



Five Ways Food Packaging OEMs Can Innovate Projects

Learn about the key design and engineering strategies you must use to address today's end user challenges in food and beverage packaging



ENGINEERING YOUR SUCCESS.

5 Ways Food Packaging OEMs Can Innovate Projects

Author: Ted Moyer
Global Platform Manager -
Fluid Connectors Group,
Parker Hannifin Corporation



Food manufacturers are under pressure to balance multiple challenges in how they package their products to remain competitive in a world with so many product choices. Smart companies know they can use packaging to help differentiate their brands, as well as to conserve resources, cut costs, and of course, preserve the quality of foods and beverages.

To answer these concerns, end users depend to some extent on the packaging OEMs that supply their machinery. OEMs that are attentive to these needs and willing to innovate to address them stand to gain more business in the growing packaging machinery market.

Background Forces

Is the market for food and beverage packaging machinery really growing? If so, why? [The Association for Packaging and Processing Technologies \(PMMI\)](#) examines these questions in its 2016 report, [“Global Trends Impacting the Market for Packaging Machinery.”](#)

In the report, PMMI cites statistics from [IHS Markit](#), indicating that the world market for food packaging machinery could grow by approximately 14% from 2014 to 2019, to a level of around \$31 billion (figure 1.1).

A key reason for this growth, PMMI notes, is the phenomenon known as “SKU proliferation.” SKU, the acronym for “stock keeping unit,” refers to a distinct item for sale at the retailer level. As PMMI reports, food and beverage packaging continues to grow in terms of size, variety and styles available. The number of the distinct items for sale, or SKUs, have in fact grown dramatically in recent years. The average grocery store now carries around 42,200 different items, a level that is close to three times the number of items food retailers carried back in 1980, according to figures from the [Food Marketing Institute](#).

Want to know
more?

[Speak with an engineer
who can share
equipment insights.](#)

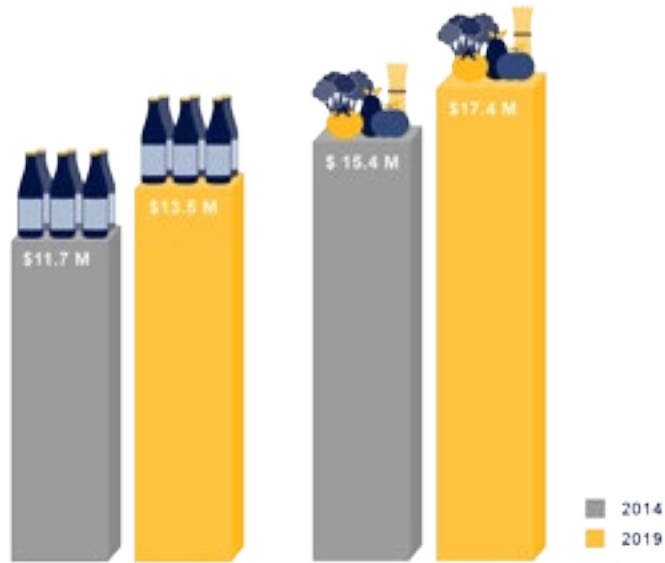


Figure 1.1

PMMI cites statistics from IHS Markit, indicating that the world market for food packaging machinery could grow by approximately 14% from 2014 to 2019, to a level of around \$31 billion.

Retailers, food manufacturers and consumers all are driving this proliferation trend, PMMI points out. At the retailer level, North American retailers are leveraging their significant purchasing power to demand packaging that appeals to consumers and decreases storage space and distribution costs.

Another related factor is the growth of private-label food products, which has spurred manufacturers further to differentiate their products by modifying content, packaging and portion sizes.

Consumers also demand more variety of product proportions and variants, such as different flavors, versions and sizes. All of these factors drive the need for upgraded or new machinery.

Separate from SKU growth, but also driving equipment investment, is the fact that retailers, food manufacturers and consumers want packaging that is considered environmentally sustainable in terms of its ability to be recycled and by minimizing the amount of packaging material required. Moving in this direction also requires end users to modify or upgrade their machinery.

