive impact on future North American PET demand. The firm announced that its adding new water bottling plants in Virginia and Connecticut this year.

In Virginia, Niagara is investing $95 million in a new manufacturing operation in Chesterfield County. The investment is expected to create 76 new jobs. The Connecticut project is a new $57 million plant in Bloomfield. That site is expected to be ready in November.

Here comes the PE

The shale situation described by Ray has created an unexpected boom in PE expansion projects. Natural gas can be used to make ethane, which is then converted into ethylene before being polymerized into PE. Major natural gas discoveries throughout North America have made that material a lower-cost alternative to crude oil, which can be converted into naphtha and then into ethylene and PE.

NOVA Chemicals and Braskem Idesa have added shale-based PE capacity in North America, with NOVA and Ineos Sasol expected to add more by the end of 2016. Those projects are estimated to add around 3 billion pounds of annual PE production capacity to the region.

Three major Texas-based PE additions – from Dow Chemical Co., ExxonMobil Chemical and Chevron Phillips Chemical – are expected to add another 6 billion pounds of PE production capacity during 2017. Adding in smaller expansion projects from other PE makers means that the market will have added more than 11 billion pounds of capacity between mid-2016 and the end of 2017.

This is occurring in a market where combined PE demand for 2015 was around 40 billion pounds and had a growth rate in the low single digits. By comparison, the 2016-17 expansions equate to adding about 28 percent to that demand total. As a result, much of this new material is expected to be exported. This in turn could lead to lower costs for North American PE processors, as PE makers match competitive prices on international markets.

Overall, 27 PE expansions have been announced for North America. If they all come to fruition, they’ll add more than 34 billion pounds of capacity — a 75 percent jump over current capacity of roughly 45 billion pounds.

Market analyst Phil Karig told Plastics News that 2016 has been “a transition year to the long awaited PE buyer’s market that should be fully in place during 2017 and 2018.”
Karig, managing director of the Mathelin Bay Associates LLC consulting firm in St. Louis, added that 2016 PE demand growth “should be tepid at best,” and that PE exports from the U.S. to Mexico “will have to find another home as the massive Braskem PE joint venture comes on line.”

Profit margins for North American PE makers should still be “quite good” in 2016, according to market analyst David Barry at PetroChem Wire LLC in Houston. Producers “aren’t worried about margin in the near term,” he added. “But that will change when the new capacity comes on.”

NOVA will do its part for new PE capacity with a 1 billion pound-capacity LLDPE line in Joffre, Alberta. NOVA PE executive Chris Bezaire said recently that material is expected to be available in the market by the end of the year.

The new line’s output “is an extension of what we currently produce,” he said. “We’re building what our customers want.” NOVA also is considering building a new PE plant either in Ontario or on the U.S. Gulf Coast.

North American PE demand also will be helped by new capacity making better-quality resins in volumes that previously were unavailable, Bezaire said. This will allow North American processors to make products that couldn’t be made with earlier resins.

“The PE being made in Joffre is the cleanest PE in North America when it comes to gels and clarity,” he said. “The future is bright — it’s maybe never been brighter in North America.”

“The (North American PE) market is going to be very competitive in two to three years,” said Barry at PetroChem Wire. “Producers will need to cater to processors to get material sold. If they don’t, someone else will.”

Impacts of new capacity

The surge in new PE and PP capacity from low-cost producers in North America, the Middle East and China is driving the global market to oversupply, which will pressure margins for producers and change the global competitive landscape, IHS analysts said earlier this year in a news release.

IHS estimates that almost 53 billion pounds of new PE capacity will be added globally by 2020, with one-third of that, almost 18 billion pounds — coming from the U.S. This addition will significantly increase the U.S. net-export position for PE and PP and other chemicals, rebalancing the global chemical trade flows that have favored the Middle East for decades, IHS officials said.

“The surge of shale gas-derived feedstock has enabled North American polyethylene and polypropylene producers to achieve a level of cost-competitiveness that is unprecedented, since the Middle East has traditionally served as the world’s lowest-cost producer for these products,” global polyolefins, plastics business director Nick Vafiadis said in the release.

“In the near-term, this excess capacity is good news for North American converters, who will be more competitive on a global basis due to the increased competition associated with the PE capacity expansions,” he added. “However, on the producer side, economics will be challenged in the near-term as global capacity expansions exceed demand growth and pressure margins.”

IHS chemical consulting director Chris Geisler said that chemical producers “are clearly looking to take advantage of continued low natural gas and natural gas liquids prices in the U.S., which is enabling the significant expansion of these gas-based projects.”
Beyond North America, China is also growing its influence as a key, low-cost provider of PE, thanks to its production additions from coal-to-olefins technology, according to Vafiadis. China is expected to add more than 37 billion pounds of new PE/PP capacity during the next five years, which will drive further market volatility.

“The U.S. and China are now competing with the Middle East for global PE/PP market share which should have significant impact on pricing and margins,” Vafiadis explained.

“There will be significant trade imbalances as we see North America and the Middle East both add more PE capacity than is warranted for their domestic markets, so exports will be key for producers.”

He added that low oil prices “could make the environment even more attractive for new plastics applications,” which will drive new innovations in PE/PP technology and applications.

**PS maintains share**

Polystyrene packaging continues to meet the demands of today’s modern lifestyles by offering an economical and high quality food service product. It frequently is used in applications where hygiene is important.

While PS is a petrochemical based material, it uses a minute amount of the nation’s supply. According to the U.S. Department of Energy, the manufacture of all polystyrene, to produce both durable and packaging products, uses less than a fraction of a percent of the nation’s natural gas and petroleum.

In 2016, North American PS sales have been steady.

“Growth in food service applications is not surprising as polystyrene characteristics like processability, expandability, and rigidity continue to support its use in this traditional stronghold,” said Brad Crocker, president of PS maker Americas Styrenics in The Woodlands, Texas. “When you couple this with the inherent benefits coming from the low crude environment, polystyrene remains both the economical and value-added choice.”

Crocker added that PS growth in the electrical/electronic segment “likely has more to do with North American production advantages around energy and workforce efficiency than polymer selection.” He also said that ease of processing “is clearly a significant advantage for polystyrene in this high throughput segment.”

Showing its commitment, Americas Styrenics is continuing to invest in PolyRenew, its 25 percent post-consumer-recycled product. The firm also remains focused on chemical recycling of plastic back into plastic, Crocker said.

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**Thermoforming Top Materials**

(by number of firms)

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Source: *Plastics News* data
Doing our part to help you make your packaging flexible

Whether you extrude specialty films for food and medical packaging, or sheet for convenient, disposable containers, you need equipment to control quality and increase productivity. To recycle scrap. To help you stay competitive and profitable in a challenging market. With broad-based equipment know-how, organizational depth, process expertise and well-defined procedures, Conair has been helping processors like you get up, running and profitable – on-time, on-budget and on-spec.

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lighter...
clearer...
faster...
stronger...
better.
Executive Spotlight | Larry Doyle

President, Conair Group

Q: There are a lot of trends today in packaging that are impacting innovation and design. From your perspective, what are some of the current trends in machinery and auxiliary equipment that are impacting packaging design? How are these trends driving growth and innovation for machinery makers?

A: Really, I think trends in packaging design are driving development of machinery and auxiliary equipment and not the other way around. Today’s plastics packaging needs to do more than ever before. Developers and consumers want packaging that is not only going to contain the product inside and get it safely to its point of use, but it also needs to be attractive, multi-functional, lightweight, environmentally friendly and, perhaps most importantly, economical. That leads to new materials, tighter processing windows, and a laser focus on productivity and cost control and those are the factors that drive innovation among equipment manufacturers like Conair. Take PET bottles, for example. In recent years, they have become much thinner in order to reduce weight and limit material use. And yet, it still needs to be structurally sound and attractive. That means that processing conditions, especially resin drying, must be precisely controlled to preserve physical and mechanical properties and avoid defects of any kind. At the same time, drying consumes a huge amount of electric power and so maximizing the volume of material processed per kilowatt hour is critical. We knew how to dry engineering resins like PET years ago, but the need for precision and energy efficiency have been the driving forces behind the development to today’s dryers.

Q: What are some of the current trends for auxiliary equipment for plastic packaging processors today?

A: User-friendliness, of course, in the form of intuitive controls with graphical and textural information instead of lights and codes. Connectivity is important too. Most of today’s control systems are designed for Ethernet connectivity and through industrial networks and the Internet so they can connect and communicate with almost any other device including smart personal devices. To facilitate data collection for process optimization – or any reason, really – we’ve equipped our TrueBlend gravimetric blenders with an interface to Microsoft SQL Server. Processors can then use this powerful relational database management system, which is widely used in general business applications, to track how much resin, regrind, color and additives are being processed. Dependability is really in demand. Customers want equipment that stays up and running because downtime is money lost. And when maintenance is required, we’re trying to make things easier with no-tools access and components that can only be installed one way... correctly.

Q: Then what would you say is the single biggest change that has taken place in the plastic packaging sector in the last few years and how has it affected the design of packaging today?

A: I’ve already spoken about the need for precision and energy efficiency. That is a big change for sure, but I think the biggest change – and one of the biggest challenges – has been the drive to increase the use of recycled materials in packaging. Let’s face it; it’s not easy to pull plastic packaging materials out of the waste stream, re-process them into a form that works in molding or extrusion, and create a bottle, bag or tray that functions as well and looks as good as one made out of all-virgin material. The need to use recycled material impacts almost every kind of equipment Conair sells. First the material needs to be size-reduced in a granulator or, if the volume of reclaim warrants it, perhaps both a shredder and a granulator will be required. The critical point is to create uniformly sized granules, free of dust and fines, which then can be mixed with virgin resin and processed efficiently into high-quality packaging again. But that is not the end of it. PET regrind needs to be re-crystallized before it can be dried and processed. Film or sheet regrind often is in the form of fluff or flake, which makes it difficult to convey and blend with virgin...
pellets. Sometimes today’s packaging incorporates recycled material in a separate layer. That’s often the case in the sheet and film used in flexible packaging and in extrusion blow-molded containers. Then you not only have feeding and handling issues, but you also have the need to control multiple extruders, each running materials with different processing characteristics and possibly inconsistent melt-flows too. The key point is that the use of reclaimed plastics has introduced a whole range of challenges to equipment makers and processors that are entirely different from handling virgin materials.

Q: What are some of the other challenges that plastics processors serving the packaging sector will face in the near future?

A: My short answer would be that they can expect more of the same. In many applications, plastics offer significant advantages over other materials and that includes—contrary to what many anti-plastics people say—environmental benefits. That suggests we are going to be seeing more plastic packaging and not less. The designs will be more sophisticated, involving new combinations of materials that add functionality, reduce weight, and improve product protection. Environmental concerns will drive higher levels of post-consumer recycled materials and biopolymers. The need to differentiate products on store shelves will require innovative shapes, colors, surface textures and elements that appeal to other senses, including hearing, smell and maybe even taste.

Q: In 2016, are processors making investments in machinery and auxiliary equipment?

A: Absolutely! So far, 2016 is on a par with the last couple of years and that’s about what we expected. We see demand for equipment going into Greenfield projects, plant expansions or simply to replace older equipment for increased efficiency.

Q: Are there any innovations in machinery or auxiliary equipment on the horizon that could impact the production of plastic packaging?

A: Really, packaging producers are no different from other plastics processors in that they are constantly looking for ways to increase productivity and become more efficient. We’re working on ways to reduce the impact of human error either by taking the operator out of the process entirely or by making systems that actually prevent operations being performed incorrectly. Predictive approaches to operation and maintenance are also becoming available too.

Q: Looking ahead, what is your outlook for the rigid plastic packaging industry over the coming two or three years, including the demand for new machinery and auxiliary equipment?

A: We expect plastic to continue to play a vital role in packaging. The trends that have historically driven the use of plastic—convenience, portability, lightweight, etc.—those trends and those benefits still prevail in the U.S. and around the world. So, yes, there will be demand for new machines and new auxiliary equipment that do things better, faster and more economically.

Q: How will the changing landscape impact equipment suppliers like Conair?

A: We are already challenged to develop equipment that is more efficient, more dependable and, at the same time, more affordable. What has already begun to change is that our focus is shifting from “equipment” to “systems.” Some years ago, we assembled a team of engineers, marketers, sales people and service and support technicians to serve the packaging market exclusively. This has already led to the development expansion of a family of what we call ‘upstream extrusion’ products targeted at both mono-layer and co-extrusion applications in film, sheet, and bottles. We’ve also developed equipment to meet the unique requirements of the PET packaging market, the thermoformed sheet market and other niches within the broader market. These are integrated solutions, designed with controls that have a common look and feel, as well as the supervisory and data-acquisition capabilities needed for Industry 4.0 and the factory of the future.
A key trend for packaging design continues to be the use of bioplastics derived from renewable biomass sources.

The global bioplastic market, which totaled 1.6 million metric tons in 2015, could hit nearly 6.1 million metric tons in 2020, reflecting a compound annual growth rate (CAGR) of 30 percent, according to BCC Research.

The Americas bioplastic market totaled 798,830 tons in 2015 and should total nearly 3.4 million metric tons by 2020, a five-year CAGR of 33.3 percent.

A bioplastic that is bio-based has some or all of its carbon produced from a renewable plant or animal source. “Renewable” is defined as a resource that is inexhaustible or readily replaced. The bio-based content may be the polymer, filler, or an additive.

Materials are also considered to be bio-based if produced in yeast, bacteria, or algae grown and cultivated with bio-based feedstocks such as sugar or lipids as long as the source of carbon within them is partially or wholly from non-fossil origin (e.g. petroleum or natural gas.)

Bioplastics offer an eco-friendly alternative to the most commonly used plastics, particularly those derived from fossil fuels. Bioplastics can be composed of a wide variety of materials, such as starches and cellulose.

Some bioplastics are biodegradable and, therefore, ideal for disposable items, such as packaging. In these cases, they not only represent a significant reduction in greenhouse emissions but also a meaningful cutback in hazardous waste.

There is a growing trend toward using bioplastics as alloys with traditional plastics.

Companies continue to explore options for bioplastics.

Avantium, a Dutch renewable chemicals company, has developed polyethylene furanoate (PEF), whose protection against water, oxygen, and CO₂ represents a promising packaging opportunity. The new bioplastic material is particularly interesting for beverage makers, as it would reduce the weight of bottles and simplify the production process.

Sharing technical expertise with Avantium, industrial material manufacturer Toyobo Co. established a system to mass-produce the new material called polyethylene furanoate (PEF).

The unique properties of PEF have called the attention of major companies, such as Coca-Cola and Danone, who are now working in partnership with Avantium to make PEF bottles commercially available.

As bioplastics become more popular and an emerging material of choice, SPI’s Bioplastics Division has taken an active role in educating the industry so that processors can understand their benefits.

The SPI Bioplastics Division defines “bioplastics” as “partially or fully bio-based and/or biodegradable.”

“We wanted to simply explain bioplastics and showcase how bioplastics support the plastic industry’s focus and commitment to reduce waste and create products that are sustainable,” said Patrick Krieger, assistant director of regulatory & technical affairs at SPI. “With our members and consumers in mind, we wanted to clarify how these innovative materials are composed, and highlight their benefits to the environment.”

The group also is working to educate consumers on the meaning behind company-specific claims that their products include bio-based content, or are biodegradable.
U.S. Federal Trade Commission’s Guides for the Use of Environmental Marketing Claims, companies that make these claims must ensure they have competent and reliable scientific evidence for the origin or degradability claims for their products.

Bio-based bioplastics can have numerous environmental benefits, including the reduction of fossil fuel usage, potential reduction of carbon footprint and/or reduction of global warming potential. Through composting, anaerobic digestion, and marine and soil environments, biodegradable bioplastics completely degrade, through biological action, into biomass, carbon dioxide or methane, and water. The benefits of bio-based and biodegradable plastics reinforce the plastics industry’s commitment to creating sustainable materials.

According to SPI, potential benefits of bio-based bioplastics are numerous. The specific benefits of a particular bioplastic, from an overall environmental standpoint, should be determined through a life cycle assessment (LCA) or other data gathering and analysis tool that broadly assesses environmental benefits and burdens.

Bioplastics produced from bio-based polymers can perform the same as the same polymer produced from a fossil source. Examples of commonly fossil-based polymers with partially or fully bio-based equivalents are: polyethylene (PE), polyethylene terephthalate (PET), and several types of polyamides. These bioplastics have the same property and processing characteristics as their fossil-based equivalents because those properties are driven by the polymer chemical structure rather than by the source of the carbon.

According to Krieger, bioplastics can be both bio-based and biodegradable. However, it is also possible for bioplastics to be only bio-based or only biodegradable. The two properties are independent but can often be achieved in the same bioplastic. As such, bioplastics have a broad range of properties and characteristics and thus ways in which they can be used.

Research success

Researchers in Alabama have cracked one of the problems of making bio-compostable films. Eggshells are being explored as a sustainable filler/reinforcement in bio-resins at Tuskegee University.

Vijaya Rangari is leading research at the university designed to incorporate nanoparticles from waste eggshells into plastic film made of bioplastic to create a material that is wholly sustainable.

“These nano-sized eggshell particles add strength to the material and make them far more flexible than other bioplastics on the market,” Rangari explained. “We believe that these traits — along with its biodegradability in the soil — could make this eggshell plastic a very attractive alternative packaging material.”

Rangari said his group crushes chicken eggshells and then uses a combination of ultrasound and chemicals to make tiny particles about 10 nanometers or smaller in size. The resultant calcium carbonate nanoparticles have a very high surface area and are porous, boosting the mechanical and thermal properties of the composite. A small amount of residual protein present on the eggshell particles significantly improves bonding of the particles to the base resin, which can be polylactic acid or other naturally sourced polymers.

They produced a bio-composite that is 700 percent more flexible than other bioplastic blends. Film made of the new material could be used in retail packaging, grocery bags and food containers — including, of course, egg cartons. Calcium carbonate derived from mineral sources has long been used as a filler in plastics but the Tuskegee research shows a biological, sustainable waste stream could be tapped as a carbonate source.

**Bioplastics benefits**

Typical benefits of bioplastics can include:

- reduction of fossil fuel usage;
- reduction of carbon footprint; or
- reduction of global warming potential (GWP),
- or any combination thereof.
Bioplastics and sustainability

According to John Standish, technical director of the Association of Plastic Recyclers (APR), there are a number of ways that blow molders can improve their sustainability and recycling efforts.

“When we look at rigid plastic packaging and sustainability, there’s four strategies that I’m aware of that can be used to address sustainability,” he said.

“One is package lightweighting,” Standish explained. “And you are all aware that not too many years ago we packaged laundry detergent products in high density polyethylene bottles that were fairly large volume.

Standish also noted that as a result of sustainability, the brand companies started to concentrate their formulations. “This allows smaller packaging to be used. So there’s an example of lightweighting,” he said.

Standish added that the sector is starting to reach the point of diminishing returns that can be achieved in lightweighting and weight reduction.

To that end, biosourcing of polymers is a strategy the industry is starting to consider.

“Some of you might know that in polyethylene, you can make the ethylene used in polyethylene from natural resources. Or in PET plastics, you can make the ethylene glycol used to make PET from bioresources. But in today’s market, making polymers directly from traditional petroleum sources is by far more economical so as appealing as this strategy is, it’s not economically practiced very much today,” he said.

Beyond lightweighting and bioplastics, Standish said the use of recycled content in new products also is a way to improve sustainability.

“The energy required to make recycled resin is about half that required to make virgin resin. And directly tied to that, the greenhouse gas generation from making recycled resin is about half of that associated with making virgin resin,” he said. “So including recycled content is an important sustainability effort.

Standish added that the industry can design products to be recyclable.

“If a product goes to landfill, that doesn’t help sustainability. If a product goes to waste-to-energy, that might be better than landfill, but it’s not as good as designing it so that it’s suitable for a next use,” he said.

While the technology exists to use a high percentage of recycled content in blow molded products, market conditions are preventing that on a grand scale.

“We’re not able to use recycled content at these high levels widely because, frankly, the demand for post-consumer resin far exceeds the supply of post-consumer resins. So the availability of post-consumer resins today limits its use.”

— John Standish, Technical Director, APR
Coca-Cola’s breakthrough

In 2015, Coca-Cola Co. unveiled the world’s first PET bottle made entirely from plant materials.

PlantBottle uses patented technology that converts natural sugars found in plants into the ingredients for making PET bottles. The packaging looks, functions and recycles like traditional PET.

“Our vision was to maximize game-changing technology, using responsibly sourced plant-based materials to create the globe’s first fully recyclable PET plastic bottle made entirely from renewable materials,” said Nancy Quan, global research and development officer at Atlanta-based Coke.

Coke’s current version of PlantBottle is made from up to 30 percent plant-based materials.

The new PlantBottle is its first to be made 100 percent from sugar cane plastic.

Coca-Cola said the sugar cane used in the PlantBottles comes from Brazil. They also contain waste products from India that are left over from processing sugar cane.

Though those are currently the only two sources of materials for its PlantBottles, Coke said it also looking at converting fruit stems, peels and bark into plastic in the future.

Since 2009, Coca-Cola says it has distributed more than 35 billion plant bottle packages in more than 40 countries. The company estimates that it has eliminated 319,000 metric tons of carbon dioxide emissions into the atmosphere as a result — the equivalent of CO2 emissions from burning 743,000 barrels of oil or 36 million gallons of gasoline.

About 30 percent of Coke bottles in North America are PlantBottles, but just 7 percent of Coke bottles around the world are made from plant materials.

The company says its goal is to exclusively use PlantBottles in place of petroleum-based plastic bottles by 2020.

“With every technological advance made in the bioplastic industry comes the opportunity to continue to scale the impact of more sustainable production for materials we depend on today,” noted Erin Simon, Coke’s sustainable research and development manager.
Executive Spotlight | David Feber

Vice President, Research & Development, Amcor

Q: There are a lot of trends today in rigid packaging that are impacting innovation and design. From your perspective, what are some of the current trends that are impacting packaging design? How are these trends driving growth and innovation?

A: There are a handful of trends we are seeing. Smaller package sizes are impacting the sector quite a bit. There is a trend we are seeing with brands moving to smaller package sizes for certain food and beverage products. This is creating new demands on design in terms of bottle designs, weights and barriers. Second, sustainability is growing in importance. Brands are trying to figure out what their sustainability message is. Plastic is one of the most recyclable forms of packaging. It is effective in packaging food and beverage products, but it has one of the worst reputations and that is one of the biggest misconceptions.

