

# Flexible Packaging

*Leading the way in packaging innovation*

**Technology and innovation created flexible packaging, and they continue to define it.**

Flexible packaging is at the forefront of important packaging trends in product protection, design and performance, consumer convenience, and sustainability, all of which positively impact the environment, consumers, and businesses.

Flexible packaging is any package or part of a package whose shape can be readily changed. It includes packaging made with **paper, plastic, film, foil, metalized or coated paper, and film, or a combination of any of these materials.** The total U.S. flexible packaging industry is estimated to be about \$30 billion in annual sales for 2016.<sup>1</sup>

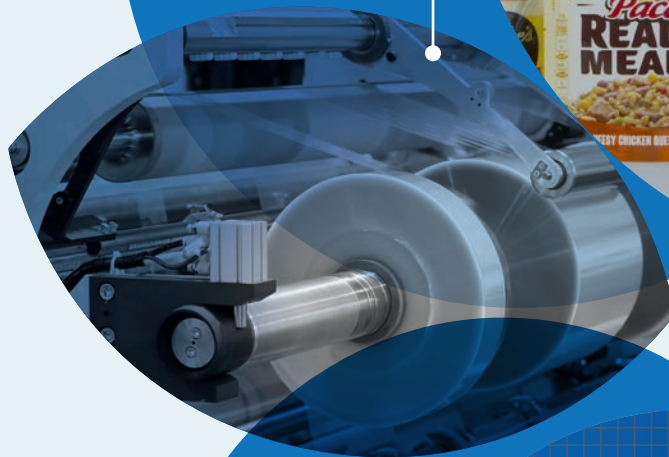
**Flexible packaging includes:**

Rollstock | Bags | Pouches | Liners | Shrink Sleeves | Shrink Wrap and Stretch Wrap | Bulk Shipping Sacks | Flexible Lidding | Film Wrap Around Labels

PRODUCT



PRODUCTION



DESIGN



## Innovation – Technology and Collaboration

Flexible packaging has facilitated many of the products in our grocery stores today—products that simply did not exist a few years ago.

Today's shoppers buy bagged salad greens that stay crisp for days; frozen vegetables that steam right in their packages; bags of cereal that stay fresh with zipper closures; and antibacterial wipes, easy-to-use laundry detergent, and health and beauty products in flexible packaging.

Consumers are conscious of the products they purchase and the packaging that holds and protects those products. They are seeking the convenience; extended shelf life; and sustainability features flexible packaging provides.



## Innovating to Meet Needs

Years ago, paper, metal, aluminum, and cellophane were the major packaging options. Innovation and technology have led to the development of substrates that provide moisture and oxygen barriers, can be printed, and create lightweight packaging that includes clarity, strength, product protection, extended shelf life, and the ability to be resealed and microwaved.

## Enhancing packaging capabilities

Flexible packaging manufacturers are responding to key issues and industry pressures impacting their customers as well as the demands of consumers and retailers including:

- Safety and product protection
- Prevention of food waste and contamination
- Freshness and extended shelf life
- Consumer convenience
- Ease of transportation, storage, and use
- Source reduction and sustainability



## Customizing to meet product protection specifications

Not all flexible packaging is the same. Different products require different types of protection. Some flexible packaging is made from a single material, however, in some cases, multiple materials are required to provide the appropriate barrier and protection. In multiple-materials packaging, each layer performs a different function in protecting and preserving the product.

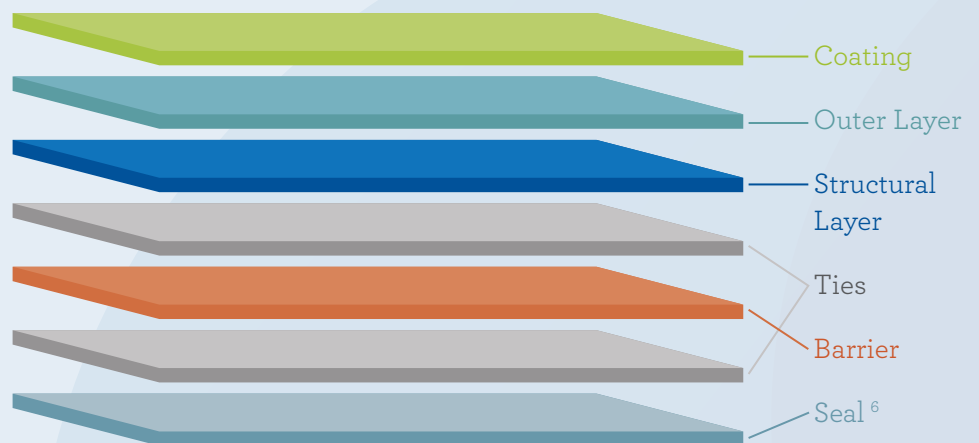
By using materials with properties geared toward specific performance, manufacturers can meet their customers' varying needs including product protection, contamination prevention, extended freshness, puncture, tear and burst resistance, tensile strength, and seal strength.

### Customization examples include:

- Continual improvements in film barriers for refrigerated foods now keep meat fresh for up to 18 days.<sup>5</sup>
- Intelligent sensor film can warn the consumer when meat and fish are past their freshness dates.
- Flexible retort pouch materials extend shelf life, reduce shipping costs, improve food quality, and reduce cooking time.
- Smart flexible packaging enables consumers to authenticate products to combat counterfeiting and provides extensive product information.
- Films scavenge food odors and prevent leaks.
- QR codes and RFID technology printed on flexible packages provide product and traceability information.
- Medication and medical devices can be easily and safely dispensed through sterilized, tear-open packages engineered for dosing compliance.
- By protecting products, flexible packaging reduces returned merchandise along with all associated operational and environmental costs of such.