Related to these forces is the growth of flexible packaging materials, such as pouches and bags that are displacing rigid packaging types such as cartons and bottles. Flexible packaging materials are generally lower cost and lighter in weight, and they may reduce the number of manufacturing steps required. However flexible packages often cannot be filled or handled with the same machinery designed for rigid packaging types, which is another reason end users have to upgrade their equipment.

As flexible packaging grows in popularity, the market for filling and closing machines to handle this type of material also will increase, PMMI says. The association cites figures from IHS Markit illustrating this growth. The world market for form, fill and seal machinery, will increase by close

Looking for assistance?

[Speak with an engineer who can implement your ideas.](#)

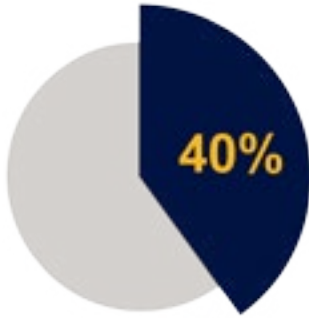


Figure 1.2

40% of food company packaging and processing engineers said they had to make new investments to ensure compliance with the FSMA.

to 19% from 2014 to 2019, to a level of around \$5.1 billion, according to the IHS Markit forecast.

The bottom line is that offering more packaging options, whatever the reason, requires end users to update packaging equipment to offer this variability.

Another trend affecting the market for packaging machinery is greater attention on food safety during the packaging process. As evidence of this trend, PMMI notes in its Global Trends report that 40% of food company packaging and processing engineers surveyed said they had to make new investments to ensure compliance with the [Food Safety Modernization Act \(FSMA\)](#) (figure 1.2).

While those new investments may be occurring in a variety of areas, OEMs and their customers will initiate some of these upgrades and changes through engineering design and component selection.

When it comes to fluid control components, pneumatics, filtration and connectors used for packaging, safety innovations may result in reduced contamination of products, machinery that's easier to clean, and packaging technology designed to preserve food quality.

Along with the desire for safer packaged foods and beverages and more flexible machinery, OEMs are also pressed to deliver their solutions within shorter time frames. What's more, these solutions must be more productive and more cost-efficient while also contributing to end users' sustainability goals. It's up to OEMs, who specialize in this sort of engineering expertise, to address all of these concerns when they design their equipment.



Need machinery ideas?

[Speak with an engineer who can help with your project.](#)

Real Opportunities

Research and industry interviews show, OEMs of packaging machinery are in a unique position to capture increasing sales by helping end users address five key packaging line demands:

- 1. Flexibility:** Packaging machinery with more changeover capability that will allow end users to package different SKUs on the same line by way of simple, easy and fast equipment modifications.
- 2. Speed/Automation:** Greater processing speed overall as well as greater throughput speeds.
- 3. Sustainability:** Packaging processes that are more environmentally sustainable.
- 4. Lower Cost:** Packaging processes that are more efficient in terms of space, energy use and overall cost.
- 5. Food Safety:** Packaging solutions that help to reduce the risk of contamination, comply with more stringent regulations and directives, and/or incorporate technologies for preserving shelf life.

But how can OEMs design systems that effectively address all five goals? The answer lies in strategic machinery and component selection aligned with supplier engineering support to navigate what is largely uncharted territory for OEMs.



Builds That Boost Flexible Processes

Considering the rise in SKUs of food and beverage products, it's not surprising that food manufacturers also want packaging machinery they can easily modify to package different SKUs on the same line.

Glen Long, senior vice president of PMMI, points out, "There's a huge emphasis on ease of changeover and speed of changeover because of the proliferation of SKUs." Long says many end users now want modular machines that can be readily adjusted to handle multiple tasks, which prevents them from having to buy a whole new machine for every new product.

At the basic level, OEMs should employ pneumatically driven systems to automate packaging machinery adjustments that previously were performed manually, thereby improving changeover time. Going a step further, even pneumatic components themselves can be selected because of their ability to be easily adjusted or indexed for different applications.

To help provide this capability, OEMs have a number of tools at their disposal. When it comes to pneumatically driven equipment, OEMs can select and configure pneumatic cylinders to serve as variable position systems. This allows a single process design to accommodate different packaging configurations. The end user has the ability to change start and stop points either electronically or manually via indexed cylinder adjustments.

"There's a huge emphasis on ease of changeover and speed of changeover because of the proliferation of SKUs."
Glen Long, Senior Vice President, PMMI

Designing a new build?