Q: Do you see flexible packaging taking market share away from rigid?

A: There is some interchange in the segments. There are areas where we see flexible pouches coming up. It is hit and miss in the Americas. Globally we are seeing it more so than in the Americas.

Q: Where are the biggest areas of opportunity for expanded growth? Emerging markets?

A: We see a number of areas for growth. In North America, rigid plastics can help drive growth in packaging. Glass conversion is one area. In the food segment, there is opportunity if packaging can be developed to replace glass. Emerging markets continue to be a medium- to long-term growth driver and Amcor is invested in emerging markets. Overall, packaging growth and consumption continues to be driven by small changes in the middle class and emerging markets are big drivers in this.

Q: How can packaging design impact the use of sustainable materials for rigid packaging?

A: There are a number of ways. The two big ways are in thin-wall and lightweighting. Getting the same functionality in packaging using less material is one of the key ways to drive sustainability. We have set aspirations for lightweighting to take weights down by 50 percent over a five-year period for hot-fill products. It is a key way to help the industry become more sustainable. Resealable products also have become a growing product in some markets in the Americas. This helps the region become more sustainable.

Q: What are some of the trends we are seeing today with regard to machinery? How can the machinery used impact design trends?

A: The machine manufacturers continue to innovate their machine platforms. For example in injection stretch blow molding for PET, the machine advancement allows us to have greater control, which gives us more flexibility for shape, design and lightweighting at a lower cost. They are getting faster and faster with more precise controls. The less precise your controls are, you tend to end up with material in places on the bottle where you do not necessarily need it. With more control, you can eliminate this waste and have lighter bottles.

Q: The business landscape is always changing and presenting hurdles for companies. What are the biggest challenges that are impacting the design of plastic packaging?

A: The biggest challenges that our customers face are finding the right tradeoffs of shape, flexibility and aesthetics while using as little material as possible for sustainability and cost. They also have to build an effective supply chain while doing this.
Q: What materials are most prevalent in rigid packaging today?

A: The three most prevalent materials are PET, HDPE and PP, by far. In the beverage space, PET is the most used material. PP is sprinkled throughout the end markets.

Q: One of the biggest costs for a company remains materials. How is the volatility in materials pricing impacting the design of packaging? What are some of the challenges in materials?

A: The volatility of materials impacts design as brands switch between materials, such as moving from PP to PE. The change in materials doesn’t tend to impact design. The need to create a lighter weight material is always there regardless of the cost of the material. There are advantages to taking weight out to meet cost and sustainability requirements.

Q: The market for value-added packaging is a huge and growing one. If current trends are any indication, do you see potential growth in this market coming in the form of short-run jobs?

A: We have seen a trend in greater flexibility in shorter runs. It is driven by a couple of things. Brands are experimenting more and more with different shapes. They often want flexibility to try something in a market or to shift if what they tried didn’t work.

Q: Has the business world’s increased focus on sustainability had a big impact on packaging, including design and materials?

A: The biggest driver has been to focus on lighter weight containers. It results in a better carbon footprint and a lower cost. When sustainability blends with lower cost, it gets a lot of momentum behind it. There also is a focus on bio-based resins.

Q: How big of an impact does the desire of consumers play in packaging design?

A: It is incredibly important. The look and feel of the package is a key driver for almost every product we are involved with. Brands are acutely interested in the look and feel of the package for the markets they are targeting.

Q: When it comes to packaging design, at what stage are plastics processors getting involved in the design process?

A: We get involved at multiple stages of the product design cycle. The best, from our point of view, is as early as possible. In our design center, next to our designers that do packaging design is an industrial design studio. They are experts in packaging design and are creative artists and not typically engineers. They look at packaging from a size perspective for shipping. The idea is to partner our industrial designers from someone with the brand so that they can start quickly and rapidly make renditions that articulate the brand’s desires.

We use rapid prototyping to develop a prototype. We work on developing a prototype in a day. The 3-D printing we use helps to ensure we have come up with the right design. Holding the product and passing it around to see how it feels is very important. When it comes to closures, we will print a closure and run it through a filling line to see how it works before we create tools.

Q: Looking ahead, will innovations continue in the area of design and engineering? Where do you see opportunity for the greatest innovation?

A: When it comes to design and engineering, we have been investing heavily in computer-aided design. The ability to simulate how a package is going to form and function to provide more rapid iterations for analysis helps us to refine our design and meet FDA guidelines. This helps with speed to market.

I think materials and material science will play a bigger role as packaging gets lighter and walls get thinner. We also are seeing more and more intelligence coming into packaging. Things are moving beyond a plastic bottle.
Q: We’ve talked about some challenges and opportunities facing the sector. Looking ahead, what is your outlook for the packaging industry over the coming years? What kind of impact will this have on plastics packaging design?

A: The outlook for packaging is positive. Packaging is an important part of distributing food and other products to the rest of the world. I think that need is going to continue to grow. The challenges that will place on the plastics industry is to create more sustainable packaging that is better for the environment or use less resources that are more efficient.

We as processors are going to have to help brands achieve these initiatives and other trends such as package size and intelligence. The overall issue that troubles us is the recycling rate of plastics in the U.S. They are low. Only 25 to 30 percent of our PET bottles get recycled. It is a society issue that needs to be addressed over time. I think the tolerance of the world putting that much plastic into landfills is going to continue to be less tolerant. We want plastic to get recycled, rather it goes back into bottles or finds other uses. There is a finite pool of resources in the world and when you put it into a plastic bottle you want to reuse that.

“The outlook for packaging is positive. Packaging is an important part of distributing food and other products to the rest of the world. I think that need is going to continue to grow.”

— David Feber, Amcor
Innovation in plastic packaging

Designing plastic packaging no longer has to be a months-long process, with iterations bouncing back and forth between decision makers, before a final version is hammered out.

According to Leo Brozell, director of innovation at Mold-Rite Plastics, packaging design also can play a key role in the use of sustainable materials for rigid packaging.

“A lightweight design that can deliver the sturdiness and functionality required will reduce the amount of materials (resin) needed to safely contain the product,” he explained. “The development and use of plant based resins or resin alternatives in packaging designs can also impact the use of sustainable materials.”

As a result, Brozell noted that plastics processors serving packaging end markets are consistently challenged to produce packaging of the lightest weight and lowest cost.

“It’s very difficult to provide any unique value added features or delight the consumer with such a strong bias toward cost cutting,” he added.

Moreover, in 2017 the market for value-added packaging will continue to grow, with potential growth coming in the form of short-run jobs.

“If a supplier can be fast, flexible, and responsive that is what Mold-Rite Plastics thrives on,” Brozell said. “Short-run jobs are contrary to the large tool, no change over, economic-driven mindset. Suppliers that can service short-run jobs effectively can reap this potential growth.”

And the desire of consumers can make or break the design of a package. Brozell pointed out that it can mean everything to the success of a product.

“Consumers can drive and create entire new package categories if you can fill an unmet need (or create one). Consumers can be very tricky, however,” he said. “Often they will tell you that they want a certain feature or options in their packages, yet, are unwilling to pay for it.”

On the other hand, if consumers aren’t presented with an option, they cannot purchase it.

“It’s an interesting dance, trying to figure what their desires are and if they really do want what they say they want,” Brozell concluded.

Automation also is playing a key role in design.

Brozell noted that designs will need to become more automation friendly to work more efficiently with automation equipment.

“It could be something as simple as adding a flat or a rounded edge or utilizing a completely different closure,” he said. “Package design engineers need to learn all they can about designing for manufacturing and build that into their designs to be successful. As a manufacturer, we have a great advantage to validate the manufacturability of a design.”

One company’s design plan

Using something dubbed the “eight-hour month,” Amcor Rigid Plastics is relying on improvements in both software and hardware to help compress the process into a single day, according to Laurie Goetz, director of product development — diversified products, at the company.

Amcor, she said, can bring decision makers together at its Manchester, Mich., location to brainstorm and create multiple container designs within a single day.

Cleaning clothes and packaging

A trio of companies are joining together, they say, to improve on a rigid plastic container.

Consolidated Container Co. is working with resin maker Braskem to produce a 100-ounce laundry detergent bottle for Seventh Generation, a company known for its environmentally friendly products.

CCC, which calls itself one of the nation’s largest rigid plastic packaging makers, is producing the new bottle with post-consumer resin and Braskem’s “I’m Green” polyethylene brand made from sugar cane.

“Our 100 [ounce] laundry packaging was made from 80 percent post-consumer resins and 20 percent conventional petroleum-based plastic. We needed to do something about that,” Derrick Lawrence, director of packaging development at Seventh Generation, said in a statement.

Seventh Generation said the packaging change is “a big step” toward the company’s 2020 vision that all of its packaging will be made from recycled or bio-based materials.

“Our green PE is the perfect solution for Seventh Generation. It has the same technical properties and recyclability as conventional PE; the only difference is the raw material used,” said Joe Jankowski, commercial manager for I’m green polyethylene in North America. Braskem also said it is working with the Netherlands-based company EEQO and label giant Avery Dennison to use “I’m Green” to make bio-based polyethylene labels.

EEQO, which makes natural cleaning and maintenance products, is using the self-adhesive labels on its packaging.
“We’ll have all those people sitting in a room and literally over a six-to-eight-hour period we usually come out with three or four designs,” she explained.

“It’s expedited the project I would say at least two months and, if not, sometimes up to three months,” Goetz said. “It’s been a huge selling point for us. Our hard part is usually to get somebody to do it once.”

After that, she said, the client is sold on the approach. “After they do it once, it’s done. It becomes the normal way they operate the business in the future,” she said.

“It’s really a great, fast process. That’s the key. Because the software and the hardware has come a long way so you don’t get bored between iterations,” Goetz said.

Bringing together customers with packaging engineers and industrial designers streamlines the design process, allowing changes to be talked about and considered within a matter of seconds or minutes thanks to advancements in software and hardware.

“That’s the trend we’re seeing to help our customers get to the finish line, and really to make much, much better decisions,” she said.

A typical day-long session can result in designs that appeal to different factions in the process, including those in marketing, operations and manufacturing, before a final decision is made. Amcor also can take the process on the road to a customer’s site.


The project development director, during a recent presentation about rigid plastics trends, also told the crowd to expect to see more metal closures on plastic containers in the future.

Launched under the A-PEX brand at Amcor, the use of more metal closures in conjunction with plastics will be a challenge for the recycling stream, Goetz acknowledged.

“You can put the same metal closure you saw on glass,” she said, on PET.

“What I’m hearing from our customers is they love that nostalgic look,” Goetz said. “We are seeing definitely a big trend.

The eyes have it

A program at Clemson University is helping determine whether that next plastic package — or any package for that matter — is going to be a hit or a miss or somewhere in-between.

The approach, years in the making at the South Carolina school, is now being commercialized through a new company using these biometrics to help guide consumer product companies as well as packaging suppliers in their decision making.

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“You’ve got this stuff down and we can pass this off to a local start-up company who can make a big difference and really utilize it and get it out into the industry and show off what we’re doing,” said R. Andrew Hurley, assistant professor in the Department of Food, Nutrition and Packaging Sciences at Clemson.

As part of the Sonoco Institute of Packaging Design and Graphics at the university, work on this approach dates back more than six years.

“There’s a lot of facets that you can apply this type of technology to. We work with leading eye-tracking software and hardware companies. We’ve highly customized commercial products to do this type of work,” Hurley said. “We can look at shelf impact and product viability. And we can do that from a very quantitative perspective.”

Clemson has its own store, of sorts, on campus. That’s where folks are invited in to shop,
and their responses to specific packaging are recorded and then analyzed.

In recent years, the practice of eye tracking has grown in popularity as a means for brands to better understand shopper behavior in a retail environment. By leveraging headsets or – more common nowadays – glasses with built-in cameras and integrated monitoring software, research teams are able to monitor an individual’s shopping experience in real-time, gaining insight into how consumers react to different marketing messages and helping to better understand their engagement with products and packaging on the retail shelf.

Eye movement itself is tracked 30 times per second. And combined with all of the other metrics, a single shopping experience can yield more than 20 million pieces of data for analysis.

“We can quantifiably tell you if that’s going to increase attention, increase shelf impact and in the end is it going to increase your sales,” Hurley said about different packaging designs. That’s good for makers of consumer packaged goods as well as their packaging material suppliers.

“We can tell you with a very high confidence what structure or what substrate or what printing process really made a difference,” Hurley said.

In 2015, Hurley said, 93 percent of all new product launches to the fast food and consumer goods categories were failures. “That’s a lot of money. That’s a lot of time. That’s a lot of waste,” he said.

But this research, he said, can help prove the viability of a package long before it hits the market. The laboratory at Clemson is called CUshop, which plays off of the university’s name as well as the mission of the work. According to Hurley, using the CUshop concept can shave months off of a product’s launch.

“The average development cycle for a company is 22 months. This process can shorten that by about seven months, making you a market leader,” he said.

CUshop, a laboratory at Clemson, helps to shave months off a product’s launch. Photo courtesy of Clemson University

cleaning products.

The company, Cappadonia indicated, is looking to push deeper into the food and beverage markets. “It’s an area of growth,” he said. “We see that as a big market we just haven’t tapped. We have all the technology capabilities of doing it.”

Alpla Studio A includes a space to develop prototypes that can then be created using 3-D printing so customers can get their hands on a sample quickly. The new design studio, renovated in an existing space, also allows the company to react to a trend toward more diversity in packaging, he said.

Studio A includes a space where company designers can work with clients to design and develop prototypes that can then be created using 3-D printers.

“We can do the design right on site while they are here, that day,” Cappadonia said. “It’s especially made for collaboration and sharing of information.”

Parent company Alpla-Werke Alwin Lehner GmbH & Co. KG, based in Hard, Austria, has 159 manufacturing sites and 16,500 employees in 42 countries. In North America alone, the company is fourth on Plastics News’ ranking of blow molders with sales of $961.7 million.

“Product life cycles are becoming even shorter, and to stay ahead of the competition our customers need a partner who can provide fast turnaround on new packages either capture attention on the shelf and increase sales,” said Jodok Schaeffler, U.S. regional manager for Alpla. “That is what Studio A is all about.”
Executive Spotlight | Stephen Kocis
Creative Design Services Manager, Silgan Plastics

Q: There are a lot of trends today in rigid packaging that are impacting innovation and design. From your perspective, what are some of the current trends that are impacting packaging design? How are these trends driving growth and innovation?

A: Key trends include dosing, ease of use and convenience. Consumers are looking for products that are easier to use than ever before and offer a convenience benefit. Examples of innovative solutions evolving from such demands include ergonomic bottle shapes; specialty dispensers like battery powered sprayers for household/industrial/agricultural packaging; easy to pour fitments in laundry; no mess dispensing membranes in closures for the food category; convenient tamper resistant and child resistant closure solutions; and concentrates. Another area is sustainability. Both our CPG customers and their end users are looking for cost savings. Creating packaging that uses less material not only saves money but creates a better carbon footprint as well.

Q: Where are the biggest areas of opportunity for expanded growth? Emerging markets? Growing end markets such as medical?

A: Dosing and the ease of use for a packaged product are emerging markets within the packaging industry. Additionally, sustainability and how it intersects with other trends is also a great area for opportunity and growth. For example, concentrated product solutions offer convenience to the end user while also allowing for a smaller package that uses less material and has a smaller carbon footprint overall. Another emerging market is that of the growing elderly population. With life expectancy on the rise, there is great opportunity for the packaging world to come up with creative ways to best suit the aging population.

Q: How can packaging design impact the use of sustainable materials?

A: It is both the brand manager and designer’s responsibility to consider sustainability issues. Best practice for all packaging designers is to have a design criteria checklist that includes the promotion of sustainable materials use. A total package solution should be considered, including material selection, lightweighting opportunities, and decoration.

Q: What are some of the trends we are seeing today with regard to machinery? How can the machinery used impact design trends?

A: The multilayer extruded barrier technology is helping different market categories support the trends of sustainability by eliminating the fluorination process in some packaging. Fluorination is typically used for products with aggressive chemical ingredients found in industrial and automotive markets, such as gas additives and agricultural products. A similar benefit can be found in the rigid food packaging market, where barrier technology is used against oxygen. In the future barrier technologies and O2 scavengers will help the health and wellness consumer trend, as preservatives can be removed and more natural ingredients added. Additionally, injection molding machinery is helping to make improvements in closure technology with bi-injection parts. New features include over molded graphics and the use of TPE materials. This particular improvement supports the consumer trend of creative packaging best suited for the aging populations. For example, TPE materials used in the over molding process provide extra grip, creating closures that are easier to open. Additionally, over molded graphics offer the opportunity to print warning or instruction graphics, such as “Push to Turn”, on a particular closure.

Q: The business landscape is always changing and presenting hurdles for companies. What are the biggest challenges that are impacting the design of plastic packaging?

A: The biggest challenge facing plastic packaging is the desire to remove packaging costs. The thought process of how packaging is designed, for the entire life cycle of the package, is affected. Designers have to consider broader issues from the retail shelf area, material selection, the logistics of shipping the finished product, manufacturing efficiencies, and the overall carbon footprint.
Q: One of the biggest costs for a company remains materials. How is the volatility in materials pricing impacting the design of packaging? What are some of the challenges in materials?

A: The volatility in materials means that we may, depending on our customer’s preference, have to consider alternate materials during the design process due to price and availability. Designing for specific materials requires designers to take into consideration different machine platforms that may be material specific, adding another layer to the process.

Q: Security is a key issue for customers today. What are some of the emerging trends in the design of tamper-evident packaging? How do you see this area continuing to evolve over the next few years?

A: Due to the need for security, innovation in tamper evident packaging has evolved. In our core business, blow molded bottles and injection molded closures, new innovations, designs and processes are becoming available. For example, tear away tamper band closures; shrink sleeve labels; induction seals and pressure sensitive tamper labels are some of the most common. We believe that various safety features such as these will continue to evolve and grow, as the need to find cost reductions continues.

Q: As processors rely more on automation for the production of some types of packaging, how can this impact design?

A: Designers have a responsibility to understand processors’ equipment, capabilities and limitations. In our industry, blow molded bottles must be able to advance down a filling line, often including closure applying equipment. Applying a closure to a bottle is dependent on the type of closure, snap-on or threaded. The bottle design has to accommodate the closure-applying process and considerations must be made for the required equipment clearance needed in order to apply a threaded closure.

Q: Has the business world’s increased focus on sustainability had a big impact on packaging, including design and materials?

A: Absolutely. Giant retailers like Wal-Mart are driving sustainability related programs that are forcing designers to consider material options, material reduction, and product life-cycle carbon footprint improvements. These factors are all relevant to the design process and result in design improvements such as cube optimization and weight reduction.

Q: How big of an impact does the desire of consumers play in packaging design?

A: Everyone involved in the development process is critical and plays a part in the design of a package. Customers, internal customers, manufacturing, fillers, labelers, etc. are all important; however, if the end user or consumer is not attracted to the package or does not find it beneficial or functional, they may not purchase it a second time or even the first time. In our business, the end user’s satisfaction will ultimately determine future sales of a product.

The importance of the packaging may vary with other types of packaged products where the package is less important to the sale of the product: such as protective packaging around consumer goods where materials could be made from a thermoforming or paperboard process.

Q: What trends are we seeing in tooling design for packaging production?

A: FDM, 3D printing and other rapid tooling processes and technologies are improving and having a positive impact in tooling design and production.

Q: Looking ahead, will innovations continue in the area of design and engineering? Where do you see opportunity for the greatest innovation?

A: Yes. I think there is opportunity in any rigid packaging process; however, Injection Molding is the most flexible and versatile process. From thin wall containers that now compete with thermoformed products, to functional moving parts that can be assem-
bled like closures and dispensers, Injection Molding offers the most opportunity for innovation.

Q: What are some of the trends we are seeing with regard to machinery? Whether it is thermoforming, injection molding or another process, how can the machinery impact packaging design?

A: The evolution of equipment and machinery is continuously improving and resulting in new opportunities for unique products through design. Some examples include deep draw thermoformed parts, thin wall injection molded containers, the ability to trim blow molded parts, the improvement of process and machinery that will create better part tolerances that can open the doors for packaging assemblies and other innovations.

Q: We’ve talked about some challenges and opportunities facing the sector. Looking ahead, what is your outlook for the packaging industry over the coming years? What kind of impact will this have on plastics packaging design?

A: Packaging is a necessity for most consumer goods products. Packaging helps to sell brands as a point of advertising, in addition to protecting the product. Reducing costs and sustainability related issues are big drivers with brand owners and retailers and will continue to influence the sector. Packaging designers need to be conscious of these drivers and other trends as the packaging industry evolves.
When it comes to packaging, designers face a unique set of challenges to ensure their products are sustainable and environmentally friendly.

More and more manufacturers of consumer goods are choosing to reduce, reuse, and recycle. Their effort aims to lighten the impact of packaging on the environment as well as boost the corporate bottom line by cutting costs for materials and transportation.

Currently their packaging options include using renewable raw materials, packaging with recycled content, and lighter packaging. Food-based, bio-plastics made from the likes of sugar cane are also satisfying the appetites of some manufacturers.

Plastics-based packaging, which represents 35 percent of all materials used, will be the fastest growing sector of the sustainable packaging market over the next five years.

In North America and globally, consumer demand and government legislation around the world are the leading drivers for the sustainable packaging agenda. Environmental awareness among a growing population of consumers is fueling demand for sustainability and the reduction of the impact of packaging on the environment.

The key trends in sustainable packaging include downsizing and lightweighting; increased recycling and waste recovery; increased use of recycled content; increased use of renewable sourced materials; and improvements in packaging and logistical efficiency.

The demand for plastic is also expected to be influenced by an increase in the demand for convenience packaged foods by consumers across the country. As a result, the demand for plastic packaging products is expected to have a positive impact on the growth of the Containers and Packaging market in the U.S.

As a custom packaging company, it is a primary responsibility to ensure that all plastic materials are not only sourced responsibly, but are also recycled and disposed of accordingly. As the Association of Plastic Recyclers communicates on its website, effectively communicating information about your recycling program can help to not only increase participation, but grow recovery rates as well.

According to U.S. Environmental Protection Agency (EPA) figures, while 32.5 billion pounds of plastic waste are generated annually, only 6 billion pounds are recycled.

As a result, designers are challenged with designing products for recovery, reuse or recycling.