*Flexible packaging materials are customized to meet product protection specifications and provide safety, quality and convenience.*



## Collaborating to Innovate

Flexible packaging manufacturers work with machinery manufacturers to achieve new levels of functionality. Packages fill faster thanks to equipment improvements, which also enable next-generation films to be used. Advanced printing press technology delivers flexible packaging that “pops” on store shelves and stands out in a crowded marketplace. High impact, razor-sharp graphics and bold colors build brand recognition and demand attention from hurried shoppers. In addition, the same package continues to “brand” the product at home since it is easy to store and reuse.



*Formed in 1994 as a council of the Flexible Packaging Association, the Sterilization Packaging Manufacturers Council (SPMC), specializes in packaging for the medical device and pharmaceutical industries. SPMC focuses on the development of test methods and guidance documents for the flexible packaging medical devices sector.*

## Impact of Select Innovations on Flexible Packaging<sup>2</sup>

### **Material Toughness Advances**

New polymer technologies have improved materials toughness/puncture resistance, product protection, and equipment handling. In the last decade, materials have been reduced by up to 50% through these new polymer technologies.

### **Coextrusion Technology Advances**

Coextrusion technology allows the properties of different polymers to be combined into a single film. This technology has allowed some packages to be reduced in weight by 33%.

### **Barrier Enhancement**

Up to 50% less material can achieve the same barrier properties because of improved application techniques and barrier science.

### **Process Optimization**

New equipment technology, resins, and manufacturing process innovations enable process optimization. Through process optimization, thickness of shrink film can be reduced up to 50%.

### **Equipment Technology**

Many of the advancements in flexible packaging lightweighting have been achieved through collaboration between flexible packaging suppliers and equipment providers. This has allowed some film thicknesses to be reduced by 50% over the last decade.

### **Tools and Metrics**

Measurement tools and metrics are being used to track lightweighting achievement and opportunity.

### **Multiple Sustainability Advances**

Flexible packaging offers a number of additional sustainability advantages when compared to other package options. These advantages include: lower carbon footprint, reduced energy use, and less waste when disposed.



## Sustainability

When assessing sustainability, examining the full life cycle of a package is critical. **Flexible packaging is the optimum environmental choice because it uses fewer resources, generates fewer emissions and creates less waste in the first place.**<sup>®</sup>

- Flexible packaging starts with using fewer resources and has the ability to package the most product in the least packaging possible, positively impacting MSW, energy use in manufacturing and transportation and GHG emissions.<sup>3</sup>
- Producing a flexible food service pouch requires 75% less energy and generates just 1/10 of CO<sub>2</sub> emissions during production than a metal can for the equivalent amount of product.<sup>3</sup>
- 1.5 pounds of flexible packaging will package the same amount of beverage or liquid foods as 50 pounds of glass.<sup>3</sup>
- A recent study by the Natural Resources Defense Council shows that up to 40% of food in the U.S. is wasted.<sup>4</sup> Flexible packaging can help reduce this waste.
- Recent advancements in materials and production processes have reduced the weight of some flexible packages up to 50%,<sup>2</sup> consequently lowering product shipping costs while maintaining or improving product protection.

### Viable End-of-Life Options

There is no single solution that can be applied to all communities when it comes to the best way to collect, sort, and process flexible packaging waste. Viability will be influenced by existing equipment and infrastructure, material collection methods and rates, volume and mix, and the relative location of the processor and demand for recovered material.

- Single material flexible packaging (about half of flexible packaging waste) can be mechanically recycled, currently using store drop-offs programs.
- Resource recovery, which generates energy feedstock, is an end-of-life option for the other half.
- Developing other end-of-life solutions is a work-in-progress. FPA partners with manufacturers, recyclers, retailers, waste management companies, brand owners, and other organizations to continue making strides toward total package recycling.



### Reducing Food Waste

A recent study by the Natural Resources Defense Council shows that **up to 40% of food in the U.S. is wasted.**<sup>4</sup> Flexible packaging can help reduce this waste.<sup>5</sup>



The shelf life of cucumbers is extended from three days to 14 days when wrapped in polyethylene shrink wrap.



Bananas last 36 days in perforated polyethylene bags versus 5 days unpackaged.



The shelf life of beef is extended from four days to up to 30 days when vacuum packed in oxygen barrier film.



Food waste is reduced from 11.0% to 0.8% when bread is packaged in biaxially oriented polypropylene film.



Packaging grapes in perforated bags leads to a 20% reduction in in-store waste.



70% of parents with children under 18 in their households are willing to spend more for products that are easy to store.<sup>7</sup>



### Convenience features and enhancements

Flexible packaging is designed to address a variety of product and lifestyle considerations and includes numerous convenience features.

- Customized fitments facilitate easy-pour spouts
- Easy open and close seals/zippers are convenient for product dispensing and portion control
- Valves and microscopic perforations enable microwaveable ready (heat-n-eat) meals and bagged salads
- Handles provide easy product transport

### Consumers value the convenience of flexible packaging

The top three packaging attributes as rated by consumers:<sup>7</sup>



## The Rest of the Story

For more of the flexible packaging story, visit [www.flexpack.org](http://www.flexpack.org).

### Sources

1. *State of the Flexible Packaging Industry Report*, FPA, preliminary 2017.
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3. Cradle-to-grave life cycle energy consumption and CO<sub>2</sub> data developed by PE Americas for FPA based on readily available data, 2009.
4. *Wasted: How America is Losing Up to 40 Percent of its Food from Farm to Fork to Landfill*, National Resources Defense Council, August 2012.
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6. *The Cost of Plastic Packaging*, Chemical & Engineering News, October 2016.
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