[Speak with an engineer who can share equipment strategies.](#)

Incorporating modularity, by way of “plug and play” components and assemblies, is another way OEMs can build more flexibility into their packaging machinery. For instance, OEMs can configure modular, stackable pneumatic control valves and manifolds to handle multiple functions or offer multiple pressure capability on a single island.

Another modular solution is incorporating multi-purpose quick couplings, which make it possible for end users to connect and disconnect fluid or gas lines quickly and easily. Similarly, pneumatic fittings, manifolds and flow controls offering push-to-connect capability simplify the changeover process by minimizing the need for tools.

At the core of these and other flexibility enhancements is working with equipment suppliers and their applications engineers who recommend specific, customized solutions and can manufacture non-standard parts and cylinders tailored for the end user’s applications and changeovers.



Automating Processes and Adding Speed

End users increasingly expect OEMs to both design and install their packaging machinery faster. And they expect that the ongoing maintenance required for these new systems be less time-intensive as well.

Additionally, end users expect their equipment to perform reliably, more of the time, and to be more productive in terms of increased throughputs.

The focus on speed remains clear even as end users work to add new product variations to the mix. Wayne Labs, senior technical editor of *Food Engineering*, observes, “End users/brand owners are looking for faster and faster turnarounds to package more and different types of SKUs.”

Fortunately for OEMs, there are a number of ways to provide this added speed. Three major approaches are streamlining overall system development, speeding up install time, and automating more tasks to achieve increased throughput.

Design and Installation Speed

According to PMMI’s Packaging Trends report, food companies say their main equipment challenge is ensuring that it can keep up with new packaging needs. Food companies also are concerned about the possibility of having long lead times for spare parts, and they’d like to increase the speed of older machinery.

Therefore, it’s no surprise that end users are increasingly interested in how fast OEMs can design and install their packaging machinery. They also expect OEMs to provide equipment that doesn’t slow them down when it comes to service, replacements and maintenance.

Need faster washdowns?

Speak with one of our engineers for suggestions.



To address these concerns, OEMs can cover a lot of ground by incorporating modular components that can be configured in unlimited ways to serve a variety of applications.

For example, OEMs may opt to use the same basic cylinder and valve system across different builds, but tailoring the options for each application. Modular linear drive systems allow OEMs to use the guidance and control modules that suit each application's needs. The actuators at the core of the system are essentially functional building blocks to which all of the modular options are directly attached, making these systems simple to install and retrofit. Similarly, modular pneumatic valve manifolds also save design and installation time, allowing multiple functions to be configured and controlled from a single island, simplifying the time it takes to adjust the valves.

Modular assemblies such as these allow OEMs to take advantage of their familiarity with that component when it comes to equipment installation, troubleshooting and end user training. They also can be quickly swapped out in case maintenance is needed.

The equipment vendor's ability to design, prototype and validate assemblies also shorten the design cycle, leading to faster implementation overall. Vendors with broad manufacturing capabilities and multiple manufacturing sites also will provide faster production and delivery time.

Washdown speed is another area where OEMs can help end users save time, because cleaning time during changeovers is arguably one of the most time-intensive aspects of the changeover process. Installing components that are designed and constructed for aggressive washdowns is the best plan of attack. OEMs should look for smooth, seamless designs and push-to-connect components, which have fewer crevices where contaminants could hide. They should also select parts constructed of materials that are chemically compatible with washdown agents.

Moving to modular?

[Speak with an engineer who can identify options.](#)

A further speed consideration that offers significant impact is partnering with suppliers that offer strong and broad global distribution networks. This benefits OEMs and their customers because data is shared from location to location, eliminating confusion. In addition, strong distributor partners will offer more comprehensive inventories of replacement parts and may be willing to inventory specialty parts.

Throughput Speed

According to another 2016 PMMI survey of food industry professionals, “[Food Packaging Trends & Advances](#),” the automation of a process that used to be done manually is one of the top reasons for U.S. food manufacturers to invest in new equipment. In this area, companies often are looking to replace manual labor for repetitive tasks. Particularly helpful equipment investments here center on systems that handle flexible packaging as well as secondary packaging processes.