As packaging today becomes less disposable, consumers want to ensure that the products they use have the smallest possible impact on the environment.

“We all know that plastic packaging plays a critical role in protecting and preserving everything from groceries to high-end electronics. Recent research demonstrates that plastic packaging also makes a significant contribution to sustainability by dramatically reducing energy use and lowering greenhouse gas emissions,” said Steve Russell, vice president of ACC’s Plastics Division.

According to Russell, the “four Rs” —reduce, reuse, recycle, and recover — are so important for understanding, measuring and improving sustainability.

The goal of recovery is to capture the social, environmental, and economic investment that remains embodied in packaging at its end-of-life. The extent to which the embodied value can be captured depends on the means of recovery.

Most designers agree that reuse will capture more value than recycling, which in turn captures more value than energy recovery or composting.
To optimize the sustainability attributes of plastic packaging, designers should design for recovery. The design team should design each package in the packaging system for the best recovery scenario that is practical and likely to occur after use.

Packaging that is reused spreads the impact of its manufacturing and conversion over several additional life cycles. Reuse is considered to be the most beneficial means of recovery, although it is not a practical option for many packaging applications.

Recycling begins at a package's end-of-life and the process starts when the end user drops off the material at a drop-off site or curbside collection system. Most packaging is collected in commingled streams and therefore must be identifiable for sorting by an automated sorting system or a hand-sorting system.

Completing the recycling process requires that the packaging material be suitable for use as a feedstock in a processing operation. Designing for recycling should take into account each of these steps in the recycling process.

As with every design strategy, designing for recovery should be used as part of an overall strategy to optimize the sustainability attributes of the package-product system. The design team should design each package in the packaging system for the best recovery scenario that is practical and likely to occur after use.

According to Kyra Mumbauer, senior director of Global Regulatory Affairs for SPI: The Plastics Industry Trade Association, plastics processors have paid close attention to sustainability in recent years.

“Companies have worked really hard, particularly in the beverage sector, to lightweight bottles and use less and less materials,” she said. “There are a number of initiatives focused on packaging design with an eye on recycling. I believe this notion of ‘safe’ vs. ‘unsafe’ materials also is wrapped up in the sustainability agenda.”

Craig Sawicki, executive vice president and chief creative officer at TricorBraun, noted that design is key when it comes to sustainability in plastic packaging.

“A good design is an informed and pragmatic design. It’s not only about the consumer,” he said. “As important is the ability of a package to be made within existing and efficient processes, filled and capped on existing lines without major modification and shelfed efficiently at retailers. Today automation has to be understood on all levels of this process.”

Leo Brozell, director of innovation at Mold-Rite Plastics, said packaging design also can play a key role in the use of sustainable materials for rigid packaging.

“A lightweight design that can deliver the sturdiness and functionality required will reduce the amount of materials (resin) needed to safely contain the product,” Brozell explained. “The development and use of plant based resins or resin alternatives in packaging designs can also impact the use of sustainable materials.”

The costs of the raw material for a sustainable package are greater than petroleum-based materials. PLA, corn-based, sugarcane-based - any kind of plant-based packaging is more expensive. This can be the biggest hurdle for sustainable packaging.

Kimberly Coghill, director of communications for SPI: The Plastics Industry Trade Association, pointed out that recycled materials are rarely part of the consumer buying decision.

“Other factors remain key to that decision -- cost, quality, etc.,” she said. “Recycled materials are deemed ‘nice to have.’ but only after other factors are met. There are also issues related to degradability in PCR that is causing some companies to move slowly in the use of recycled materials in flexible packaging.”

Jeff Wolff, president of St. Louis, Mo.-based Anchor Packaging Inc., noted that Anchor continues to offer PETE/RPET, PP and mineral-filled polypropylene products using the
4Rs of waste management: Reduce, Reuse, Recycle, and Recover.

Wolff also pointed out that there are many definitions for “sustainability” and depending on the person you are speaking to often carry many different implications.

Sawicki further noted that sustainable materials are an ever evolving market – one he said he believes will never stop.

“For years, the chosen method has been light weighting. But obviously lightweighting has its limits,” he said. “Further, the primary job of the primary package is to protect and deliver the product. Simply lightweighting a package frequently has a negative impact on both of those jobs. Recycled, biodegradable or compostable materials can sometimes retain the structure and still be sustainable.”

Tim Ritter, vice president of engineering and marketing at Universal Protective Packaging Inc., pointed out that over the last three years, the company has designed and produced more than 500 green packaging solutions.

“We have been able to achieve this by combining green design techniques with lighter gauged green materials and efficient tooling,” he said.

Today, companies can easily reduce their carbon footprint while saving money by implementing green manufacturing practices.

Ritter noted that UPPI has updated lighting and added motion sensors to warehouse lights, enabling the company to reduce its carbon footprint by 345,379 pounds.

“We’ve always placed the highest priority on reducing our carbon footprint by promoting energy conservation of equipment and minimizing our consumption of non-renewable resources,” he said.

As UPPI has demonstrated, green manufacturing practices will create an energy efficient and environmentally friendly manufacturing facility by reducing energy consumption, lowering overhead and contributing to the conservation of natural resources.

**APR takes lead**

The Association of Plastic Recyclers (APR) claims it has created the plastics recycling industry’s most comprehensive plastic packaging design resource.

The latest iteration of its APR Design Guide for Plastics Recyclability outlines detailed steps for packaging and design engineers to consider the implications of new products or containers in the recycling process. The organization suggests that the new and improved guidelines are more user friendly, align with APR test protocols, and provide a variety of additional resources.

The goal of the APR Design Guide is to have packaging designed that is compatible with the recycling infrastructure.

According to APR President Steve Alexander, a key challenge facing plastic recyclers are containers that come through the stream that may have a negative impact on recycling.

“APR firmly believes that companies want to design packaging that is recyclable and sustainable,” he added. “Both recyclers and product manufacturers often do not realize the implications of new products, until they have been brought to market, made it through the collection process, and contaminate the recycling stream.”

It has been estimated that 95 percent of the value of plastic packaging, worth up to $120 billion annually, is being lost to the economy since it is only used once. Furthermore, scaling up use of sustainable plastic could deliver environmental savings of $3.5 billion.
The APR Design Guide specifically addresses plastic packaging, but the principles can be applied to all potentially recycled plastic items. It is organized by individual resin categories, which are then divided into design elements such as color, dimensions, labels, inks, and adhesives.

“If products are designed with recyclability in mind, it allows the plastics recycling industry to help consumer brand companies meet their sustainability goals, while boosting supply and enhancing the quality of the plastics recycling stream,” commented John Standish, APR Technical Director.

Increasing plastic recycling or circularity – in other words, increasing how much the materials are used before being disposed of in a landfill or incinerated – has received quite a bit of attention recently. Amidst a culture of excess packaging and a struggling recycling industry in the U.S., organizations have called for standardized labels, extended producer responsibility (EPR), and a host of other solutions to curb the plastic waste problem.

SPI: The Plastics Industry Trade Association recently launched a tool for plastics manufacturers to evaluate waste reduction opportunities and maximize landfill diversion. The trade group says its Zero Net Waste program provides plastics companies with a concrete set of resources they can use to pursue, and achieve, zero waste in their facilities and offices.

APR Technical Director John Standish outlined four proven recycling strategies for rigid plastic packaging, particularly plastic bottles. Already, the recycling recovery rate for plastic packaging and containers is the highest of all categories, coming in at an impressive 40 percent of the amount generated.

There are always ways for a rigid plastic packaging processor to step up its recycling efforts. According to Standish, here are four proven ways custom product packaging manufacturers can step up recovery efforts (and one extra suggestion from our own custom blow molding experts). Not only will these strategies improve recycling recovery rates, but they can also help custom packaging companies save money in the process.

**Biosourcing of polymers**

As the plastics industry approaches the limits of custom packaging lightweighting, substituting bioresources for traditional petroleum sources is an underused strategy. While that’s unlikely to change while crude oil prices are at rock bottom, many believe it’s the future of the plastics industry.
“In polyethylene, you can make the ethylene used in polyethylene from natural resources,” Standish said. “Or in PET plastics, you can make the ethylene glycol used to make PET from bioresources.”

Standish also noted that in today’s market, making polymers directly from traditional petroleum sources is by far more economical. “So, as appealing as this strategy is, it’s not economically practiced very much today,” he noted.

Using recycled resins

“The energy required to make recycled resin is about half that required to make virgin resin. And directly tied to that, the greenhouse gas generation from making recycled resin is about half of that associated with making virgin resin,” Standish added. “So including recycled content is an important sustainability effort.”

Unfortunately, supply of post-consumer resins lags behind demand. By promoting more effective recycling recovery, plastic packaging manufacturers in turn increase the supply of cost-saving, sustainable recycled resins.

Plastic scrap meets its next life, recycled back into new resins for use in new packaging options. File photo
Executive Spotlight | Jerome Romkey

Business Development Manager, GN Thermoforming

Jerome Romkey is business development manager at GN Thermoforming. He has been involved in the Thermoforming Industry for more than 35 years. During his career with Chester Plastics and GN Thermoforming Equipment, he held a variety of positions and is presently in charge of Marketing and Business Development. Jerome was instrumental in establishing new markets for GN in various areas of the world during the early years of the company’s development. GN is a supplier of Thermoforming machinery and has sold equipment in over 65 countries.

Q: There are a lot of trends today in rigid packaging that are impacting innovation and design. From your perspective, what are some of the current trends in machinery that are impacting packaging design? How are these trends driving growth and innovation for machinery makers?

A: I would have to say from our perspective that we are seeing the package designers pushing the equipment makers for innovations. We are seeing a lot of new and innovative package designs from clients that really push the packaging design to the limits of what can be done on traditional thermoforming equipment and tooling.

If we are to assist our customers in turning these designs into reality then we find ourselves looking at all aspects of machine and tool to try and understand if the design is really possible to produce. We do expect that this trend will increase as everyone competes for more market share.

Q: Where are the biggest areas of opportunity for expanded growth?

A: In the U.S. and Canada, we continue to see a large portion of meat and poultry sold in EPS trays. We also see a large portion of egg trays made from EPS and pulp. In most other countries we see the move is or has been made to rigid packaging.

The egg tray is the one that we question the most as contamination from broken eggs from opening EPS or pulp trays is much higher than compared with eggs packaged in transparent trays.

Q: When it comes to the production of rigid packaging, which process is most prevalent today – blow molding, injection molding or thermoforming?

A: Certainly in the food industry, thermoforming is still the leader in packaging production. The high speeds combined with large cavity tools and abilities to run thin gauge makes this process very favorable.

Q: In 2016, are processors making more investments in machinery?

A: We are seeing a strong order book this year and inquiries are pointing to this continuing into 2017.

Although the North American economies are still fragile to a point, overall we are seeing growth continuing and employment growth month over month which leads to an increase in consumer spending for products that require thermoformed packaging.

Q: We’ve talked about some challenges and opportunities facing the sector. Looking ahead, what is your outlook for the packaging industry over the coming years, including the demand for new machinery?

A: I can only speak for the thermoforming sector but we feel moving forward that there will be a strong demand for more automated equipment that will have the opportunity to replace older, labor intensive equipment. Reduction of labor costs seems to be a topic on everyone’s mind.
in the area of design and research and development, tamper evidence is virtually a requirement and as a result a key focus of these efforts among plastic packaging processors today.

Packaging is critical to food, for keeping food fresh as well as safe to eat. Packaging security is just as important as it prevents everything from consumer tampering to bioterrorism to product counterfeiting.

Tamper-evident packaging has an indicator or barrier to entry which, if breached or missing, can reasonably be expected to provide visible or audible evidence to consumers that tampering has occurred.

Tamper-evident solutions may involve all phases of product production, distribution, logistics, sale and use. No single solution can be considered as “tamper proof.” Most times many levels of security need to be considered to minimize the risk of tampering.

“Tamper evident” also can mean slightly different things in different markets. In food packaging (as well as retail packaging), tamper evident designs help eliminate overwraps, security labels and other secondary processes. Packages are designed with hinges (if clamshells) or snaps (if 2-part) to allow the consumer to inspect whether or not it has been opened or damaged.

When it comes to trends in the food and beverage sector, none is more important than food safety. A tamper-evident band on the outside of the cap or container provides a physical and visible confirmation to the consumer that the product inside has not been altered since leaving the production facility. The advantage of the tamper-evident band is that the consumer does not have to open the package to confirm that the contents are safe prior to purchase, or after they get home.

In 2014, Baxter, Minn.-based Lindar released Simply Secure, a selection of tamper evident packaging that is among the first of its kind in the food packaging industry. The Simply Secure packaging includes special tabs that snap into place to secure the product while in stores.

For one to open the package, the perforated tabs can be simply torn off, making it user friendly, while easily identifiable if the container has been opened. They are available in both two-piece and hinged varieties.

Its Simply Secure packaging for produce containers are designed for fruits and vegetables including cut melons, grapes, mini carrots, broccoli and cauliflower, and can be created in a variety of shapes and sizes.

Processors today are seeing a renewed interest in tamper-evident packaging that also incorporates brand protection functionality. Anchor Packaging’s Jeff Wolff noted that initial tamper evident packages in the market today do not function well for the consumer and it may not be immediately obvious whether they have been opened in the store.

“Next-generation products will emerge that better satisfy consumer needs for opening and reclosing while providing increased protection for the retailer,” he explained.

In medical and pharmaceutical packaging, tamper-evident features are typically related to the materials used whereby evidence of tampering can be seen through color changes. Acrylic-based compounds contain certain optical properties that are formulated to ‘show’ evidence of a package breach. Sterility and package integrity have been driving factors in this market segment for quite some time.

Track and trace

Rigid packaging designers in 2016 continue to develop a variety of packaging technologies to keep food safe from such interference and to provide fast, thorough product tracking and tracing in the event of a recall.
Covert and overt packaging techniques are being developed that are much more sophisticated. Covert techniques require a scanner or other device for detection. Marking packages with invisible, ultraviolet-luminescent ink is an example of covert security. Overt refers to something visible on the package, such as a batch code or tamper-evident band.

Dr. Susan E. Selke, director of the School of Packaging at Michigan State University, said she sees more growth in track-and-trace systems rather than in tamper-evidence itself.

“Counterfeiting seems to currently be a much bigger concern than malicious tampering,” she explained.

A related area, especially for food but not only there, is related to safety and inadvertent contamination. “I think there’s going to be considerable developments in sensors of various types that can signal if the product is no longer acceptable due to microbial growth, oxidation, temperature exposure, or a host of other conditions,” Selke added.

Previous tamper-resistant packaging methods included shrink wrapping and thermoforming containers with removable tabs. Sara Lee has adopted the vacuum-formed PET package for various single-serve, “grab-and-go” foods. In addition, Wal-Mart has approved the tamper-evident system for so-called “Dip-n-Go” packaging.

Another option is tamper-proof blister packaging, which is ideal for expansive products that require tamper-proof security. These packaging options protect the products in the package until it reaches the customer.

**RFID tags**

Emerging technology includes radiofrequency identification (RFID) tags that consist of a tamper-evident technology to ensure that the RFID tag has not been interfered with after initial positioning on an article.

These tags, if tampered with, become disabled, thereby preventing use of the tags on counterfeit or substitute products, and ensuring that detecting a working tag also means identifying the original product to which it is attached. As food and beverage companies increasingly experiment with RFID to satisfy retailer demands, they are enjoying the side benefit of greater control of cases and pallets moving through the supply chain. The heightened control increases the security of products during distribution.

One company in particular, Dordan Manufacturing, has been active in research and development of tamper-evident packaging, leading to the design of several easy-open clamshell concepts, including a faux perimeter seal that gives the illusion of an RF seal at retail while actually being two separate thermoforms that snap together via recessed platforms.

“Another solution includes designing a perf around the snap button feature of a clamshell that are smashed together for pilferage protection; when opened by the consumer, the buttons remain smashed together yet the perf allows the package to be freed from the buttons,” said Chandler Slavin, Dordan’s sustainability coordinator.

**Other innovations**

In 2016, machinery for tamper evident packaging has continued to emerge to ensure product safety and deliver technology that is fast, efficient and cutting edge. These trends will continue to evolve in 2017.

The tamper evident sleeve or band is necessary to protect the contents inside and maintain brand integrity. There are a number of advantages to using a full-body sleeve to differentiate a product and grab a consumer’s attention. Shrink sleeve labels cover the entire package and provide the brand manager with a 360-degree canvas on which to communicate a brand’s image, nutritional information or a product’s unique characteristics.

Technology advances in resins are creating new films with brighter graphics and bolder colors than ever before, and with different finishes.
Shrink sleeves offer significant sustainability advantages over other forms of labeling. Shrink sleeves do not “stick” to the bottle or container, and can therefore be removed more easily during the recycling process. As a result of recent advances in film manufacturing technology, sleeves are getting thinner, and using less material. The amount of material in some sleeve labels today has been reduced by 30 percent to 50 percent.

**Liner systems**

The use of a liner system to provide tamper evident seals is also common, particularly in the dry food and pharmaceutical industry. These type of liners are often made with multiple layers of materials that, when sealed, will adhere to the land area of the bottle to create a seal. Consumers must break the liner in order to gain access to the product inside, and the liner material is designed not to reseal to the bottle once it has been removed, leaving behind evidence of prior entry.

Tamper evident liners are common and can be used with most stock plastic and glass packages.

However, liner materials must first be tested to ensure proper adhesion with the bottle. Since the liner is a product facing material (it makes contact with the product), it must also be tested to ensure compatibility with the product itself. Further, special machinery is required to apply heat induction liners to ensure a proper seal.

**Heat shrink bands**

Heat shrink bands come in all different sizes and must be measured specifically to a container and closure combination for optimal performance. Heat shrink bands are often perforated to help consumers remove the shrink band prior to use. However, since the heat shrink band does not actually adhere to the package, it may not work with all bottle designs such in cases where the closure sits flush along the side of the bottle, preventing the shrink band to “grab” onto the neck.

Commonly made with PVC plastic materials, heat shrink bands contract as they come in contact with heat (often a heat gun) and bind the closure and container together externally. The consumer would need to break the shrink band in order to remove the cap, and since it does not come in contact with the product inside, it is a popular option for many dry and liquid products in stock packaging that do not have the tamper evident bead. Going forward, designers will continue to focus on tamper-evident packaging components that are effective. A key will be optimizing the tamper-evident regulatory requirements while seeking new ways to meet standards or business brand-protection needs.

From the perspective of a designer, there is a brand-protection opportunity when the tamper-evident packaging components are under close scrutiny by consumers. That close scrutiny — a consumer being required to look closely at a packaging component to open the package — is an effective opportunity to provide incremental brand-protection features. Moreover, increased FDA and ISO focus on brand-protection authentication features, enhancing the tamper-evident packaging components with brand-protection features is a logical innovation.

**Seeing results**

One company is experiencing growth, driven by its patent-pending anti-tampering food packaging. Mansfield, Mass.-based Lacerta Group Inc. in April 2016 announced plans to add more equipment, more employees and 55,000 square feet of space to set up an extrusion operation.

“Right now the plan is to put the extrusion line in the new building. As we keep growing, we will need to add more production capacity,” said President Ali Lotfi.

Lotfi said Lacerta started making a thermoformed tamper-resistant food container with a tear-away tab. It is used by supermarkets and convenience stores for ready-to-eat products. Lacerta applied for a patent on the project in 2016, and recently filed for another.

He said the packages are being used throughout the United States, and are being tested in South America, Europe and the Middle East.
In a sector that is as competitive as the plastic packaging market, processors need to have every advantage that can drive innovation when it comes to design.

In 2016, packaging designers have had the luxury of an expanded R&D Tax Credit.

The R&D tax credit rewards companies that invest resources in innovation. For plastics processors, this can include product development, mold design, new materials or resins and process development/improvement.

After 15 extensions since it was first introduced in 1981, legislators made permanent and expanded the tax credit. As a result, plastics processors with less than $50 million in gross receipts can now claim the credit to offset their Alternative Minimum Tax (AMT) and the credit is now opened up to start-ups, allowing businesses with gross receipts of less than $5 million per year to take the credit up to $250,000 against their payroll taxes up to five years on any research or supply costs while working toward innovation.

“Removing the AMT limitations makes the credit available to many smaller entities that are stuck paying AMT,” noted Tom Sanger a partner with accounting and advisory firm Moss Adams. “Credits that may previously have been unusable now can reduce AMT and allow reinvestment in the company.”

With the R&D Tax Credit permanent, small plastics manufacturers will have the opportunity to reduce their tax liability. Now plastics companies just have to take advantage of it, according to Michael Devereux II, partner and director of manufacturing and distribution services for Mueller Prost.

Devereux noted that the R&D tax credit is a dollar-for-dollar credit against the taxpayer’s federal income tax liability. Taxpayers benefit from the deduction in the year the expenditure is paid or incurred and by claiming the credit. Many areas can meet the definition of research, including mold design, software for internal use, special equipment, time spent to develop end-of-arm tooling and other costs.

“When have I eliminated uncertainty? That’s when the clock stops on the credit,” Devereux said, adding that the IRS also has made it easier to claim the R&D tax credit for past years, with the proper documentation.

Devereux also said the Protecting Americans from Tax Hikes (PATH) Act, which includes some tax incentives that can save manufacturers money, is permanent, but the so-called “bonus depreciation” for capital spending is being phased out through 2019.

Taking into account that the R&D tax credit provides an estimated $10 billion in annual tax savings for U.S. companies, and considering that statistics from the IRS for the latest tax year on record reveal that manufacturers make up the largest amount of credit claims (at 39.2 percent), it might surprise you to know that the R&D tax credit is actually still under-claimed by the majority of qualifying businesses.

Plastics processors and mold and tool makers do more R&D activity than they realize and many are under the false impression that R&D tax credits are just for large corporations that have laboratories. That is not the case and it is worth their while to look into the tax credits. According to Devereux, the R&D tax credit rewards companies who invest resources in innovation, product development, mold design, new materials or resins, and process development/improvement.

In the past, the greatest barrier preventing manufacturers (particularly small and mid-sized manufacturers) from claiming the R&D tax credit was the Alternative Minimum Tax bar.

Small businesses now can breathe easy with permission to expense up to $500,000 in capital expenditures per year.

“Removing the AMT limitations makes the credit available to many smaller entities that are stuck paying AMT. Credits that may previously have been unusable now can reduce AMT and allow reinvestment in the company.”