Some of the specific packaging functions where OEMs will find opportunities to automate manual tasks include multi-single use packaging, such as for meats and poultry, carton erecting and palletizing systems.

When it comes to increasing throughputs by speeding up a process that has already been automated, OEMs should consider specific pneumatic refinements to boost packaging speeds. For example, advanced flow control in specific packaging processes lead to faster movements, finer speed adjustments and enhanced production rates.

Nontraditional valve-actuator combinations may be another way to increase processing speeds. OEMs should consider using decentralized, distributed valve-actuator combinations located at the points of use, as opposed to centralized multiple-valve manifold configurations. This strategy increases processing speed by providing more discrete control over a specific actuator’s speed than with traditional centralized configurations.



Sustainable Packaging Machinery

End users continue to seek packaging process machinery that promotes sustainability, both in terms of the packaging material itself and by way of the equipment they install. Besides the fact that a growing number of consumers desire more sustainable packaging materials, food companies also are working to reduce packaging weights and reduce waste of packaging materials, PMMI points out.

Ben Miyares, packaging market trends analyst and president of the Packaging Management Institute, confirms this finding in a recent [Packaging World](#) article on packaging managers and sustainability: “Many have come to realize that sustainable packaging development and

Want to boost performance?
[Speak with an engineer who can share equipment insights.](#)

“Many have come to realize that sustainable packaging development and production of lightweight, less costly to ship and easier to open/reclose flexible packages can pay both economic and environmental dividends.”

Ben Miyares, President,
Packaging Management
Institute

production of lightweight, less costly to ship and easier to open/reclose flexible packages can pay both economic and environmental dividends,” he writes.

When it comes to packaging material, many of the latest equipment investments have in fact centered around equipment that can handle lightweight and/or flexible packaging types.

Pneumatically driven components are vital in this area, allowing for upgrades of older pneumatically driven machines built for rigid or heavier packaging materials. By upgrading these lines to handle lighter or more flexible materials, equipment costs can be reduced in comparison to wide-scale replacement, while at the same time filling the end user’s demand for more sustainable packaging options.

More compact equipment designs also greatly promote sustainability, because they translate to reduced surface area, which leads to reduced use of cleaning agents, water and the energy needed for washdowns. Equipment solutions that naturally lead to more compact design, include tubing and hoses constructed of materials that provide a tighter bend radius, allowing OEMs to design greater utility in less space. Additionally, OEMs may employ micro pneumatic valve systems, designed to maximize valve density, as well as the use of rodless pneumatic cylinders, to help facilitate compact equipment design.



Lower Cost Machinery and Design

Packaging machinery companies continue to place a high value on engineering maximum performance into their designs, but they’re often forced to compromise some performance during the negotiation phase.

According to PMMI, competition for new equipment sales in the U.S. often comes from machinery providers who can offer food companies lower cost equipment, but in many cases this lower cost comes with higher risk in terms of post-sales service and support.

This means OEMs committed to building loyalty and trust with end users should find ways to help them manage their costs and prevent the loss of performance at the same time.

An example of this value strategy is incorporating long-life, premium quality cylinders into pneumatic machinery. Low-cost cylinders are notorious sources of failures and downtime, which end up increasing maintenance costs as well as downtime over the long run. Using dependable, high-performance cylinders then becomes a lower cost, higher value proposition.

The strategy of compact equipment design also will help control costs, because it allows OEMs to maximize their use of space. Packaging

**Challenged by
an upgrade?**

[Contact us to help you
troubleshoot.](#)



machinery designed to fit within an end user's existing space constraints eliminates the need for renovation or new construction, which may be cost-prohibitive. Selecting modular components such as pneumatic cylinders, valve systems and connectors is a key tactic, leading to more efficient space utilization through greater design flexibility in constricted spaces.

While the compressed air systems that power pneumatic packaging lines are viewed as costly to operate, there are opportunities to cut costs here too. By implementing flow control, check valves and other reduced-pressure cylinder configurations, for example, OEMs can reduce the amount of air that is consumed by operations not integral to the packaging process, such as return movements.