— Tom Sanger, partner, Moss Adams
For the plastics industry, the federal government considers any resin maker with fewer than 750 employees a “small business.” For plastics manufacturing and mold makers, it’s fewer than 500 people but for plastics products wholesalers, any more than 100 employees and you’re not small enough for the feds.

The majority of small and mid-sized plastics companies (and businesses in general) are organized as pass-through entities and are taxed as such at the owner’s individual tax rate. This would often lead to the owner being subject to the AMT barrier, meaning that even if a business had engaged in activities that would normally qualify them for the R&D tax credit, that business would still effectively be barred from claiming the credit.

However, the PATH Act changes all of that. Seeking to address a shortcoming in tax policy — and allow for more innovative small and mid-sized businesses to be rewarded for what the credit was specifically designed to incentivize — starting in 2016 the PATH Act effectively turned off the AMT bar for “eligible small businesses” (defined by the legislation as businesses with less than $50 million in average gross receipts for the prior three years) that qualify for the R&D tax credit.

Dean Zerbe, national managing director of Washington, D.C.-based Alliantgroup, said the removal of the AMT bar is expected to allow for a tenfold increase in the number of small businesses that can utilize the R&D tax credit. “With their activities often making them ideal candidates for the credit, the new law should have manufacturers celebrating in the streets for years to come,” he said.

According to Devereux, taxpayers claiming the R&D tax credit are required to capture information necessary to prove that qualified research is actually taking place, while connecting the employees that perform qualified research to the activities themselves.

“Business documents that many taxpayers already prepare as part of the engineering or reporting systems are the best place to begin,” he said.

Many times, these documents — including, but not limited to, drawings, iterative designs, sample results, pictures, notes, emails and meeting minutes — create nexus to the employees performing or supporting qualified research.

According to William R. Carteaux, president and CEO of SPI, plastics companies in 2016 have been able to benefit from the changes.

“The U.S. Senate voted to deliver a huge benefit to America’s economy by passing several key tax measures. They permanently extended the Research & Development Tax Credit, extended ‘Bonus Depreciation,’ permanently extended Section 179 ‘Small Business Expensing’ and granted a two-year moratorium on the medical device excise tax. Combined, these provisions help ensure that businesses throughout the plastics industry value chain can invest with certainty and keep the U.S. on the cutting edge of economic growth and technological innovation.”

— William R. Carteaux, President & CEO, SPI

Going forward, the versatility of plastic packaging signals the potential for design innovation in the plastic manufacturing industry. Whether it is high-tech manufacturing methods, such as 3D printing or innovative applications and automated operations, the plastic packaging segment of the plastics industry can reach new levels of productivity and ingenuity. Increasing concerns about sustainability also can lead to opportunities to develop new materials and practices. Federal R&D tax credits support plastic packaging companies investing in eligible design innovation activities.

Taxpayers who are already claiming the credit should, from time to time, review their returns and credit methodology, documentation supporting the research expenditures and the underlying activities to ensure they are claiming the proper amount of R&D tax credit. Devereux explained that this approach is prudent to ensure that taxpayers are in line with the IRS’ documentation requirements, recent court cases and ever-changing treasury regulations.
Executive Spotlight | Jeff Wolff

President, Anchor Packaging Inc.

Q: There are a lot of trends today in packaging that are impacting innovation and design. From your perspective, what are some of the current trends that are impacting packaging design? How are these trends driving growth and innovation?

A: Busy lifestyles are driving smaller portion size with the increase in snacking throughout the day rather than sitting down for a meal with the family. Individual portions of single food items allow the consumer to mix and match proteins and side dishes to meet the various tastes in the family. More blurring of the segments for take-out prepared foods.

Consumers want to be able to find good quality and healthy options wherever food is sold and they don’t want to wait. This trend is driving the increase in Grab and Go displays in restaurants, supermarkets, convenience stores, college campuses, and many other foodservice venues. Fast and convenient are essential.

Q: Where are the biggest areas of opportunity for expanded growth? Emerging markets? Growing end markets such as medical? Products, such as stand-up pouches, flow wraps, resealable films, printed technology, etc.?

A: Our business is food packaging and we see the biggest opportunity in rigid, tamper-evident packages. With the ever increasing demand for to-go meals as a result of our busy lifestyles, operators need to protect the consumer and their business with the use of tamper-evident packages.

While there have been some attempts at tamper-evident packages by other manufacturers, they are often viewed by the consumer as difficult to break the seal, have very sharp edges and create waste with tear-off strips. Additionally, consumers have also found that some packages don’t look open once the strip is removed. Flexible wraps and pouches don’t preserve the food presentation as well as rigid packaging does. The customer wants the restaurant experience at home, so the way the food looks is a key element for a return visit and increased sales for the operator.

Q: The business landscape is always changing and presenting hurdles for companies. What are the biggest challenges that are impacting the design of plastic packaging?

A: The biggest hurdles are to stay ahead of market trends, look for ways to reduce costs, and assure that our products comply with existing and future government regulation. We work closely with our customers to design packaging to meet their requirements and fit food portions demanded by the market. These end users are continually faced with rising food, labor and operational costs and look for savings in packaging to help offset these costs. Slight changes in size to reduce portion size or substitute alternative food items will require a major tooling investment and often new equipment as well. We also participate with several industry groups to assure that we are staying ahead of legislation, by continually reducing petroleum-based material content, improving recyclability, and making our containers consumer-reusable wherever possible.

Q: One of the biggest costs for a company remains materials. How is the volatility in materials pricing impacting the design of packaging? What are some of the challenges in materials?

A: We have implemented new materials that are not entirely petroleum-based, and continue to do trials with others. Advanced engineering techniques have been implemented, which reduce material thickness, while maintaining strength and performance. We have found ways to generate less material loss during production, and have virtually eliminated scrap.
Q: The market for value-added packaging is a huge and growing one. If current trends are any indication, do you see potential growth in this market coming in the form of short-run jobs?

A: Value-added packaging does not necessarily mean short-run thermoforming jobs. Anchor has been awarded the WorldStar Packaging Award, the Ameristar Design Excellence Award, and a total of eight awards, all for innovation. It is that innovation that delivers the value-added to our customers, whether they are large or small.

Q: As processors rely more on automation for the production of some types of packaging, how can this impact design?

A: Food processors have always been part of the markets we serve, so our package designs include features for high-speed equipment whenever possible. However, as portion size and tamper-evident designs drive change, the processors’ need for more universal or quick-change equipment will become even more important.

Q: Has the business world’s increased focus on sustainability had a big impact on packaging, including design and materials?

A: There are many definitions for “sustainability” and depending on the person you are speaking to often carry many different implications. As an example, PLA and other compostable products are often more expensive and the limited availability of commercial composting locations often sends these products to a landfill. Paper and other fiber-based materials are made from renewable resources, but lack the food visibility and structural performance needed for moist applications. Anchor continues to offer PETE/RPET, polypropylene, and mineral-filled polypropylene products using the 4Rs of waste management: Reduce, Reuse, Recycle, and Recover. Our definition of sustainability and how the 4Rs fit is available on our website: www.anchorpackaging.com/sustainability/

Q: We’ve talked about some challenges and opportunities facing the sector. Looking ahead, what is your outlook for the packaging industry over the coming years? What kind of impact will this have on plastics packaging design?

A: The demand for plastic packaging will continue to grow with the ongoing demand for the time-saving convenience of prepared foods to go. As all foodservice segments expand their takeout food offerings, they will look for competitive, cost-effective options to preserve the food presentations and choose packages good for the environment. Education on the sustainable options to minimize the packages going into landfills, new technology, and new material blends to reduce the use of oil-based resins will continue to be driven by plastic packaging manufacturers. Package designs will continue to evolve to embrace the size and shape of consumer demands.

“The demand for plastic packaging will continue to grow with the ongoing demand for the time-saving convenience of prepared foods to go. As all foodservice segments expand their takeout food offerings, they will look for competitive, cost-effective options to preserve the food presentations and choose packages good for the environment.”

— Jeff Wolff, Anchor Packaging
orth American thermoformers are facing the challenge of older equipment, which can put them at a competitive disadvantage.

When it comes to packaging design, a key challenge for plastics processors today remains the unique processing variants that allow the thermoforming of non-typical part designs that traditionally are being made in other types of processing methods.

Machinery and tooling continue to evolve with new control systems and automation in the form of robotic stacking systems. These developments have allowed thermoformers to be more efficient while improving the repeatability of the process.

Thermoformers today likely are already pushing the limitations of the molding technology and conventional thermoforming equipment designs, including their associated automation. As a result, the design of thermoforming machinery isn’t likely to change dramatically or react with any revolutionary equipment designs, until the demand for these concepts is required to accommodate a new tooling and/or processing concept.

As companies come into North America from Europe and South America, they are bringing with them new state-of-the-art machinery.

These companies, starting from scratch with new equipment, are able to run parts a lot more efficiently.

Today’s thermoforming machines run at higher speeds, achieving 60-65 cycles per minute. That is up from about 20 cycles a minute a decade ago. The average is probably closer to 40 cycles per minute. While the machines are capable of the higher speeds, companies haven’t fully got a handle on the tooling to enable the machines to maintain that output.

According to *Plastics News* Economics Editor Bill Wood, based on recent trends, global demand for packaging machinery is expected to climb about 4 percent a year to more than $41 billion by 2017.

“In machinery, 2016 got off to a good start, Wood said. There has been a strong upward trend in the machinery data since the recession hit bottom in 2009, but this trend hit a plateau during the first three quarters of 2015.”

According to Wood, the upward trend has reignited at the end of 2016 and is expected to continue into the first half of 2017.

The thermoforming segment also is pressed by injection molding, which is making inroads into rigid packaging, particularly in the production of 100 percent recyclable single-use coffee pods. Blow molding also captures a share of the packaging sector.

Amid these and other challenges, some larger thermoformers can grow through acquisition, that isn’t an option for many thermoformers. Capital investments in new equipment can lead to productivity gains and can prove to be an investment in growth.

With new machinery, thermoformers can increase their productivity with machines that are wider, faster and more efficient.

“I have seen some trends indicating there is some retirement of old presses going on and acquisition of new presses that addresses optimization and productivity issues. If you can get a machine that can operate much faster with more consistency, it is a nice thing to have. It adds to your throughput.”

— Jeff Mengel, principal, Plante Moran

Packaging machinery trends

"I have seen some trends indicating there is some retirement of old presses going on and acquisition of new presses that addresses optimization and productivity issues. If you can get a machine that can operate much faster with more consistency, it is a nice thing to have. It adds to your throughput.”

— Jeff Mengel, principal, Plante Moran

“I have seen some trends indicating there is some retirement of old presses going on and acquisition of new presses that addresses optimization and productivity issues, noted Plante Moran's Jeff Mengel. "If you can get a machine that can operate much faster with more consistency, it is a nice thing to have. It adds to your throughput.”

Many thermoformers tend to hang on to aging equipment because it is paid for. In fact, Mengel notes that many thermoformers may hang on to machinery longer than they should.

“They also know that if they need to compete, they have to replace a machine," he explained. "They are not going to replace a machine to replace an old machine. They are going to get a machine that does a lot more than that old machine. When purchasing..."
machinery, thermoformers look at machinery that will serve them for a decade.”

Current trends

While the basic thermoforming machine has changed little in the last several years, process controls and machines that support higher speeds have improved efficiency.

According to Mark Strachan, senior technology director, First Quality Packaging Solutions, the machines are including more features that are more conducive to the thermoforming process.

“With the advent of servo drive systems this allows thermoformers to draw the material out and run at higher speeds. Before everything was pneumatic,” he said. “Now, we can have much higher accuracy from cycle to cycle. We can eliminate waste by down gauging and running a machine more economically.”

Strachan also noted that machinery manufacturers are more willing to change the design of a machine or go away from a standard design.

“Today, they are willing to talk about the machine. It is giving us more opportunities to build a machine around a product and build a better product,” he said.

As a result, Strachan said this allows processors to thermoform more intricate designs and parts that they couldn’t have done in the past.

According to Dana Hanson, president of Processing Technologies International, a key trend he sees today is customers seeking to replace older equipment for higher capacity efficient systems.

Other positive macro-economic factors include capital equipment purchase incentives, low interest rates, and accelerated depreciation benefits.

“We are not seeing in thermoforming as much integration of secondary activity in line with the thermoforming activity,” Mengel explained. “You could have decorating done in-line, and we are seeing that happen more often today.”

However, down times to change decorating on packaging products can slow product production.

Further, in-mold labeling (T-IML) has evolved over the past decade and is now becoming more common for the higher end of the thermoforming spectrum. The technology has improved and standards are being developed so that systems integration is easier.

Input and output diagnostic systems seem to be standard on machinery today and have improved the production process.

“It makes it easier to address the issues that need to be managed,” Mengel said. “When it comes to management of the production, you want to manage the exceptions. Processors need to address the common issues and create ways to identify the uncommon issues so that they can be managed.”

This also is allowing processors to have less labor. Labor doesn’t have to be involved with addressing many issues that can be done through computer systems.

“The impact has been through how we manage the process versus how it has impacted specific processes,” he said.

Large-bed machines are a growing trend for processors. The concepts of Electric/Servo Driven platen designs also are evolving today. This focus can be on taking heavy platens and tools and moving them as quickly as possible while retaining the proper closing power and tonnage

The thermoforming industry has grown up using individual vacuum pumps on each machine for vacuum forming, but companies should consider centralized pumps — a concept just like the commonly used central air compressors, according to an official of a pump manufacturer.
Maintaining individual vacuum pumps, and fixing them when they break down, is a major expense, especially for larger companies with a large number of thermoforming machines, said Bill Gerlach, sales manager of Brabazon Pump, Compressor and Vacuum, in Richfield, Wis.

“You have all these individual pumps that require maintenance of changing oil, filters and labor costs to maintain them,” Gerlach said.

As technology continues to find its way into the design of thermoforming equipment, thermoforming machinery continues to advance in some ways. The primary focus for machinery builders is platen-speed and determining the best method for accomplishing this.

According to Steven Clark, president of Auburn, Mich.-based Monark Equipment Technologies Co., the areas that are most open to improvement include toggle-style platen actuators that still tend to dominate the industry.

“That type of technology has been utilized for 60 years,” he said. “Of course, more modern versions of it are utilized today, but it’s probably time to change.

For a 24/7 operation, the payback for a central vacuum system could be as short as one year.

For any machinery purchase, the problem can be cash. However, companies today are able to secure financing and avoid tapping cash reserves.

“The money is cheap. If you have good credit, it is not difficult to get loans,” Mengel said. “The loans are relatively inexpensive at this point. I haven’t seen that as a barrier. You just don’t buy a new press. You typically buy everything that goes along with it. It can be an expensive and extensive transition.”

When it comes to central systems, the fact of having all their vacuum eggs in just one basket, have kept thermoformers from considering central systems. “If that one pump goes down, what happens then?” he said.

Another big question: Is a new central vacuum system cost-justified?

According to Mengel, companies must have a specific assessment to determine ROI.

Some companies can utilize three half-sized pumps. Two vacuum pumps meet demand, and the third is available as a backup when one of them is down for maintenance.

You could also leave existing individual pumps in place. Or you could sell them.

In thermoformed packaging, particularly in clear lids, there is a trend moving from PS to PET. These lines also can run materials such as PP and PLA without the need to make any screw changes, providing processors with a high level of flexibility.

As technology continues to find its way into the design of thermoforming equipment, thermoforming machinery continues to advance. The primary focus for machinery builders is platen-speed and what’s the best method for accomplishing this.

Computer technology has improved the thermoforming process, including the control of various aspects of the process. Improved machine control software in recent years also has impacted the thermoforming process.

One area where that improvement has been demonstrated is timing. Advances in electronics permit thermoformers to measure platen positioning pretty precisely, which means fine tuning of mold-related functions in relationship to platen position is easily and precisely accomplished.

Electric panel heaters dominate the roll-fed packaging market. Panel-heater systems provide a very even heat projection toward the sheet and they tend to be very durable in harsh environments.

Motor-driven platens have replaced most pneumatic platen drive systems. The technol-
ogy has shown significant improvements in recent years. Platen strengths and weights continue to increase to accommodate challenging applications that require higher pressures.

Larger-machine technology also continues to evolve heading into 2017.

For the bigger bed machines a lot of the technology for controlling the mold-related operations still are being developed, along with the timing and flow capabilities of the components.

Demand for large machine technology is increasing, particularly in the food-service markets.

Going electric

Electric machines are a growing trend when it comes to thermoforming equipment. Their ability to run more consistent is critical when it comes to tighter quality specs and customer expectations. Their overall energy use is lower too, which helps keep rising energy costs in control.

Another trend is equipment that is geared toward a customer’s applications, rather than general-purpose machines that dominated the market in the past.

Tooling advances

CNC machining centers have evolved to high speed spindles and ever increasing federates.

Today, the software is far more sophisticated in its ability to render 3-D models prior to cutting metal. There have also been advancements in rapid prototyping via 3-D printing.

The thermoforming machines themselves are witnessing a continuing increase in spindle speed and feed rates, allowing for more efficient forming and consequently, more competitively priced parts.

Moreover, some of the industry leaders have in recent years opted to outsource their tooling, particularly since their tooling often is large, high-cavitation units. In the same way, matched-metal tooling calls for much more sophistication, and it is frequently farmed out.

Rapid prototyping systems [3-D printers] along with the development of more intelligent and accurate multi-axis machining stations have reduced the time to market.

Wire iridium systems, laser welding and the availability of steel rule knives with softer bodies along with various levels of knife-tip hardness and developments in plug-assist materials [CMT materials] have increased tooling accuracy and opened up previously impossible opportunities for form-and-trim tooling configurations.

Machinery companies seeing opportunity

With the potential for growth in the packaging sector, Brown Machine LLC of Beaverton, Mich., has moved to tap into that market with thermoforming equipment that molds the packaging used for food display, protection and preparation.

The company recently updated its Quad series of thermoformers, which the company describes as “tougher” and “beefier,” as well as its Elite series of trimmers. The current models offer faster production and changeover times than previous examples.

“Latin American markets continue to develop, particularly in the disposable polypropylene food and beverage markets,” Bob Gordert, Brown’s director of sales, said. “With this demand comes the need for increased production and output. Brown Machine is excited to be the proven provider and partner to fulfill these needs.”

In addition to PP, Brown thermoformers produce packaging in a variety of materials, including polystyrene foam, high-impact PS, oriented PS, polylactic acid and PET — amorphous, recycled and crystalline — for everything from egg cartons and yogurt containers...
to fruits and vegetables in clear containers for seeing freshness to microwavable food to disposable to plates, cups and lids.

To complement the Quad series, Brown engineers focused on improving trim press capabilities. Last year the company launched its Elite series of servo-driven, horizontal trim presses, which are capable of speeds that exceed 175 stokes per minute and changeover times of less than 30 minutes.

Another company, Aurora, Ill.-based Processing Technologies International (PTi), a manufacturer of high-performance sheet extrusion machinery, is seizing on the growing demand for sheet extrusion equipment.

Sheet for packaging also is a strong area for PTi, Hanson said. “We’re in record territory. We’re breaking revenue volume records,” he said.

The company in August broke ground on a $10 million expansion in response to this demand.

“Our business has hit record levels the last several years and our products are being well received throughout the packaging markets in North America,” Hanson said. “We are planning for a sustained period of growth that will require expanded manufacturing resources.”

Paul Caprio, president of KraussMaffei North America, based in Florence, Ky., said solid business in packaging, medical and other markets, is keeping the 200-employee unit busy.

Caprio said KraussMaffei Corp. generated $300 million in new orders in 2015 — a record.

“More orders are coming from America than from any single country,” Caprio said. “Last year was the first year that we had more orders than Germany.”

Caprio said the company has seen packaging — both thin-wall and industrial packaging — picking up in a very healthy manner in 2016.

Caprio said that KM’s growth also is benefiting from the “reshoring” of work to the United States, and decisions by many U.S. companies not to move production offshore in the first place.

“We have always supported the strategy that goods for the U.S. market should be produced within the U.S. borders,” he said.

Companies like Milacron, which produces equipment for injection and blow molding, see the potential for growth in rigid packaging.

Steve Morris, the company’s vice president and general manager of co-injection systems, said the packaging segment represents a significant space for Milacron.

“As the packaging becomes more creative and customers are looking for thinner walls and different shapes, we are seeing this driving performance in machinery,” he said.

Morris added that speed performance and operator-friendliness are key trends today in machinery.

“I think the growth we are seeing in retail packaging especially is driving a higher level of performance in the equipment,” he said. “We look at faster cycle times, energy efficiency in our servo hydraulics, servo clamps and servo screw drives. The packaging industry is really driving performance into the machines.”

Milacron also is rolling out its Klear Can to be in-market, on retail shelves and available for consumer purchase no later than the first quarter 2017.

Klear Can is a plastic can that replaces metal cans for fruits, vegetables, soups, meats and other products. It requires the same filling, seaming, retorting machinery as metal cans, so minimal downstream investment is required.
“We are going to go into that industry and start replacing metal cans on the shelf with plastic," Morris said. “They are recyclable and the customer can see the products on the shelf.”

Going forward, Morris noted that injection-molded coffee pods likely will claim market share from thermoformed options.

Milacron’s Kortec embedded technology is now being used in the production of 100 percent recyclable single use coffee pods. The single use coffee pod market has grown rapidly over the past decade and Milacron’s technologies ensure that the newly designed pods are able to enter the recycling stream rather than the landfill.

**Options**

Today’s new thermoforming machines are available with more than 150 options, almost four times that of several years ago. Some are application-specific, and some are quickly becoming new industry standards.

The large array of options and capabilities now being offered allows thermoformers to focus on machinery features that will help them create a unique machine specification, allowing them to hold stronger competitive advantages.

Clearly anything the plastics industry can do to displace other types of products, like paper, as new recyclable materials evolve, the machinery & tooling industry for the most part has and will need to continue to react in a supportive role.

There are robotic improvements that are helping to make today’s thermoformers more efficient and competitive. Robotic trimming has improved to the point that it is competitive with other methods of cutting parts in the cut-sheet area.

Thermoformers also are looking to automation for increased repeatability and efficiency. Automation is helping thermoformers increase production and reduce costs in an effort to gain a competitive edge in today’s business climate.

**Ahead of the curve**

There are a number of companies working to stay ahead of the curve with new innovations that will have an impact on plastic packaging design trends going forward.