Another innovative cost-cutting measure, which some OEMs might not have considered, is harnessing efficiencies simply by reducing the number of vendors they work with. Two immediately apparent benefits relate to purchasing and warranties. By narrowing the field of suppliers, OEMs can issue fewer purchase orders, which in itself costs both time and money. They also may be able to secure better overall warranty coverage on their builds, based on the premise that equipment suppliers are more likely to stand behind systems and assemblies that use only their parts and assemblies.



Ensuring Food Safety

Packaging machinery innovations that reduce the risk of contamination in foods and beverages are particularly in demand in light of today's more stringent food quality environment and the growing cadre of requirements.

Patrick Young, publisher of *ProFood World*, observes, "There's no question, OEMs and makers of components are definitely driving the trend to manufacture products that provide greater sanitation."

Similarly, PMMI's food packaging trends report points out, U.S. food companies are prepared to begin documenting just about everything they do, with the intense focus on traceability that's being called for by FSMA. This group of regulations requires food manufacturing companies to document their work at all steps in the process to protect consumers.

Toward that end, OEMs are called to help automate the traceability process surrounding such issues as identifying the individuals that performed certain processes. According to PMMI's 2016 survey of food industry professionals, "40% of respondents said they would invest in equipment that could automate the report documentation process for traceability under FSMA." OEMs could help automate this sort of documentation with components like modular-style solenoid valve

**Looking to
simplify
sanitation?**

Speak with one of
our engineers for
suggestions.

systems designed for integration with advanced HMI and PLC systems that require user registration and login.

Two other food safety concerns for OEMs and end users are the drives to prevent contamination and to enhance food freshness. OEMs can help end users on both counts by maximizing designs for both hygienic standards and for product preservation.

When it comes to hygienic design, OEMs must continue to select FDA- and CFR-compliant components constructed of materials that stand up to both harsh washdown procedures and high operating temperatures.

To truly embody hygienic design, component design also must come into play. Components with round edges reduce the chance of bacterial entrapment. Slanted lines promote drainage of water, where microorganisms could otherwise thrive. Push-to-fit components minimize the need for screws and bolts and thus the associated nooks and crannies where bacterial matter could collect.

Leaching and corrosion are additional concerns that are addressed by components. Hoses and tubing used for food and beverage transfer should be selected based on their ability to stand up to harsh chemicals without corroding or leaching chemicals into products. Food-contact-grade fluoropolymer and thermoplastic tubing answers this call in many food and beverage applications, and is available in various grades each offering specific attributes such as increased clarity, long lengths and increased strength. Specially treated antimicrobial tubing can be employed for its ability to resist cracking and degradation from mildew, algae, fungi and biofilm.

Stainless steel, FDA-compliant push-to-connect fittings are ideal for use in food packaging applications, because they withstand corrosive chemicals while offering a smooth, easy to clean external design that is less likely to harbor buildups.

The use of lead-free fittings, connectors and valves is another innovation opportunity for OEMs, who should make use of fittings, connectors, valves, and cartridges that, in addition to being NSF- and FDA-approved, also conform to the latest lead-free standard required by the [Safe Drinking Water Act](#). In some cases, OEMs can also incorporate pneumatic system fittings that conform to this lead-free standard.

Even the compressed air that powers food packaging operations is increasingly under scrutiny because of the risks of contamination it poses. OEMs can minimize this risk by partnering with equipment vendors offering comprehensive and modular air drying and filtration systems, along with air quality maintenance and monitoring programs, designed to meet the [ISO 8573](#) standard defining compressed air quality for food and beverage packaging operations.



**Want to optimize
hygienic design?**

Speak with one of our
engineers
about solutions.

A related opportunity area is making use of these same compressed air systems to cost-effectively generate modified atmosphere packaging (MAP), which eliminates the need for specialized tanks and removes price variability of gases such as nitrogen. MAP improves food quality by eliminating oxygen, moisture and other contaminants within packages and extends product shelf life.

Get Started

Flexibility, speed, sustainability, cost, and safety. It may be a growing market for food and beverage packaging equipment, but building systems that simultaneously incorporate all five of these qualities is a tall order for any OEM. Packaging machinery engineers will win big by having a supplier partner at their side that has the track record to help OEMs accomplish these tasks and the technical experts empowered and driven to do it.

To learn how Parker Hannifin can bring the experience and technologies to inspire innovations in your next food and beverage packaging machinery project, email us at foodbev@parker.com to be connected with a Parker representative.