One such example is Transmit Technology Group LLC, which is working to market a machine that can compare the thermoformability of various resins.

The Technoform testing device was developed by Irving, Texas-based TTG. It offers rapid, quantitative and repeatable information about materials’ ability to thermoform as a function of temperature, pressure, and vacuum under controlled speed. Technoform uses small-size samples, eliminating the need for expensive and time consuming field trials, officials said.

They added that Technoform is a cost-effective tool for quality control, material development and process optimization. TTG designed a smaller version of the device in the early 2000s, President Amit Dharia said by phone.

The device has been used by several major resin makers, as well as by consumer products firms. Dharia now is looking for a partner to expand the market for Technoform.

“I’m seeking either a manufacturing partner who is willing to invest with me, or a company with resources to purchase the entire package for a one-time fee,” said Dharia, who founded TTG in 1999. “In my early market study, we had estimated about 800 companies, academic and research institutes which can use [Technoform].”

Novara, Italy-based machinery maker Amut Comi is pushing the envelope for innovation. It recently debuted its ACF 820 series, billed as a rugged, reliable, flexible, and high-speed former for packaging that combines the features of the firm’s V and F series. File photo
clamshells, nursery trays, and plates.

Modular in design, the ACF can be supplied in various configurations: forming only, forming and cutting in the same station, forming and cutting in two stations, and forming-punching-cutting in three stations.

The series can be furnished with up or down stackers, a three-axis robot, and customized solutions to stack parts with different nesting requirements.

**Outlook**

In 2017, automation will continue to impact thermoformed packaging companies, because it reduces labor costs and potential for improved efficiency and output. The latest impact is in thermoformed in-mold labeling (T-IML).

This technology allows thermoformers to add a high quality pre-printed label to a non-round container in the forming process. This is driven by retailers wanting to get more product on the shelf per cubic foot, thus getting away from traditional round containers that can be printed via dry offset technology.

The Committee on Equipment Statistics (CES) at SPI, reported bookings of auxiliary equipment for participating companies were up about 13 percent during the first half of 2016 and PN's Wood said he sees nothing on the short-term horizon likely to affect that.

According to the CES, packaging will enjoy the strongest growth in demand for plastic products and equipment heading into 2017. Expectations for all other end markets call for steady-to-better demand to prevail through the final quarter of 2016.

Wittmann Battenfeld CEO Michael Wittmann said sales accelerated in both 2014 and 2015. He expects that trend to continue through 2016.

Wittmann said that order intake in the first half of 2016 was at a high level, with strong demand for SmartPower and MacroPower machines.

Milacron's Morris noted that the packaging sector will continue to experience growth going forward.

"This will stimulate the sale of equipment across all processes and it will enhance machine manufacturers’ ability to support that industry growth,” he said.

John Hart, managing director of P&M Corporate Finance (PMCF) and leader of the firm’s Plastics & Packaging team, said he expects to see more of the same in the packaging sector in 2017.

“Thermoformed packaging is going to largely track the respective end markets,” he said. “There may be some share shift from flexible, but it won’t be a significant amount. The thermoformed packaging industry will grow more than the overall packaging industry because of its position, desirability and performance over other materials.”

While new technologies and materials continue to be developed, getting them to market quicker will be key to sustaining growth among thermoformed packaging machinery manufacturers.
The number of global plastics mergers and acquisitions dipped during the first eight months of 2016, but the market remained on pace to record more than 300 deals for the sixth consecutive year.

“Strategic buyer deals are down, but the number of those involving financial buyers is about the same,” said John Hart, managing director with P&M Corporate Finance in Southfield, Mich. “Private equity remains strong, and there’s the same level of interest in activity.”

P&M tracked 155 plastics and packaging deals in the first half of the year, down almost 11 percent from the 174 recorded in the same period last year. “There’s still a lot of interest in packaging, but there’s a limited pool of sellers there.

Hart noted that there has been some consolidation in packaging in 2016.

Among end markets, food and beverage saw the biggest first-half decline, sliding from 43 deals to 26 (down 40 percent). The number of deals in the consumer end market rose from 20 to 24.

In product segments, the number of first-half consumer deals ticked up from 7 to 10. But the number of rigid packaging deals tumbled from 24 to 16 (down 33 percent).

Competitive landscape

First-half plastics M&A has played out against a backdrop of U.S. GDP growth of around 2 percent, and with the Dow Jones Industrial Average up almost 3 percent through June 30. This would appear to be moderate economic growth at best, but it’s better than results in some other parts of the world.

Prices for West Texas Intermediate Oil began the year around $40 per barrel, then fell below $35 but were near $48 as the first half ended — a six-month increase of about 20 percent. North American resin prices haven’t seen as much volatility, which has been good for plastics processors in the region.

Top markets attract deals

The packaging market remains among the key areas of emphasis for plastics M&A.

“Packaging is more fragmented, but it tends to be insulated from some of the ups and downs of the market,” said Thomas Blaige, chairman and CEO of Blaige & Co. in Chicago.

“We’ve seen a lot of growth in packaging,” added David Evatz, managing director at Stout Risius Ross Advisors LLC in Chicago. “Plastic is still replacing other materials there. Consolidation is continuing — but it’s a large segment.”

Jay Radtke, managing director of Mason Wells, heading up the private equity firm’s packaging materials and converting sector, pointed out that fragmentation exists in packaging M&A heading into 2017. “You look at the market share of the rigid plastic and flexible packaging converters, there’s slight consolidation. But it’s still very fragmented,” he said.

“On the flexible side, the top three converters only make up about a third of the market. And after that, the largest player is only at 3 percent market share,” he said. “It’s the same case on the rigid plastic packaging side where the top four players make up about a third of the market. The next largest player has 5 percent of the market.”

The top 10 suppliers account for about 50 percent of North American converted flexible packaging sales, leaving the other half of the market quite fragmented. On the rigid side, the top 10 account for about 55 percent, Radtke said. That’s part of the reason why Radtke believes those businesses will truly never consolidate into the hands of a few players.

And while plastic packaging companies continue to be bought and sold, there also is a stream of people jumping back into the market to create new firms due to the attractive-
ness of the business. “I think it’s very healthy. I really do. It’s a huge market,” Radtke said. “There are a lot of different niches. I think people complain sometimes there’s too much capacity, and that ebbs and flows.”

**Headlining deal**

Several financial pros cited Stone Canyon Industries’ $2.4 billion purchase of plastic and metal container maker Bway Corp. of Atlanta as a standout deal to date in 2016. Bway was sold in June by private equity firm Platinum Equity LLC to Stone Canyon, which owns a broad portfolio ranging from railroad equipment to women’s apparel.

Platinum had acquired Bway for $1.24 billion in 2012 from Madison Dearborn Partners LLC and bolted on Ropak Packaging, a maker of rigid plastic shipping containers, within a matter of months in a $265 million transaction.

Blaige also cited Novolex acquiring Heritage Bag Co. as an example of a firm trying to consolidate in both plastics and paper packaging. Heritage operates six plants, making plastic trash bags, can liners and food bags for institutional and commercial customers.

Bill Ridenour, president of Polymer Transaction Advisors in Foxfire, N.C., added that the medical sector “isn’t under a lot of price pressure,” since some products “are propped up by government programs.” He cited personal care and pharmaceuticals as “top targets” in the medical space.

Also during the third quarter of 2016, food packaging maker Sabert Corp. acquired Mullinix Packages Inc., a provider of plastic packaging for food, from Mason Wells. Mullinix, based in Fort Wayne, Indiana, makes and forms several types of plastic materials used in foods packaging, including meat trays. The deal for Mullinix follows Sabert’s acquisition of Kalman Packaging Inc., a maker of plastic hinged food packaging for bakeries and supermarkets in Graham, N.C., earlier this year.

**In it for the money**

Bank lending and financing seems to be readily available to firms with good credit. Low interest rates also continue to encourage buyers to take advantage of M&A opportunities.

“There’s been no change in financing,” said Rick Weil, managing director at Mesirow Financial in Chicago. “We’re seeing some very attractive debt packages.”

Blaige agreed that financing “continues to get more favorable,” but he pointed out that the broader economic market “is in the seventh year of the seventh cycle. It makes you wonder when the other shoe is going to drop.”

Andrew Petryk said he’s already seeing some signs of banks behaving as if the current up cycle may be ending. “We’ve seen some banks becoming less aggressive,” he said.

“Banks are looking at where we are in the current cycle,” Petryk added. “We’re six to seven years in now, and they’re starting to build in some conservatism, because they expect it to be down at some point.”

**Now how much would you pay?**

One of the most reliable ways to increase the heart rate of an M&A pro is to ask him or her about earnings multiples that buyers are paying.

P&M’s Hart is no exception. “Sellers’ expectations have gone up,” he said. “They see the hype of a multiple without the full story. A small company isn’t going to get the same multiple that a billion dollar company will.”

“For a lot of deals, multiples in the first half were flat vs. last year, with not much change,” Hart added.

The 4-to-6-times EBITDA range has been relatively standard for middle-market plastics firms, with specialty businesses and larger firms commanding higher prices. But even that 4 to 6 level is being tested in the current market.
“It used to be if you told a buyer you could get them 4-6x they were happy with that,” said Weil at Mesirow. “Now you tell some of these guys 6x and you get laughed out the door. They want 7x or 8-10x for a mid-market deal. Those aren’t always realistic.”

Companies with above average growth and above average margins “continue to sell at a premium of one to two turns above the prevailing market multiple,” said Kevin Mayer, managing director at Western Reserve Partners in Cleveland.

Higher multiples “primarily are resulting from a huge supply and demand imbalance in the M&A market, in terms of buyers with ample amounts of cash vs. companies that are truly actionable to be sold,” he added.

“We look at multiples on a case by case basis,” Blaige explained. “There always will be a size premium, but an average plastics processing company with $25 million to $50 million in annual sales isn’t going to get 8-10x unless it’s high-tech. A $25 million company typically can get anywhere from 4-5x to 6-7x.”

**Private equity’s influence**

As in many investment areas, the influx of private equity money has had a big impact on plastics M&A in recent years.

Bain Capital executive Ken Hanau sees good things still happening in the plastics packaging market for private equity firms. “There are still good trends in the plastics space, like lightweighting and recycling,” he said.

“Plastic is still taking share from other types of packaging,” he added. “The market is still fragmented, but has a good deal of non-discretionary consumer demand. It’s a good place for private equity to park money.”

Large amounts of new polyethylene resin capacity set to hit North America in 2017 and beyond should keep resin prices low, according to Hanau, and allow plastics firms “to continue to be aggressive vs. other materials.”

The amount of total plastics and packaging transactions completed by financial buyers nearly reached 45 percent through the first half of 2016, up from approximately 40 percent in the first half of 2015, according to Hart at P&M. This increased activity “reflects a strong appetite for financial buyers to continue driving consolidation, particularly in the injection molding segment,” he added.

“Private equity is in a good place right now, but sometimes to beat out a strategic buyer, they still need to pay a big price,” Blaige said.

**Still sweet going forward**

What does the coming months and year hold for plastics M&A?

“We should make it through election season and be solid for the rest of 2016,” said Ben Whiting at KeyBanc. “I don’t see any slowdown.”

“We’re enthusiastic for 2016 and 2017,” added Petryk at BGL. “But we’re hearing from some potential sellers ‘If I sold my company today what would I do with the money?’ They’re saying that because of low stock market returns.”

Mesriow’s Weil added that high prices being paid for plastics firms “are hard for sellers to resist. Even if you’re wrapped up in your company, it might be easier to decide to sell because valuations are so strong,” he said.

Although plastics M&A interest is high, Hart said the 2016 global deals total could end up falling short of the 2015 mark for several reasons, including a more limited supply of quality targets for acquisition as consolidation continues and more caution in debt markets.

“We continue to see strong buyer interest in well-positioned companies with exposure to attractive end markets,” he said.
APPENDIX
COMPANY PROFILES
AND DATA
**TOP MOVERS**

1. **Shape Products LLC**  
   **CHANGE:** +71  
   **NEW RANKING:** 72

2. **Amros Industries Inc.**  
   **CHANGE:** +29  
   **NEW RANKING:** 91

3. **Fiber Pad Inc.**  
   **CHANGE:** +13  
   **NEW RANKING:** 102

4. **Robinson Industries Inc.**  
   **CHANGE:** +12  
   **NEW RANKING:** 51

5. **C+K Plastics Inc.**  
   **CHANGE:** +10  
   **NEW RANKING:** 68

6. **Shepherd Thermoforming and Packaging Inc.**  
   **CHANGE:** +10  
   **NEW RANKING:** 112

7. **Piedmont Plastics Inc.**  
   **CHANGE:** +9  
   **NEW RANKING:** 70

7. **Plastech Corp.**  
   **CHANGE:** +9  
   **NEW RANKING:** 139

9. **Innovative Plastech Inc.**  
   **CHANGE:** +8  
   **NEW RANKING:** 89

9. **Hagans Plastics Co. Inc.**  
   **CHANGE:** +8  
   **NEW RANKING:** 119

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**TOTAL THERMOFORMING SALES**

- **Packaging:** 84.75%  
  **INDUSTRIAL:** 15.25%

- **TOTAL THERMOFORMING SALES**  
  $11.6 BILLION  
  **PACKAGING:** $9.8 BILLION  
  **INDUSTRIAL:** $1.8 BILLION

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**TOP END MARKETS**  

**Industrial**  
- **Automotive/transportation:** 120  
- **Recreational/sporting goods:** 102  
- **Medical/pharmaceutical:** 79  
- **Electrical/electronics:** 72  
- **Food packaging:** 64

**Packaging**  
- **Food packaging:** 51  
- **Consumer products:** 44  
- **Medical/pharmaceutical:** 35  
- **Electrical/electronics:** 32  
- **Industrial:** 29

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**TOP MATERIALS**  

- **PS:** 180  
- **PE:** 168  
- **ABS:** 167  
- **PP:** 142  
- **PETG:** 140
Pactiv LLC manufactures and distributes food packaging and foodservice products, offering containers.

The company supplies products for various applications, such as beverage, take-out, deli, HMR, bakery, food preparation, and processor packaging, as well as sustainable, tableware, and catering products. The company also provides custom printing and embossing, and new product development services.

Pactiv serves foodservice, food processing, supermarket, and convenience store markets in the United States and internationally.

Founded in 1965 as Packaging Corp. of America, Pactiv today is based in Lake Forest, Ill. It has additional locations in Arkansas, California, Florida, Georgia, Illinois, Maine, Massachusetts, Minnesota, North Carolina, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Texas, Virginia, and West Virginia, as well as Asia, Canada, Europe and Mexico.

Pactiv had estimated thermoforming sales of $3 billion, according to Plastics News' 2016 rankings data, all of that total from packaging.

The company has 23 thermoforming plants and its processes include thin gauge, extrusion, heavy gauge, in-line extrusion and pressure forming. Materials include PE, PS, PP, PET, PVC and PETG.

In 2010, Pactiv was acquired by Rank Group Limited, and became part of Reynolds Group Holdings Limited (RGHL), a global manufacturer and supplier of consumer food and beverage packaging and storage products.

As part of its business strategy, in December, Pactiv announced a $4.5 million investment at its Columbus, Ohio, location. The expansion will focus on paper products to complement Pactiv's variety of food service and food packaging products, including plastic wrap, containers, cutlery, plates, platters, bowls, cups and trays.

In March 2015, the company announced a $24 million expansion project in North Carolina.

While the company offered little information about the project, a Pactiv company official told Plastics News the project was plastics food packaging related.

Pactiv CEO John McGrath, in a statement, said the company was “confident that North Carolina” was the right place for the growth.
Dart Container Corp., founded and headquartered in Mason, Mich., manufactures cups, plates, containers, lids and straws made from such materials as expanded polystyrene foam, solid polystyrene, polypropylene, polyethylene terephthalate (PET), paper and sugar cane.

In 2016, the company ranks as one of the largest manufacturers of polystyrene foam food packaging.

From its humble origins as a machine shop in Mason, Dart has expanded across the globe to include more than 40 locations in seven countries. Dart has about 15,000 employees worldwide.

Dart had thermoforming sales of $1.4 billion, according to Plastics News’ 2016 ranking of thermoformers. All of its sales are derived from packaging.

The company’s processes include thin gauge, extrusion, in-line extrusion and twin-sheet forming. Materials include PE, PS, PP and PET.

In 2012, Dart purchased rival Solo Cup Co. for $1 billion. It then kicked off a $47 million expansion and renovation of its headquarters and facilities in Mason, Mich. The project was completed in 2014.

During the fourth quarter of 2015, Dart announced plans to open an expanded polystyrene foam recycling drop-off center.

The site is accessible 24 hours a day, seven days a week for residents, businesses and organizations, Dart said.

Dart also has been actively opposing a ban of expanded polystyrene in New York City.

Late in 2015, Dart released a nearly 3-minute video aimed directly at Mayor Bill de Blasio to make a case for expanded polystyrene recycling in the city.

Release of the video came about a month after a Manhattan Supreme Court judge overturned the city’s EPS ban of single-serve foodservice items.

Claiming EPS is not recyclable, the city administration decided in 2015 to ban use of the material. Dart responded by successfully suing, and Judge Margaret Chan ruled the material is, indeed, recyclable.

The ban was originally set for July 1 with enforcement starting Jan. 1, 2016, following a six-month grace period.
Processor Profiles - Thermoformers

D&W Fine Pack LLC

D&W Fine Pack provides a wide range of products serving the foodservice and food packaging industry.

D&W had thermoforming sales of $510 million according to Plastics News’ 2016 ranking of thermoformers. Of its sales, 85 percent are derived from packaging. It has 2,000 thermoforming employees.

The company’s processes include thin gauge, extrusion and heavy gauge. Its materials include PS, PP, PET, PLA and post-consumer resin.

As part of its business strategy, the company announced in January plans for a $20 million expansion of its manufacturing site in South Carolina.

Marketing Director Fran Rizzo told Plastics News that she was limited in what she could reveal about the investment, but did indicate the project will include extrusion and converting.

“D&W Fine Pack remains committed to investing in the latest innovations, skilled employees and business partnerships that will not only strengthen its competitive advantage in the marketplace, but help generate new opportunities for employment, economic development and community relationships,” CEO Kevin Andrews said in a statement.

Aside from Fountain Inn, the company has locations in San Bernardino, Calif.; Miami, Fla.; Cadiz, Ky.; Elk Grove Village and Lake Zurich, Ill., Fort Wayne, Ind., Fort Calhoun, Neb.; Hatfield, Pa.; and Gladwin, Mich.

The company employs more than 1,700 workers across the U.S.

D&W Fine Pack is owned by Mid Oaks Investments LLC, a Buffalo Grove, Ill.-based private investment firm.

D&W Fine Pack was created in 2010 after the acquisitions of Wilkinson Industries in 2004, Dispoz-o Products Inc. in 2009, C&M Fine Pack Inc. in 2009, and Tri-City Packaging in 2010, the company previously indicated.

Mid Oaks later invested in CM Packaging Group Inc., Clear Lam Packaging Inc.’s thermoforming division, and Jet Plastica Industries Inc. to help expand D&W Fine Pack, according to the investment firm’s website.
Genpak LLC
Since 1969, Genpak has been a manufacturer of food packaging. The company started with one manufacturing facility located in Middletown, N.Y., and has since expanded to 18 facilities throughout the United States and Canada with its corporate headquarters located in Glens Falls, N.Y.

The company’s manufacturing scope ranges across 10 different rigid packaging substrates – serving the retail, food processing, and food service industries with its portfolio of products.

Genpak had thermoforming sales of $465 million, according to Plastics News’ 2016 rankings. All of those sales are from packaging. The company’s processes include thin gauge and extrusion. Its materials include PS, PP and PET.

Genpak operates as a subsidiary of Great Pacific Enterprises Inc.

One specialty area for Genpak is its variety of polystyrene hinged carryout and takeout containers. Over the past 40 years, it has built a reputation based on the manufacturing of these containers.

The industry itself has faced untold environmental challenges with municipalities and different groups banning PS foam containers. To that end, Genpak officials maintain a section on the company’s website dedicated to debunking common myths about PS.

Genpak’s strategy is to make environmental stewardship its way of doing business. In its products, the company is continuing its offering of eco-friendly “green” packaging. Among the latest entries is a line of PS foam containers that will have 25 percent post-consumer recycled content.
Processor Profiles - Thermoformers

Berry Plastics

Berry Plastics is a global manufacturer and marketer of plastic packaging products. The company manufactures a wide range of products, including open-top and closed-top packaging, polyethylene-based plastic films, industrial tapes, medical specialties, flexible packaging, heat-shrinkable coatings, specialty laminates and flexible intermediate bulk containers.

The company is generally divided into four divisions: Rigid Open-Top, Rigid Closed-Top, Flexible Packaging and Engineered Materials.

The company had thermoformed sales of $420 million according to Plastics News’ 2016 rankings data, all from packaging. It has two thermoforming plants and 44 thermoforming machines.

Berry conducts in-line extrusion using PS and PP.

Berry touts its efforts to keep sustainability at the forefront of new developments and help customers increase their sales and profits while reducing their packaging impact on the environment. The company has active projects focused on use of recycled content, bio-based materials, biodegradable materials and introduction of fillers and additives.

According to CEO Jon Rich, the company’s plan is to achieve a half turn or more reduction in leverage through free cash flow and earnings growth.

Consumer packaging, including containers, cups, bottles and closures, represents 45 percent of sales. And engineered materials — think tapes, bags, trash can liners and films, account for the other 30 percent of the company’s business.

In December 2015, Berry announced plans to add 18 manufacturing cells at its Jackson, Tenn., plant.

Berry said it will streamline production and increase capacity as part of the work, adding work cells for a variety of plastic containers and bottles in Jackson.

The company also saw increased demand in 2015 for its Versalite brand cups made from polypropylene.

The insulated cups, being positioned as an alternative to expanded polystyrene and even premium paper cups, already are being used by Dunkin’ Donuts, Subway and 7-Eleven as well as “several other regional customers,” according to Rich.

“To date, the majority of our customers for Versalite cups switched from expanded polystyrene, commonly known as EPS, in response to regulatory requirements or to meet sustainability objectives despite the slightly higher cost they incurred,” Rich said.

“As we look forward to building higher demand for Versalite in the future, significant opportunities continue to exist by targeting customers who are currently using premium paper cups where a Versalite cup offers greatly improved performance, graphics, and recyclability at a very competitive price,” he said.

While still small in comparison to PET and HDPE, the recycling market for PP is expanding. It’s this emerging recycling market for PP that’s helping to heighten the sustainability message of the resin.
Processor Profiles - Thermoformers
Fabri-Kal Corp.

Fabri-Kal was incorporated in 1950 in Kalamazoo, Mich., when seven shareholders purchased the plastic segment of the Kalamazoo Paper Box Co. and set up shop in 5,000 square feet of a former A&P grocery store.

In 2016, as one of the largest thermoformers in North America, Fabri-Kal’s customer base includes thousands of foodservice operators and dozens of consumer product manufacturers.

The company employs more than 800 people. Its thermoforming plants are in Greenville, S.C., Hazleton, Pa., and Kalamazoo, Mich.

The company had thermoformed sales of $383 million according to Plastics News’ 2016 rankings data, all from packaging. It has four thermoforming plants and 41 thermoforming machines and annual resin throughput of 175 million pounds.

The company’s processes include thin gauge, extrusion, in-line extrusion and pressure forming. Fabri-Kal uses PP, PET, PCR-PET, HDPE, PLA, renewable agricultural pulp, and HIPS in making foodservice and custom thermoformed packaging solutions.

Fabri-Kal currently employs more than 900 people in five manufacturing, printing and warehousing facilities across the US.

Its materials include PE, PS, acrylic, PP, PET, PETG, PLA and post-consumer resin.

Fabri-Kal’s sustainability and green initiatives have taken center stage in several ways. In its product lineup, Greenware is the company’s exclusive line of annually renewable cold drink cups, lids and portion containers, made from biopolymers. Made in the United States, Greenware is 100 percent compostable in actively managed municipal or industrial facilities.

As part of its business strategy, in 2015 Fabri-Kal announced plans to invest $50 million in a new facility in Burley, Idaho, which would source local agricultural fiber for use in the company’s Greenware packaging line.

The thermoformer now uses Ingeo polylactic acid from NatureWorks LLC to make cups, portion containers and other foodservice items.

The Burley plant also is supporting Fabri-Kal’s thermoforming push west of the Rocky Mountains, Fabri-Kal vice president of sales and marketing Chuck Garlock noted.

Completed in 2015, the 100,000-square-foot building will house design and manufacturing.

The company also continues to design innovative packaging options. It recently debuted a new line of mushroom packaging, known as tills, made from high density polyethylene in a lightweight, compact design.

The mushroom tills are made from a blend of HDPE and calcium carbonate, produced with 25 percent less plastic than Fabri-Kal’s previous tills.
Processor Profiles - Thermoformers

Anchor Packaging Inc.

Founded in 1963 as a converter of plastic film, Anchor Packaging Inc. has expanded company offerings and services to become both a national and global producer of plastic packaging for the foodservice retail and food-processor industries, both nationally and globally.

Headquartered in St. Louis, Anchor Packaging manages operations stateside in Missouri, Kentucky and Arkansas. Global operations are located in Argentina, England and Australia with representatives in 18 countries.

Anchor had thermoformed sales of $290 million according to Plastics News’ 2016 rankings data, all from packaging. It has two thermoforming plants, 36 thermoforming machines and more than 700 thermoforming employees. The company’s processes include thin gauge, extrusion, in-line extrusion, pressure forming and twin-sheet forming. Materials include PE, PS, PP and PET.

Anchor is owned by St. Louis-based Hermann Cos. Inc.

Several acquisitions in recent years – including Innovative Plastics, the MicroLite division of Amoco, and the BonFaire division of Placon Corp. – have allowed Anchor Packaging to expand its product offerings.

In the United States, Anchor Packaging works through a sales organization comprising direct sales personnel and dedicated manufacturers’ representatives who sell company products through national and local distributors.

As part of its business strategy, the company is focused on specific areas, including offerings in reusable, recyclable and microwaveable upscale take-out polypropylene and recyclable PET packaging.
Sonoco Plastics

Sonoco Plastics Thermoforming is based in Hartsville, S.C., and is operated by Sonoco Products Co.

The parent company is a $5 billion global provider of consumer packaging, industrial products, protective solutions and display and packaging services. It has more than 330 operations in 34 countries, producing packaging for a variety of industries and many of the world’s most recognized brands, serving customers in 85 nations with more than 19,900 workers globally.

The firm produces packaging for a variety of industries as well as some of the world’s most recognized brands. It has offices that offer services in the following locations: 18 in South America; 51 in Europe; 30 in Asia; and seven in Australia. In North America, it operates 11 thermoforming plants.

The company had thermoforming sales of $280 million, according to Plastics News 2016 rankings data, all from packaging.

The company’s processes include thin gauge, extrusion, heavy gauge and in-line extrusion. Its materials include PE, PS, PP, PET, PVC and post-consumer resin.

Sonoco’s operations consist of a wide stock of consumer packaging businesses offering a platform of solutions — Global Rigid Paper and Closures, Global Flexibles and Global Plastics; a Global Services division, which provides high-impact retail displays and packaging supply-chain management; an Industrial Converted Products business, which manufactures a variety of tubes and cores, engineered protective packaging solutions and reels for the wire and cable industry; and the Primary Materials group, which produces uncoated recycled paperboard globally for its fiber-based packaging divisions and external converters. The company’s business units include Sonoco Recycling, one of the world’s largest recyclers.

Two main areas of thermoforming that Sonoco features are CPET and polypropylene. The company says that CPET products are applicable for frozen and chilled prepared meals, case-ready meat trays, bakery products and the food-service industry.

As part of its business strategy, Sonoco recently spent $12 million to create a new packaging studio at its Hartsville, S.C., headquarters. The Innovative Packaging Solutions studio includes spaces for observation of customer interaction with products and packaging in a variety of environments, including retail, kitchen and bathroom, the company said.

Other features of the site include collaborative spaces to explore packaging concepts and technology to develop design and manufacturing options for potential commercialization, the company said.

Sonoco also made news late in 2015 with the introduction of its TruVue plastic can. That can is aimed squarely at products traditionally served in steel cans. The TruVue can features a multi-layer plastic wall with an easy-open metal top and a metal bottom. At the time, Sonoco said the can could be on store shelves in just a matter of months.
Winpak Portion Packaging Inc.

Winpak Portion Packaging Inc. is part of Winpak Ltd., which manufactures and distributes packaging materials and related packaging machines. The company’s products are used primarily for the protection of perishable foods and beverages and in health care applications.

The company had thermoforming sales of $205 million, according to Plastics News 2016 rankings data, all from packaging. It has 500 thermoforming employees at three thermoforming plants with 20 thermoforming machines. It has annual resin throughout of 80 million pounds.

The company’s processes include thin gauge, extrusion and in-line extrusion. Materials include PE, PS and PP. Winpak Portion Packaging is part of a global packaging group operating nine production facilities in Canada and the United States. The North American business units assist customers throughout the United States, Canada, Latin America and the Pacific Rim countries.

Winpak’s proprietary coextrusion processes and custom resin blends are the elements that it believes differentiate it from others in the industry.

The company’s core competency is supported by a technical organization that includes engineering, packaging, and polymer and food-chemistry expertise that is dedicated to the development of new materials and lower-cost manufacturing realized through the use of advanced technology.

Winpak’s product range includes thermoforming films, pre-made cups, lidding films, die-cut lids, pouches and packaging machinery.

As part of its business strategy, Winpak recently debuted its Hi-Bar Condiment Packaging System, which features a PVdC free condiment tray material that has much greater barrier properties, is fully recyclable and has a lower carbon footprint than PVdC coated PS tray material.

Georgia-Pacific LLC

Georgia-Pacific is a leading manufacturer of packaging, building products and related chemicals.

The company manufactures packaging for bulk bins, water-resistant packaging, reusable shipping pallets and high-finish and preprinted packaging for point-of-sale displays and is one of North America’s leading suppliers of containerboard and corrugated containers.

GP’s Color-Box™ business is the largest litho-laminate corrugated manufacturer in North America - producing bleached board used in food service items, such as disposable cups and plates, and kraft paper used to make bags for pet food and fertilizer.

Georgia-Pacific LLC has operated as a subsidiary of Koch Industries Inc. since Koch purchased Georgia-Pacific for $21 billion in 2005.

According to Plastics News data, it had $200 million in thermoforming sales in the most recent rankings list, all of that total derived from packaging.

The company has more than 35,000 employees globally, including 900 thermoforming employees in North America at two plants. Processes include thin gauge, extrusion and in-line extrusion. Materials include polystyrene.

As part of its business strategy, Georgia-Pacific has been active in sustainability initiatives. It implements environmental and sustainable practices in its manufacturing operations as well.
The Waddington Group

The Waddington Group is a major global packaging manufacturer and marketer with four divisions.

According to Plastics News data, Waddington had $185 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

Waddington manufactures disposable dinnerware and serving products for the commercial, food service and retail markets. It operates 17 manufacturing facilities in the United States, Canada, Britain and Ireland and has about 2,900 employees.

In Canada, the company’s Polar Pak division has many of the same manufacturing capabilities offered by WNA in the U.S. and serves the foodservice, bakery, deli, produce and confectionary markets. In addition to products manufactured in Canada, the brand also markets products produced by other Group companies, thereby providing one-stop shopping convenience for single-use foodservice products across Canada.

As part of its business strategy, product innovation has been the key to the success of WNA. The company also operates Waddington Europe and Econ-Products divisions. Econ-Products, of Boulder, Colo., is a leading brand and thought innovator in the green packaging space.

The Waddington Group was acquired in 2015 by Jarden Corp. In December 2015, Jarden announced plans to merge with Newell Rubbermaid Inc.

Tekni-Plex Inc.

Tekni-Plex is a leading manufacturer of packaging and tubing materials for products distributed globally.

Basing operations in two dozen manufacturing sites in eight countries across North America, Europe and Asia, Tekni-Plex is a supplier to international brands in healthcare, food and beverage and consumer retail. Its thermoforming operations in North America are focused on foam packaging for food products.

Tekni-Plex had $18 million in thermoforming sales as reported in the 2016 Plastics News thermoformers rankings, all of that total derived from packaging. Processes include extrusion and materials include PS and PET. The company has five thermoforming plants in North America, according to Plastics News data. The company’s primary end markets include food packaging, agricultural and consumer products.

Over the last several years, the company has taken an aggressive position in restructuring for profitability and improved operating performance. The company now has a new operationally focused management team; it exited unprofitable businesses and product lines and reduced the number of stock keeping units; it consolidated plants; it increased plant efficiencies and raised productivity through automation; it established a professional raw material sourcing function; and it adopted a strong market pricing discipline to pass through raw material costs.

Tekni-Plex is owned by private equity firm American Securities.

Part of the company’s business strategy has been to expand its footprint in packaging. In March, Tekni-Plex Inc. expanded into the liner business with the purchase of Sancap Liner Technology Inc. of Alliance, Ohio. The acquisition, was the third liner deal for Tekni-Plex in 18 months.
Founded in 2002, Peninsula Packaging’s focus has allowed it to grow from a single plant in California to a national producer with four high quality plants around the United States.

The company designs, develops, and manufactures primary packaging products for produce, bakery, food processing, confectionary, convenience (grab-n-go), and deli markets in North America.

According to Plastics News data, Peninsula had $175 million in thermoforming sales in the 2016 rankings, 95 percent of that total derived from packaging.

The company has 700 thermoforming employees at four plants. It has 36 thermoforming machines. Processes include extrusion and pressure forming. Materials include PET and post-consumer resin. Its primary end markets include food packaging and agricultural.

Peninsula Packaging has achieved industry recognition for the use of recycled drink bottles in packaging products it manufactures, as well as ownership and operation of one of the largest privately funded solar farms in North America.

A total of 3,888 solar panels located adjacent to Peninsula’s Exeter, CA facility generate 1.1 megawatts of power per day providing a significant portion of the power used in the production of Peninsula’s packaging products from clean, renewable energy.

Odyssey Investment Partners LLC has a minority stake in Peninsula.
Prent Corp.

Founded in 1967 by Jack and Carol Pregont, Prent Corp. has grown to become a global leader in the design and manufacture of custom plastic, rigid thermoformed packaging.

Headquartered in Janesville, Wis. the company counts as its customers many of the world’s largest medical, electronics and consumer products companies.

The company had thermoforming sales of $160 million, ranking No. 15 in Plastics News’ 2016 thermoformer ranking, all from packaging.

The company has 800 employees at three thermoforming plants. Its processes include thin gauge and pressure forming. Materials include PE, PS, PP, PET, PC, PVC and PETG.

In addition to its headquarters and a facility in Flagstaff, Ariz., the company operates manufacturing facilities globally, including nine Class 8 Clean Room facilities in China, Malaysia, Puerto Rico, Costa Rica and Denmark.

While offering a complete line of products and services, the heart of Prent is the company’s thermoforming operation. To achieve 100 percent traceability and repeatability and meet customers’ requirements, each thermoformer features a customized computer control panel to provide precise instructions to each former and real-time statistical process control for temperature, pressure, cycle time and more.

These controls also are networked to production control and logistics for computerized forecasting, scheduling, tracking, inventory control, shipping and maintenance.

Prent also has been a leader in providing electrostatic dissipative protective electronics packaging for more than 20 years. Computer, microchip, hard-drive storage, cell phone and other industries have depended on Prent to design, engineer, tool and thermoform custom plastic packaging to protect sensitive electronic components and consumer products.

The company specializes in custom, precision parts, even-wall, deep-draw, nestable plastic containers and automation trays for numerous markets including the disk-drive, semiconductor, consumer electronics and the computer and printer industries.

As part of its business strategy, the company in January took a step toward continued plastic packaging design innovation with the debut of is new multi-million-dollar tool room.

Added are new vertical format mills to machine 63-inch parts in one set-up. Plus, a Horizontal Machine Center — with servo controlled equipment, logic technology and sophisticated programs — provides a truly 24/7, lights-out, hands-free system for milling tools with the highest accuracy.

The company also has been a leader in the design of rigid plastic packaging for OEMs in the medical end market.

“Our quality system follows a Plan-Do-Check-Act methodology to coordinate continuous improvement,” explains Dave Henry, Prent vice president of quality. “It all begins with understanding customer requirements, providing robust designs, utilizing process controls to provide defect free products — and verifying the outputs at various toll gates throughout the process.”
Novipax LLC

Novipax is a leading manufacturer of absorbent pads and expanded polystyrene foam trays in the United States. It offers barrier and non-barrier trays; and packaging and support services.

The company serves food processors, supermarkets, and food packaging distributors. It offers its products through suppliers. It operates five manufacturing facilities in Indiana, Pennsylvania, North Carolina and Mississippi and has more than 700 employees at two thermoforming plants with 27 thermoforming machines.

According to Plastics News data, Novipax had $155 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging. Processes include extrusion and pressure forming of PS.

As part of its business strategy, the company continues to develop new products for its customers.

Earlier this year, the company unveiled the innovative, new Pad-Loc Fresh. Pad-Loc Fresh generates carbon dioxide inside the package to help create an environment that is unfavorable for microbial growth on fresh and processed meats, poultry, seafood and other food products.

Novipax was founded in 2015 and is based in Oak Brook, Illinois. It has plant locations in Paxinos, Pa.; Indianapolis, Ind.; Rockingham, N.C.; and Grenada, Miss.

Novipax was launched by holding company Atlas Holdings LLC to own Sealed Air Corp.’s former North American foam trays and related absorbent pads business.

Atlas of Greenwich, Conn., and affiliates own 17 companies in a wide range of manufacturing. Its subsidiaries generate sales exceeding $4 billion per year.
Placon Corp.

Placon is a leading North American designer and manufacturer of custom and stock thin gauge thermoformed plastic clamshells, trays and blisters with an environmentally-responsible line of recycled PET rollstock materials.

The company also offers stock food packaging, custom food containers, medical device packaging, and sustainable packaging to the food, consumer packaged retail, and medical markets.

According to Plastics News data, Placon had $135 million in thermoforming sales in the 2016 rankings list, 100 percent of that total derived from packaging.

The company has 420 thermoforming employees at two plants with 24 machines. Processes include thin gauge, extrusion, in-line extrusion and pressure forming. Materials include PS, PP, PET, PVC, PETG and post-consumer resin.

Placon is one of the few companies to reclaim post-consumer thermoforms destined for landfills, processing them into flake, and extruding them into recycled PET roll stock.

Because Placon is using a high percentage of post-consumer recycled PET in the company’s rollstock, it is helping to preserve natural resources while reducing its total carbon footprint.

The company uses plastic bottles collected in curbside recycling programs to make RPET flake that carries a letter of non-objection from the Food and Drug Administration. The flake is extruded into sheets and thermoformed into food packaging, like delicatessen and bakery containers.

The company remains a family-owned business, with Dan Mohs, the son of late founder Tom Mohs, at the helm.

Innovation remains a key component of the company’s business strategy.

In 2016, Placon was awarded a U.S. patent on a tamper-evident container that prevents re-use with counterfeit goods.

The design, which is already being deployed in Placon products including a clear plastic clamshell, features a snap feature on the inside of the lid which holds a graphic card in place. When opened, a perforated area is broken and locks the graphic card in place. The break is visually obvious so consumers can see that the pack has been opened before.

The feature also makes it difficult for counterfeiters to not only repack the clamshell but to repurpose the graphic card as well. The thermoformed containers are made with Placon’s EcoStar resin and contain between 70 percent and 100 percent post-consumer recycled content.

Placon opened its EcoStar recycling facility last year in Fitchburg, Wis., but the company has been working with recycled material for about 20 years. The EcoStar containers appeal to businesses looking to meet sustainability requirements and mandates, but customers have also responded to the containers’ tamper-evident lids.

Looking ahead, the company will continue to execute its growth plan and will continue to launch new products.
Printpack offers flexible and specialty rigid packaging solutions to global customers in a range of consumer food and non-food industries.

Based in Atlanta, the firm has manufacturing facilities in the United States, England, Mexico, the United Kingdom, Poland and China. Advanced rigid thermoforming is among the company’s core capabilities.

According to Plastics News data, Printpack had $130 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has 300 thermoforming employees at two plants with 17 thermoforming machines and annual throughput of 75 million pounds.

Processes include thin gauge, extrusion and pressure forming. Materials include PS and PP. Its primary end market is food packaging.

In May, longtime chairman and CEO Dennis Love announced that Jimmy Love will be Printpack’s next CEO.

Dennis Love advised the Printpack associates that he will continue in his role as chairman of the Board of Directors and focus his attention on corporate governance and on major strategic issues that come to the board. The leadership change will be effective at the end of June.

In January 2016, the company announced a $25.7 million expansion at its Newport News, Va., facility.

Plans call for its existing 105,000-square-foot facility to grow by 50,000 square feet on roughly 10.7 acres.
Mullinix Packages Inc.

Founded in 1970, Mullinix Packages Inc. produces plastic packages in the United States.

Based in Fort Wayne, Ind., Mullinix thermoforms clamshells, trays, cups and lids for the food processing, retail and restaurant markets. It also makes its MX SleeveRedi thermoformed cups, which are wrapped with a paperboard sleeve.

SleeveRedi’s paperboard component adds strength to the cup, allowing the use of less plastic, the firm said. The sleeve is easily removed and provides high-quality graphics using offset and digital printing on the outside and inside of the sleeve.

Mullinix does roll-fed and in-line thermoforming using polypropylene, amorphous PET and crystalline PET.

The company also brings an integrated approach to custom solutions in plastics including PETE, RPET, CPET, PLA, CPLA and a variety of value-added layered materials.

According to Plastics News data, Mullinix had $125 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has 450 thermoforming employees at one plant with 25 thermoforming lines. Processes include thin gauge, extrusion and in-line extrusion.

Mullinix’s machinery ranges from small prototype to large 50-inch thermoformers. A prototype forming line is utilized for quick small run samples for trials/testing. It also has 30-inch, 40-inch, and 50-inch thermoformers for in-line and off-line thermoforming as well as two-stage CPET and large, flat-bed thermoforming.

Using a combination of vacuum and up to 100 psi of air pressure, the company can form a variety of sizes including difficult deep-draw parts.

In January 2012, private equity company Mason Wells of Milwaukee purchased Mullinix.

As part of an ongoing commitment to quality and good manufacturing practices, Mullinix has been awarded SQF Code Edition 7.2, Level 2. SQF is recognized by retailers and food-service providers around the world who require a rigorous, credible food safety management system.
Silgan Plastic Food Containers Corp. was founded in 2012 when its parent company, Silgan Holdings Inc., purchased Rexam’s thermoformed high-barrier food packaging business.

Based in Stamford, Conn., Silgan Holdings is a supplier of rigid packaging for consumer goods products. The company operates 82 manufacturing facilities worldwide. Since its inception in 1987, the company has acquired 27 businesses.

According to Plastics News data, Silgan Plastic Food Containers had $118 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging. The company has 275 thermoforming employees at one plant with 18 thermoforming lines and annual resin throughput of 60 million pounds.

Processes include thin gauge, extrusion and in-line extrusion, heavy gauge and twin-sheet forming. Materials include PP and PE and primary end markets include food packaging, medical/pharmaceutical and plastic cups/lids.

Innovation has been a key component of Silgan’s business strategy.

In 2015, Silgan debuted the straight wall plastic can, which is compatible with standard canning systems, which is a primary attribute to making the new can acceptable to food processors.

According to Silgan, it can be double-seamed and sterilized in traditional retort systems without the need of overriding pressure. Existing assets can be retrofitted to handle this container making any migration project affordable and easy to implement; best of all, it runs at similar speeds.

For the consumer, the benefits of the Silgan Straight Wall Can are that it’s microwave-able, reusable after opened (re-closable), dent-free, lighter weight, and easily recyclable.
Plastic Ingenuity

Founded in 1972, Plastic Ingenuity is one of the largest custom thermoformers in North America.

The packaging company’s capabilities include design, prototyping, tooling, custom thermoforming, vacuum forming and plastic sheet extrusion. It serves the food, medical, electronics and retail markets.

According to Plastics News data, Plastic Ingenuity had $100 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has approximately 390 thermoforming employees and operates 51 thermoforming lines across its four U.S. locations. It has annual resin throughput of 37 million pounds.

Processes include thin gauge, extrusion, and in-line extrusion. Materials include PE, ABS, PS, PP, PET, HMW-PE, PVC, PETG, PLA and post-consumer resin.

The firm has an in-house mold/tool department with 30 mold makers.

Plastic Ingenuity maintains a focus on sustainability, participating in Wisconsin’s Department of Natural Resources Green Tier program. It is also working to reduce its environmental footprint through various manufacturing initiatives.

As part of its operational strategy, Plastic Ingenuity in 2016 debuted Perfect Shelf that can cut costs and trial-and-error testing for package designers.

Perfect Shelf is a 3D experience solution from Dassault Systèmes that bridges the gap between retailers, consumers, and product design engineers while a design is being developed—far before any real-world trials are needed. The digital modeling system creates highly realistic aisle views with shelves, fixtures, products, lighting, and promotional materials, all supported with product performance and consumer trend information.

Product shelving quality affects brand awareness, sales margins, and overall product revenue. A key factor to any product’s overall success, packaging choices directly influence the consumer shopping experience. Perfect Shelf software simulates the subtleties of a package’s unique design in context, allowing for better informed strategy and decision making — and ultimately more successful work.

According to the company, its team of in-house packaging design engineers combine deep industry experience and merchandising strategy with the new simulation software to create superior labeling, artwork, and consumer experiences at a reduced cost with faster turnaround times.
Processor Profiles - Thermoformers

Amhil Enterprises Inc.

Founded in 1975, Amhil Enterprises Inc. manufactures and markets thermoformed plastic products, including container lids, mugs, bowls, trays, glasses, drinking straws and plates.

Amhil’s capabilities include designing, prototyping, manufacturing and quality control.

The company is based in Mississauga, Ontario, Canada, with additional offices in Burlington, Ontario. It operates as a subsidiary of Wentworth Technologies Co. Ltd.

According to Plastics News data, Amhil had $85 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has 300 thermoforming employees at two plants with 16 thermoforming lines and annual resin throughput of 35 million pounds, according to Plastics News data. Processes include thin gauge, extrusion and in-line extrusion. Materials include PS, PP and PET.

Parent company Wentworth Technologies Co.’s businesses are organized into 3 groups: plastics packaging, packaging molds and high precision molds. It operates 13 independent mold manufacturing, service facilities and contract plastics processing facilities, located in Europe, North America and Asia.

Wentworth also services its tooling customers through eight mold manufacturing and service centers in Poland, United States, Canada, Germany, the United Kingdom and China.

Huhtamäki Inc.

Huhtamäki Inc. is a specialty packaging organization that provides consumer goods packaging and foodservice containers as well as the retail line of Chinet disposable tableware.

Huhtamäki Industries was established in 1920 in Kokkola, Western Finland, by Heikki Huhtamäki. Today, Huhtamäki Oyj, the global packaging company, is headquartered in Espoo, Finland. Its U.S. growth has been largely through the acquisition of companies such as Sealright, which originated in the 1870s, with brands such as Chinet, whose molded fiber technology was developed in 1903 by Martin Keyes of the Keyes Fibre Co. of Waterville, Maine, where Chinet is still made.

The company’s U.S. corporate offices are located in De Soto, Kan. This location also serves as Huhtamäki Americas, the regional headquarters for the company’s 13 facilities in North and South America. Huhtamäki’s global headquarters is located in Finland.

According to Plastics News data, Huhtamäki Inc. had $84 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has 430 thermoforming employees at two North American thermoforming plants with 31 thermoforming lines and annual resin throughput of 100 million pounds.

Processes include thin gauge, extrusion, in-line extrusion and twin-sheet forming. Materials include PS and PP. Key end markets include food packaging and plastic cups/lids.
**Processor Profiles - Thermoformers**

**Inline Plastics Corp.**

Inline Plastics, based in Shelton, Conn., makes thermoformed PET packaging for fresh-cut fruit and vegetables, salads, food-service, baked goods and deli items.

It was founded in the basement of a small family home in the late 1950s by Rudolph and Gene Orkisz. They moved to a small rented building in 1961.

The company has thermoforming plants in Shelton and Milford, Conn., Salt Lake City, Utah, and McDonough, Ga.

According to *Plastics News* data, Inline had $70 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging.

The company has 450 thermoforming employees at three plants with 52 thermoforming lines. Processes include thin gauge and pressure forming.

Materials include PS and PET. Its primary end markets are food packaging and plastic cups/lids.

As part of its business strategy, the company recently added 150,000 square feet to its Shelton, Conn., head office plant and started up a new thermoforming line there. The extra space is being used for manufacturing, warehousing and offices.

In Salt Lake City, Utah, Inline opened a new line recently. At its McDonough, Ga., plant it announced plans to install a new thermoforming line. It has added 42,000 square feet of manufacturing and warehouse space to this facility.

**Lollicup USA Inc.**

Lollicup USA manufactures and distributes plastic disposable foodservice packaging products and Tea Zone beverage ingredients for thousands of retail business accounts, including several Fortune 500 restaurant franchises.

The company claims it provides a true one-stop solution for all beverage and foodservice needs.

According to *Plastics News* data, Lollicup had $55 million in thermoforming sales in the 2016 rankings, 100 percent of that total derived from packaging. The company has one North American thermoforming plant with four thermoforming lines. Processes include thin gauge, extrusion, in-line extrusion and twin-sheet forming. Materials include PS, PP and primary end markets include food packaging and plastic cups/lids.

Lollicup is known for its Karat line of foodservice disposables and packaging, including tensils, to-go packaging and plastic cups. The company also offers custom printed products.

The eco-friendly Karat Earth line, includes PLA plastic cups and containers, bagasse products and bio-based utensils.

As part of its sustainability strategy, in April 2016 the company added a new, more energy efficient extruder in its production facility in Chino, Calif. The large, state-of-the-art extruder is a machine by the Reifenhäuser Group, which is the leading provider of advanced technologies for plastics extrusion. The new extruder will improve the company’s energy efficiency and manufacturing capabilities. Alan Yu, Lollicup USA CEO and co-founder, said Lollicup USA’s energy use is expected to decrease by 25 percent.

Peace Chen, a production supervisor at Lollicup USA, said this new machine will also increase the manufacturing capacity by 50 percent. The company anticipates it will manufacture more than 1 billion cups in 2016, Yu said.
Nelipak Healthcare Packaging

Nelipak Healthcare Packaging designs, develops and manufactures custom thermo-formed packaging products that provide superior protection for medical devices and pharmaceuticals.

The company offers medical trays and blisters, surgical procedure trays, pharmaceutical handling trays, custom built sealing machines and other value added services.

According to Plastics News data, Nelipak had $47 million in thermoforming sales in the 2016 thermoformers rankings, 100 percent of that total derived from packaging.

Nelipak has 500 thermoforming employees at two North American plants. Processes include thin gauge and pressure forming.

Materials include PE, PS, PP, PET, PC, PVC and PETG. The company serves the medical/pharmaceutical end market.

A family run business, the packaging operation set the industry standard in 1980 by being the first European vacuum thermoformer to introduce cleanroom manufacturing.

By 1995 with the acquisition of its Irish facility, Nelipak had established itself as Europe’s market leading custom thermoformer with in-house design, development and tooling capabilities, a position it still enjoys today.


In 2013, private equity firm Mason Wells renamed its acquired rigid medical packaging producer Nelipak Corp. after purchasing it from Sealed Air Corp.

In July 2014 Nelipak expanded its presence in the American Southwest with the acquisition of Flexpak Corporation of Phoenix, Az.

Today, following its departure from Sealed Air, the Nelipak Group is the only 100-percent focused medical and pharmaceutical cleanroom thermoformer with ISO certified operations across all its manufacturing sites.

During the company’s 60 year history, it has continued to develop innovative medical packaging solutions which solve new industry challenges working with the worlds’ leading medical device and pharmaceutical companies.
**TOTAL SALES FOR TOP 100 INJECTION MOLDERS**

(In billions of dollars)

$27.96 billion for 2015*

Up 5.4% from 2014 → $26.52 billion for 2014*

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**TOP MOVERS**

1. Quantum Plastics LLC
   - Elgin, Ill.
   - $140 million in sales**
   - RANKED #64

2. F&M Tool and Plastics Inc.
   - Leominster, Mass.
   - $82 million in sales
   - RANKED #86

3. Leon Automotive Inc.
   - Grand Rapids, Mich.
   - $200 million in sales
   - RANKED #47

4. EG-Gilero
   - Columbus, Ohio
   - $240 million in sales**
   - RANKED #34

5. Dinesol Plastics Inc.
   - Niles, Ohio
   - $70 million in sales
   - RANKED #93

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**WELCOME TO THE TOP 100**

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**TYPES OF INJECTION MOLDERS**

- Firms public or have public parent companies: 21
- Firms are minority owned (including women owned): 9

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PN’s database of processor rankings is available for download.

Buy this ranking at www.plasticsnews.com/data
Processor Profiles - Injection molders

Newell Brands

Founded in 1902 as Newell Manufacturing Co., the company merged in 1999 with Rubbermaid to create Newell Rubbermaid Inc.

The consumer products company is known for its namesake containers and home products as well as Sharpie pens. The company has about 19,900 employees.

According to Plastics News’ 2016 ranking of injection molders, the company had injection molding sales of $950 million. That total is up $45 million from the previous year. Newell Brands does thermoplastic injection molding at 11 plants. Materials include ABS, HDPE, LDPE, LLDPE, PP, PS, nylon, PC, acrylic and TPE.

As part of its growth strategy, Newell is powering up for global expansion through its merger with Jarden Corp., which was completed in the second quarter of 2016.

“The combination of our two great organizations creates a powerhouse consumer goods company and sets up a very exciting long-term growth and value creation story,” said Michael Polk, Newell Brands CEO. “I am honored to have the opportunity to lead Newell Brands and the development of our business. We expect Newell Brands to unlock far greater upside than either company could have on their own.”

Newell said it expects roughly $500 million in annualized cost savings from the deal over four years, particularly in the areas of distribution and transportation.

Newell is now organized into writing, commercial, tools, baby and home divisions. The merger will bring on board Jarden’s infrastructure in Europe, and help Newell Rubbermaid adapt more nimbly to a shift in customers’ purchasing patterns, Polk said.

Polk also reported moves to broaden Newell’s advertising and bolster the new products pipeline, including more investment in industrial design.

Newell Brands announced in October it would sell about 10 percent of its portfolio and simplify its operating structure as it continues to remake itself after its recently completed $15 billion merger with Jarden Corp.

The company said it was simplifying its operating structure, paring down the existing 32 business units to 16 operating divisions, including by creating a new global companywide e-commerce unit.

In April, Polk told The Wall Street Journal that he was looking to fix or sell the combined company’s underperforming brands. The sales are under way and the company wants to finish them by the first half of next year. Proceeds will be used pay down debt.
AptarGroup

AptarGroup, based in Crystal Lake, Ill., makes dispensing systems used in a variety of packaging for the fragrance/cosmetic, personal care, pharmaceutical, household, food and beverage end markets.

The company has a global footprint with production facilities in North America, Europe, Asia and South America.

According to Plastics News’ 2016 ranking of injection molders, the company had injection molding sales of $735 million. It has eight injection molding plants, and its processes include thermoplastic injection molding. Materials include HDPE, LDPE, LLDPE, PP, nylon and acrylic.

AptarGroup currently operates in three segments: Beauty and home, pharma and food and beverage. The Beauty and Home segment includes operations that sell dispensing systems primarily to the beauty, personal care and home care markets.

The company also manufactures and sells elastomer primary packaging components. These components are used in the injectable market. Products include stoppers for infusion, antibiotic, lyophilization and diagnostic vials.

President and CEO Stephen Hagge said that in 2016, the company has been committed to investing in research and development and in the capital projects necessary to support its long-term growth.

“Certain macro-economic conditions could remain challenging in the near-term, including the stagnation affecting certain markets in Latin America and the global foreign exchange environment,” he said. “However, we will stay focused and execute our strategy and in doing so, continue to help our customers grow their businesses with our innovative dispensing solutions.”

AptarGroup remains committed to its strategic plans which include investment in equipment and acquisitions, to drive growth and profitability.

A particularly eye-catching innovation is Aptar’s new Proteo packaging for the personal care market. The flexible packaging is in itself different from the rigid containers currently in the market, but the dispensing closure is where Aptar comes into its own.

Unlike the screw caps found on bottles, or zip closures on pouches, the Proteo dispensing system slides to open and close. The new system was developed over the course of three years, involving extensive research and global collaboration between Aptar’s different personal care areas.

Aptar claims that Proteo “will change the flexible packaging world with its unprecedented and convenient proposal for the Personal Care market. It aims at consumers who look for convenience by offering a packaging that can easily be kept in a bag or even simply in their pocket”.

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Nypro Inc. runs 13 molding plants in North America and has 41 locations in 14 countries.

In 2013, Jabil Circuit Inc. of St. Petersburg, Fla., acquired the company. Jabil has kept the Nypro name in the health care space, citing the company’s experience and well-known brand.

The company had injection molding sales of $690 million in Plastics News’ 2016 rankings data with 5,000 injection molding employees at 13 plants. It operates 570 presses and has reported annual resin throughput of 193 million pounds.

According to CEO Courtney Ryan, Nypro now operates as one of three divisions within Jabil, mainly focused on packaging and health care markets.

Ryan noted there are key trends that make packaging an attractive market, including on-the-go packaging which is growing to meet consumer convenience.

Approximately 65-70 percent of Nypro’s revenue came from the health care and packaging markets, with the rest coming from its consumer electronics business. Jabil has been in the health care market for 10 years, while Nypro has more than four decades in the industry.

The firm makes plastic parts used in devices that range from cell phones and electric razors to inkjet printer cartridges and personal computers. Nypro’s three global units include Consumer & Electronics, Packaging and Healthcare. Although precision plastic injection molding is Nypro’s core business, the company also offers assembly services to other manufacturers. Major customers include Dell, Nokia and Procter & Gamble.

As part of its business strategy, Nypro stresses that understanding how patients interact with devices, care givers and technology is critical to medical product design and development. Nypro works with leading health-care, pharmaceutical and medical-device companies to design and produce drug-delivery, diagnostic and home-health products.

Beyond its Clinton headquarters, Nypro operates facilities making health-care products in the following places: Asheville, N.C.; Mebane, N.C.; Chicago; Tijuana, Mexico; San Juan, Puerto Rico; Bangalore and Tamil Nadu, India; Shenzhen, Suzhou and Tianjin, China; as well as in Singapore, France, Germany and Ireland.

Nypro now operates as one of three divisions within Jabil, mainly focused on packaging and health care markets. The entire company operates on one enterprise resource planning system.
BWAY Corp.

BWAY is one of the largest manufacturers of rigid metal, plastic and hybrid containers in North America.

The company manufactures and markets containers and packaging primarily for industrial and consumer products, including paints, inks, coatings, chemicals and adhesives, and also markets product to the food and military segments.

Founded in 1989, BWAY was formerly known as Brockway Standard Holdings Corp. and changed its name in February 1996. BWAY Corp. operates as a subsidiary of BWAY Holding Co.

According to Plastics News’ 2016 ranking of injection molders, the company had injection molding sales of $590 million. Global corporate sales totaled $1.45 billion.

BWAY operates 25 plants in the United States and Canada. Materials processed include HDPE, LDPE, LLDPE and PP.

In September, BWAY acquired KLW Plastics, a maker of tight-head plastic containers ranging in size from 1 to 7 gallons and United Nations-rated packaging for the food, chemical and agricultural markets. KLW uses high density polyethylene.

“This business is an excellent fit with the company’s core market, add-on strategy,” noted BWAY CEO Ken Roessler. “In addition to sales growth, this acquisition expands our product offering with innovative new products which further support the Company’s goal of positioning BWAY as the premier supplier for rigid general line packaging.”

BWAY, owned by holding company Stone Canyon Industries LLC, purchased KLW Plastics from KODA Enterprises Group.

BWAY also has increased its emphasis on sustainability in an effort to increase profits. The company makes more than 270 different products from metal, plastic and hybrid materials.

The company also has a number of sustainability initiatives in practice at manufacturing facilities and administrative offices. These include energy conservation, fuel consumption, emissions reduction and water conservation.

As part of its business strategy, BWAY’s plants run all-electric equipment, have processes in place to recycle water and industrial solvents and, over time, have significantly lowered emissions of volatile organic compounds and hazardous air pollutants.

The company has also worked to make containers lighter weight without compromising their capabilities.
Technimark LLC manufactures plastic packaging products for consumer products for a global customer base. The company's capabilities include product design and research and development services, tool engineering services, tooling maintenance, manufacturing, and decoration and assembly services.

The company had injection molding sales of $408 million in Plastics News’ 2016 ranking of injection molders, placing No. 12 on the list. It has more than 3,000 injection molding employees and 338 presses at eight plants, according to the data. Annual resin throughput is 175 million pounds. The company processes ABS, HDPE, LDPE, LLDPE, PP, PS, PVC, SAN/SMA, TPE, nylon, hi-temp thermoplastics, PC, acetal, acrylic and post-consumer resin. Processes include insert molding, co-injection, gas-assisted injection and multishot.

In 2014, the Pritzker Group purchased Technimark.

During the first year of the new ownership structure, Technimark opened a new $5 million manufacturing site in Silao, Mexico, its third in that country. Plans are to eventually expand the current 93,000 square feet to 160,000 as business grows.

Technimark offers technological services, including rapid prototyping, computer-aided design (CAD), industrial product design, raw material testing, product testing, electronic data transfer of CAD data, computer numerical control machining, metrology and sampling.

The company serves various end markets, including medical products, consumer durables, industrial components, proprietary products, and delivery devices, as well as consumer packaging, such as health and beauty, personal care, food/beverage, confectionary, textiles, home care, recreational products and media products.

As part of its business strategy, company officials cite investments in manufacturing technologies, global expansion with existing customers and developing a market leadership position in recycled materials for its growth.

Letica Corp.

Founded in 1968, Letica is a multi-faceted packaging company and maker of plastic packaging, from buckets to cups, some of which use recycled material.

Letica Corp. has estimated total injection molding sales of $395 million according to Plastics News’ 2016 injection molding data. The company has 1,500 injection molding employees and operates 11 plants. It performs thermoplastic injection molding and materials include HDPE and PP, with packaging among its primary end markets.

The company offers plastic and paper packaging products to foodservice organizations, restaurants, and convenience store chains. Its rigid packaging solutions include a range of containers and lids consisting of UN certified containers and lids, tamper evident lids, and value-added lid fitments; and food service packaging products comprise double PE cold cups, paper hot cups, thermoformed plastic cups, injection molded souvenir cups, lids, and food containers.

The company also produces one- to seven-gallon commercial containers, often with multi-color labels. Its end markets include containers/closures, food service, consumer products and recreational/sporting goods.

Letica sells to paint, chemical, and food packaging industries, as well as to building material suppliers, hardware stores, and restaurant outlets nationwide.

The company’s diverse list of customers includes Behr, Benjamin Moore Paints, Sherwin Williams, Burger King, Coca-Cola, Dunkin’ Donuts, Dairy Queen, PPG, Subway and ExxonMobil, among others. The company markets its products through its direct sales team and a network of distributors.
Cascade Engineering Inc.

Cascade Engineering, headquartered in Grand Rapids, Mich., is a manufacturer comprised of eleven strategic business units serving a wide diversity of markets including automotive, commercial truck & bus, solid waste & recycling, furniture, material handling, renewable energy and consulting services.

The company had sales of $360 million, according to Plastics News’ 2016 injection molding rankings. It operates 10 injection molding plants with 48 presses and annual resin throughput of 70 million pounds.

Cascade’s processes include thermoplastic injection molding, insert molding, co-injection, gas-assisted injection and multishot.

Materials include ABS, HDPE, PP, TPE, nylon, hi-temp thermoplastics, acetal and post-consumer resin.

With a core competency in large scale plastic injection molding Cascade Engineering is a global company with 1,200 employees throughout North America and Europe. As one of the largest certified “B” corporations in the world Cascade Engineering is a nationally recognized proponent of sustainable business practices that emphasize the key role business can play in building financial, social and environmental capital.

The company is a 2001 Plastics News Processor of the Year winner.

While profits drive the business at Cascade, CEO and President Mark Miller carries on founder Fred Keller’s triple bottom line mentality of emphasizing people and planet as well. This manifests itself in the company’s active welfare-to-career program, its prisoner-re-entry program and even its division (Triple Quest) that makes water filtration products to provide clean water in third-world countries.

“These programs help us recruit and they also support our culture. So it builds on itself. That also helps with our retention rate, too, not only for folks in those programs but other folks who see this and support it and feel good about where they work,” Miller said.
ABC Group Inc.

A privately owned Canadian company since 1974, ABC Group is one of the world’s leading automotive systems and components manufacturers.

ABC Group Inc. and its subsidiaries, design, develops and produce plastic automotive systems and components for automotive and original equipment manufacturers in Canada and internationally.

According to Plastics News’ 2016 ranking of injection molders, the company had injection molding sales of $322 million. Global corporate sales totaled $955 million.

The company has 1,209 employees at nine injection molding plants with 180 presses.

Processes include thermoplastic injection, structural foam, insert molding, co-injection, gas-assisted injection, multi-shot and reaction injection. Materials include ABS, HDPE, LDPE, PP, PS, TPE, nylon, hi-temp thermoplastics, PC and post-consumer resin.

ABC Group has grown from a single manufacturing facility in Canada into a diversified, vertically integrated plastics company with a global presence.

Packaging is among ABC Group’s primary end markets.

The company covers every facet of plastics processing technologies, systems and components for the global automotive industry, including fuel systems, fluid management, flexible products, interior and exterior systems and air induction systems.

As part of its production strategy, the company’s research and development, materials, design, testing, tooling, machines, processing technologies and secondary assembly systems are all supplied and controlled within the company. The result is faster development, increased design flexibility, improved efficiencies in manufacturing and assembly, significant cost savings and enhanced quality and performance.

ABC Group’s Salflex Polymers Ltd. subsidiary coordinates supply of proprietary and externally sourced materials. The company processes a variety of materials. Its North American manufacturing facilities are in Ontario, Alberta, British Columbia, Michigan, Kentucky and Tennessee. It also has plants in Mexico, Brazil, Spain, Poland and China, as well as offices in Japan and Germany.

As part of its business strategy, the company is looking to China and Japan for its global growth plan.
Silgan Plastics is a unit of publicly held packaging giant Silgan Holdings Inc., a major supplier of metal containers, vacuum closures for food and beverage products, and plastic containers for personal care, health care, household and industrial chemical and food markets.

The company operates seven injection molding plants, which generated $290 million in injection molding-related sales, according to Plastics News’ 2016 data. Throughput at Silgan’s seven injection molding plants is estimated at 146 million pounds per year of resins, with 173 presses in operation. Employment in the sector is estimated at 1,400.

Processes include thermoplastic injection and multishot. Materials include HDPE, LDPE, LLDPE and PP.

Silgan Plastics overall operates 22 manufacturing facilities in the United States and Canada, and processes include blow molding, stretch blow molding and vertical wheel extrusion in addition to injection molding.

Silgan Plastics’ product line includes custom-designed and stock HDPE containers for personal care and health care products; household and industrial chemical products; and pharmaceutical products. It also makes plastic tubes primarily for personal care products.

Other plastic products include containers, closures, caps, sifters and fitments for food, household and pet care products and crafts supplies, as well as thermoformed plastic tubs for personal care and household products, and multilayer microwaveable and retortable plastic bowls for food products.

The company provides design, development and technology support.

Silgan uses a full range of resin material, primarily in pellet form, such as virgin HDPE, virgin PET, recycled HDPE, recycled PET, polypropylene and, to a lesser extent, polystyrene, low density polyethylene, polyethylene terephthalate glycol, PVC and medium density polyethylene.

Silgan Plastics, the subsidiary based in Chesterfield, Mo., in early 2015 kicked off construction of two new facilities, one in North East, Pa., and the other in Hazelwood, Mo.

The Pennsylvania facility went online during the third quarter of 2015, and the Missouri site was up and running at the start of 2016.
Processor Profiles - Injection molders

WestRock Co.

In January 2015, MeadWestvaco Corp. announced a merger with Rock-Tenn Inc. that created a new company with nearly $16 billion in annual total sales.

While the vast majority of that revenue will come from paper-based packaging, there’s still a chunk of the newly combined company operating in the plastics packaging sector. Combining the companies is expected to yield $300 million in annual savings after three years, the companies said.

WestRock manufactures and markets packaging dispensers and sprayers internationally and it serves cosmetic, fragrance, personal care, pharmaceutical, household and garden, and automotive and industrial markets.

Its injection molded products include trigger sprayers and dispenser pumps, as well as dispenser components, such as tubes and springs.

The company had estimated North American injection molding sales of $280 million, according to Plastics News’ 2016 injection molding rankings data. It has four injection molding plants and 1,600 employees.

The company does thermoplastic injection and materials include HDPE and PP.

Prior to the merger, MeadWestvaco Calmar was formerly known as Saint-Gobain Calmar Inc. Founded in 1946, the company is based in Grandview, Mo. It has operations in Africa, the Asia-Pacific, Europe, and North and South America.
**TOP PLANT LOCATIONS**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>40</td>
</tr>
<tr>
<td>Illinois</td>
<td>31</td>
</tr>
<tr>
<td>Ohio</td>
<td>40</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>31</td>
</tr>
<tr>
<td>Texas</td>
<td>27</td>
</tr>
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</table>

**INDUSTRIAL BLOW MOLDING SALES TOTAL BY YEAR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
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<tr>
<td>Sales (in millions)</td>
<td>$3,473.40</td>
<td>$3,878.20</td>
<td>$4,186.20</td>
<td>$4,413.20</td>
<td>$4,673.90</td>
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</tbody>
</table>

**BOTTLE BLOW MOLDING SALES TOTAL BY YEAR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (in millions)</td>
<td>$12,654.50</td>
<td>$13,337.10</td>
<td>$13,797.80</td>
<td>$13,351.80</td>
<td>$13,560.70</td>
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</tbody>
</table>

**END MARKETS**

- **73** Industrial/Agricultural Chemicals
- **60** Other Food
- **63** Medical/Pharmaceutical
- **56** Motor Oil/Car-Care Products
- **65** Household Chemicals

**NUMBER OF EMPLOYEES AND MACHINERY**

- **32,248** Total Employment (105 Firms)
- **3,482** Total Machines (110 Firms)

**MATERIALS USED**

- HDPE Copolymer (HAC)
- LDPE
- HDPE Homopolymer
- PP
- PET
- HIPS
- PVC
- Polystyrene

**NUMBER OF FIRMS**

- Industrial/Agricultural Chemicals: 73
- Other Food: 60
- Medical/Pharmaceutical: 63
- Motor Oil/Car-Care Products: 56
- Household Chemicals: 65

**BY YEAR**

- 2011: $3,473.40
- 2012: $3,878.20
- 2013: $4,186.20
- 2014: $4,413.20
- 2015: $4,673.90
Processor Profiles - Blow Molders

Graham Packaging Co. LP

Graham Packaging Co. designs and manufactures bottles for packaging applications. It offers PET containers, and polyolefin and decorative bottles.

The company offers its products for food, beverage, household, auto/chemical, personal care, and healthcare industries in the United States and internationally.

Graham Packaging was founded in 1994 and is based in Lancaster, Pa. The company has international locations in China, Europe and Mexico. It became a wholly owned subsidiary of New Zealand-based Reynolds Group Holdings Ltd. in 2011.

The company, the largest blow molder in North America, had blow molding sales of $2.7 billion, according to Plastics News’ most recent ranking of blow molders. All of that total was from bottles.

Graham Packaging has 6,700 employees and 71 plants.

Processes include continuous shuttle monolayer, continuous shuttle coextrusion, continuous rotary wheel monolayer, continuous rotary wheel coextrusion, intermittent reciprocating screw monolayer, intermittent accumulator head monolayer, Injection blow single machine process, stretch blow single machine process, stretch Blow separate preform production process.

Materials include HDPE copolymer, HDPE homopolymer, PET, PP, PVC and LDPE.

As part of its business strategy, Graham Packaging earlier this year opened a new 245,000-square-foot blow molding facility dedicated to containers for Sun Products Corp.’s line of fabric and dish care products made in Bowling Green, Ky.

Graham spent $22 million on the new facility on land provided by Sun, which owns brands such as All, Snuggle, Wisk, Surf and Sunlight.

The total value of the project is $31.5 million, including private development of the new building worth $9.5 million.

The company also focuses on sustainability by minimizing its environmental impact. It also works to provide sustainable solutions throughout its supply chain.

Graham is one of the world’s largest suppliers of bottle-grade recycled plastics. Fifty million pounds of its post-consumer resin comes from its Graham Recycling Center in York, Pa. And millions of the company’s containers come from recycled plastic alone each year. Recycling saves vast amounts of energy and natural resources, diverting hundreds of millions of pounds of plastic from landfills and substantially reducing greenhouse gas emissions.

In March, Graham Packaging moved its global headquarters from York County, Pa., to Lancaster County, Pa.
Amcor Rigid Plastics is a unit of Amcor Ltd. and calls itself one of the world’s largest makers of plastic packaging for food, beverage, spirits, personal and home care, and health care. The company has 58 locations in 12 countries.

The company produces containers for carbonated beverages, water, juices, teas, and sports drinks; and narrow- and wide-mouth PET containers for condiments, dressings, oils, spreads, sauces, and other foods. It also provides PET containers for pharmaceutical manufacturers, as well as for personal care products, such as soaps, lotions, hair care, and other liquids.

Amcor had blow molding sales of $2.2 billion in Plastics News’ most recent ranking, holding the number two spot.

The company has 29 plants in North America, according to Plastics News data.

Processes include continuous shuttle monolayer, continuous shuttle coextrusion, continuous rotary wheel monolayer, continuous rotary wheel coextrusion, injection blow separate preform production process, stretch blow single machine process, stretch blow separate preform production process.

Materials include HDPE copolymer, PET, PC and post-consumer resin.

As part of its business strategy, Amcor Rigid Plastics announced it is launching a new business approach designed to give the same kind of services to smaller beverage companies that the container maker currently provides the big players in the industry.

The company’s UpStart program includes a network of four locations in the United States to serve lower volume or niche companies.

Smaller beverage companies, with their lower volumes, can find it difficult to pay for the tooling required to create a unique package for their products. One way around that economic hurdle is to use stock bottles with customized labels to help build a brand identity. But Amcor Rigid Plastics said UpStart can lower tooling and equipment costs by up to 75 percent by changing its approach for these smaller companies.

The key is using smaller cavitation systems, because these smaller companies do not need the volume of their larger brethren.

In September 2016, Amcor announced it was purchasing Sonoco Products Co.’s blow molding operations for $280 million.

The move includes seven manufacturing plants — six in the United States and one in Canada — that have sales of $210 million annually, Amcor said. Sonoco said the sites produce containers for the personal care and food and beverage markets.

“The combined assets and talents of Amcor Rigid Plastics and Sonoco will allow us to meet strategic customer growth objectives while expanding our extrusion and injection molding assets and adding advanced decorating capabilities,” said Mike Schmitt, president of Amcor Rigid Plastics based in Ann Arbor, Mich.
Plastipak Packaging Inc.

Plastipak Packaging blow molds containers for the food, beverage, and consumer products industries. It provides plastic rigid containers for salad dressings, mayonnaises, sauces, and grated cheese, as well as beverage containers and bottles.

Founded in 1967, the company also offers heavy-duty, liquid laundry detergent containers, and household cleaners, as well as health, personal care, multiple size mouthwash, hand soap, and distilled spirits containers. The company also provides containers for processed foods and drinks, such as coffee creamers, relishes, vegetable oils, and sports drinks and juices.

Plastipak had sales of $1.8 billion, according to Plastics News’ most recent blow molders ranking. It operates 17 North American plants.

Globally, the company now has more than 37 sites and more than 5,000 workers in the United States, South America and Europe.

Continuous shuttle monolayer, continuous shuttle coextrusion, continuous rotary wheel monolayer, continuous rotary wheel coextrusion, intermittent reciprocating screw monolayer, intermittent reciprocating screw coextrusion, injection blow separate preform production process, stretch blow single machine process, and stretch blow separate preform production process.

Materials include HDPE copolymer, HDPE homopolymer, PET, PP and post-consumer resin.

As part of its business strategy, Plastipak Packaging Inc. earned a cool $1 million in rebates from for its packaging factory in Jackson Center, Ohio. Plastipak Packaging boosted the energy efficiency of its heating, ventilation and air conditioning system, compressed air and motors and drives, and in turn, scored a rebate for the efforts.

The company in 2015 announced it would invest $9 million to expand a manufacturing facility in Louisiana. They added three PET product manufacturing lines at its Pineville, La., location, the Plymouth, Mich.-based company said.

The company also has grown through acquisition. In 2015, it finalized the acquisition of Artenius PET Packaging Europe, or APPE.

APPE has been rebranded Plastipak Packaging, the company said.

“The acquisition significantly strengthens Plastipak’s position in Europe and provides a solid platform for further growth into surrounding regions,” Plastipak Packaging CEO William Young said in a statement. “The combination of the strong leadership teams of both companies, positions Plastipak to be the global leader in rigid packaging.”

In August, the company announced it is adding two new lines to the company’s plastic bottle manufacturing facility in McCalla, Ala.

The $10.4 million project will create at least five new jobs on top of the 117 people who already work at the site near Birmingham.
Consolidated Container Co. LLC manufactures and supplies rigid plastic packaging solutions.

It offers bottles and containers, as well as rigid plastic containers made from polyethylene resin. The company serves dairy, water, beverage, food, specialty chemical, automotive, and nutrition markets. It offers its products through distributors in the United States and internationally.

Consolidated Container had sales of $820 million, according to Plastics News’ most recent ranking of blow molders, holding the No. 7 spot on the list.

Processes include continuous shuttle monolayer, continuous shuttle coextrusion, continuous rotary wheel monolayer, continuous rotary wheel coextrusion, intermittent reciprocating screw monolayer, intermittent reciprocating screw coextrusion, intermittent accumulator head monolayer, intermittent accumulator head coextrusion, injection blow separate preform production process, and stretch blow separate preform production process.

Materials include HDPE copolymer, HDPE homopolymer, PET, PP, PC, PVC and LDPE. As part of its business strategy, Consolidated Container recently partnered with Milacron Holdings Corp.’s Uniloy business unit to develop a new, lower-weight family of milk jugs, in gallons, half-gallon and other sizes: Dura-Lite.

Other attributes of Dura-Lite include improved strength, consumer appeal and compatibility with the supply chain.

The container has radiuses, symmetrical ribs and angles that work together to reduce weight without sacrificing bottle performance or aesthetics.

The containers began hitting retail shelves in early 2016. Because of an exclusivity agreement between Milacron and Consolidated Container, Dura-Lite containers are available only through Consolidated.

As part of its growth strategy, Consolidated Container filled in a gap in its footprint in October 2015 with acquisition of the assets of blow molder Precision Plastics Inc. in Chippewa Falls, Wis.

“We can easily integrate those size deals into our systems and processes,” said Pete Bitter, vice president of finance.

The bolt-on acquisition “to our core business is in a strategic location with a strategic customer base,” Bitter told Plastics News.

Primarily, the site supplies high density polyethylene containers to the bottled water market for the dairy industry.

Chippewa Falls becomes Consolidated’s 55th rigid package manufacturing plant. Consolidated’s other upper Midwest blow molding plants are in Harvard, Ill., and Moorhead, Minn.

Also in 2015, Consolidated, which acquired Envision Plastics LLC and Ecoplast Corp. in June 2014, announced a reorganization of the two companies to ensure current and future growth expectations.

In April 2015, Consolidated became the principal U.S. manufacturer of rigid thin-walled high density polyethylene bottles using Baritainer technology.

Barrier Plastics Inc. and Consolidated Container kicked off what the companies call a strategic manufacturing partnership focused on bringing new types of barrier bottles to the market.
CKS Packaging Inc.

CKS Packaging Inc. manufactures, supplies, markets, and sells blow-molded plastic containers.

The company offers HDPE, PP, PVC, and PET plastic bottles and containers for food, juice, water, dairy and other end markets.

It also provides labeling services.

The company was founded in 1985 and is based in Atlanta, Ga., with additional locations in Hollywood, Orlando and Winter Haven, Fla.; Atlanta and Mableton, Ga.; Kansas City, Mo.; Canton, Miss.; Arden, Graham and Mooresville, N.C.; Charleston, S.C.; and Dallas and Fort Worth, Texas.

CKS had sales of $375 million, according to Plastics News’ most recent ranking of blow molders, ranked No. 12 on the list. All of its sales come from bottles.

The company now has 21 manufacturing plants and about 2,000 employees with 300 blow molding machines, according to Plastics News data. It reports annual resin throughput of 3 million pounds.

Processes include continuous shuttle monolayer, intermittent reciprocating screw monolayer, intermittent accumulator head monolayer and stretch Blow single machine process.

Materials include HDPE copolymer, HDPE homopolymer, PET, PP, PC, PVC, LDPE and TPE. The company also can provide labeling services including sleeving, glue on labels or paint/ink labeling.

CKS has made sustainability a component of its business strategy. It is continuing to create new approaches to packaging, including PCR and educating itself on bio-based resins and biodegradable materials. This reduces the company’s waste in landfills and uses renewable sources creating environmentally friendly packaging.

The company’s offices are striving to use earth-friendly items and recycling when it can. In addition, CKS is in the process of integrating a new electronic system to reduce the energy and waste of printed materials.
Western Container Corp. is a high performance company dedicated to being the premier manufacturer of PET containers for the Coca-Cola Bottling System.

The company was established in 1979 by a group of Coca-Cola Bottlers who acted on the long-term need to offer a central distribution point and a reliable source of high quality low-cost plastic bottles.

According to the company, it currently has 480 employees at five manufacturing plants and its corporate headquarters. In 2013 Western Container produced 5.8 billion units. The company has 36 injection molding machines and 20 blow molding machines at its facilities.

As part of its business strategy, Western Container Western Container and Coca-Cola have taken steps to reduce their carbon footprint by reducing the amount of raw material needed to produce their bottles. This serves the dual purpose of sustainability while reducing costs.

The company also has focused on maintaining its position as a technology leader in the packaging industry. It focuses on achieving production volumes sufficient to ensure stability of supplies of raw materials.

Western Container also has developed close ties and collaborative relationships with equipment manufacturers. This commitment has resulted in Western Container leadership during industry advances in both blow molding and injection technology with Western Container maintaining highly efficient plants that employ state-of-the-art technology. Additionally, the company strives to enhance shareholder value by ensuring a dependable source of high quality, low cost plastic bottles.
Ring Container Technologies Corp.

Ring Container Technologies is a privately held, multinational corporation focused on finding sustainable solutions for the consumer packaging industry. It manufactures PET and HDPE plastic packaging containers for the food and beverage end markets.

Ring had sales of $287 million, according to Plastics News’ most recent ranking of blow molders, holding the No. 14 place on the list. All of its sales come from bottles. The company has 19 blow molding plants, according to Plastics News data.

Processes include continuous shuttle monolayer, continuous rotary wheel coextrusion, intermittent reciprocating screw monolayer, stretch blow single machine process and stretch blow separate preform production process.

Materials include HDPE copolymer, HDPE homopolymer and PET.

Ring Container also recycles and provides polystyrene products, such as resins, recycled molding beads, polystyrene loose-fill, engineered expandable polystyrene products, filler beads, and miscellaneous gassed products worldwide.

In addition, the company also offers technical support services, such as package design, product quality, manufacturing technology and a technical center.

As part of its business strategy, the company has grown organically. It recently invested nearly $8 million in a facility in South Carolina.
Mauser USA LLC

Mauser Group is a worldwide producer of industrial packaging.

The company had sales of $285 million, according to Plastics News’ most recent ranking of blow molders, placing it No. 15 on the list.

Founded in 1896 and headquartered in Bruehl near Cologne, Germany, the company has influenced the international market through innovative packaging technologies. The company has 650 blow molding employees at 11 North American plants, according to Plastics News data. It reports annual resin throughput of 230 million pounds and processes HMWHDEPE.

Processes include continuous shuttle coextrusion, intermittent accumulator head monolayer and intermittent accumulator head coextrusion.

Mauser primarily serves the beverage and food end markets employing about 4,500 staff globally.

In addition, it sells and licenses blow-molding technology, machines, systems, and products to licensed partners.

As part of its business strategy, the company has grown through acquisition. In March 2016, Mauser acquired Berenfield Containers.

Mauser also has a reconditioning subsidiary, National Container Group. The subsidiary was founded in 1988 in North America where it established the first nationwide recollect service for IBCs.

The company’s recollect service has been expanding continuously since then and today operates a comprehensive network of strategic locations for a worldwide recollect service.
Pretium Packaging LLC

Pretium Packaging is a provider of custom rigid plastic packaging solutions. It designs, manufactures and sells rigid plastic bottles and containers for food, personal care, household products, healthcare, and pharmaceutical end markets in the United States and Canada.

Pretium is a portfolio company of Genstar Capital.

It provides polyethylene terephthalate (PET) bottles and containers, including salad dressing containers; peanut-butter jars; pickle jars; wide-mouth containers for snack food; bottles for juices, sauces and jellies; liquor bottles as well as stock bottles.

Pretium Packaging had sales of $285 million, according to Plastics News’ most recent ranking of blow molders, placing it No. 15 on the list. All of its sales were for bottles.

According to Plastics News data, the company has 1,230 blow molding employees at 14 blow molding plants in North America with 240 blow molding machines.

Pretium also offers a variety of secondary operations—in-mold labeling, shrink sleeve, silk screening, dry-offset printing, and heat-transfer decorating.

Processes include continuous shuttle monolayer, continuous shuttle coextrusion, continuous rotary wheel monolayer, continuous rotary wheel coextrusion, intermittent reciprocating screw monolayer, intermittent reciprocating screw coextrusion, intermittent accumulator head monolayer, intermittent accumulator head coextrusion, injection blow single machine process, stretch blow single machine process, stretch blow separate preform production process.

Materials include HDPE copolymer, HDPE homopolymer, HMWHDE, PET, PP, PVC, LDPE and post-consumer resin.

Pretium utilizes its national manufacturing footprint, design and engineering capabilities and full range of process capabilities to provide customized solutions to customers mainly in the food & specialty beverage end market.

In February 2016, Pretium appointed Paul Kayser as its new president and CEO. Previously, he was president of Jabil Circuit Inc.’s Nypro Packaging arm. He was instrumental in getting Nypro into packaging in 2005 and was named president of the division in 2008.

Under his leadership, Nypro Packaging grew to nine locations in the United States, Mexico and Europe.

A versatile blow molder, the company leverages its primary design skills and flexibility in production to reduce production time windows. It also has invested in automation. As part of its business strategy, the company has grown through acquisition.

In July 2016, it purchased Custom Blow Molding, with locations in Escondido, Calif., Carrollton, Texas, and Aurora, Ill.

CBM is a major rigid packaging supplier for the sports nutrition and supplement industries in North America.

Alpha Packaging manufactures high-quality bottles and jars made from polyethylene terephthalate (PET), high-density polyethylene (HDPE), polypropylene (PP) and polylactic acid (PLA) for the food and beverage and other markets.

Alpha Packaging is a portfolio company of Irving Place Capital.

The company manufactures stock and custom containers in a variety of styles and colors, all available with very short lead times.

Alpha Packaging had sales of $245 million, according to Plastics News’ most recent ranking of blow molders, holding the No. 17 spot on the list. All of its sales were for bottles.

According to Plastics News data, the company has 885 employees at seven blow molding plants with 176 blow molding machines. It processes 109 million pounds of resin throughput annually. The company’s capabilities include superior-quality injection and injection stretch blow molding, as well as extrusion blow molding. It recently added PVC to the list of resins processed, for products that are not compatible with other plastic resins.

As part of its operation strategy, Alpha Packaging also features in-house engineering and tool-building departments that work with customers in a six-step process to bring ideas “from art to part,” for a variety of manufacturing processes including injection stretch blow molding, reheat and blow molding, injection blow molding and extrusion blow molding.

Alpha Packaging’s current footprint includes eight manufacturing locations, a technograph container decorating facility and a warehouse in southern California with more than 190 items in stock and available by the pallet.
Doing our part from pellet to package

Years ago, a team of Conair specialists was created to serve the packaging market exclusively. Since then, they developed specialized equipment and systems for mono-layer and co-extrusion of film, sheet, bottles, PET packaging, thermoformed sheet and other niches in the industry. Big system or small, Conair’s broad-based equipment know-how, organizational depth, process expertise and well-defined procedures get you from pellet to package, on-time, on-budget and on-spec.

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clearer...
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