PACKAGING WORLD

packager's playbook series
education for packaging professionals

2017 EDITION

Flexible Packaging Playbook

IN THIS EDITION:
All new checklists for:
*Setup *Cleaning
*Maintenance
*Training
*Changeovers

How to successfully implement flexible packaging projects

- Essential tools, analyses, & resources
- Limits of research, design, & filling
- Specifying flexible packaging equipment
- Trends and advances in form/fill/seal

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CONTENTS

CONTRIBUTORS

6 All the packaging experts who contributed to this Playbook

INTRODUCTION

9 A flexible approach to flexible packaging

DESIGN

12 Ten guidelines for effective front-panel design
17 Top-level considerations when revitalizing packaging
24 Consumer research and its limitations
29 Twelve tips for selling new packaging ideas to retailers
33 Flexible pouches for cooking sauce see popularity growth

MATERIALS

35 Principal flexible packaging performance characteristics
39 Trends in flexible packaging
44 Flexible packaging polymer primer
46 Top 12 factors in the digital printing equation
50 Implementing brand protection strategies – top considerations

DEVELOPMENT

55 Best practices in flexible package development
60 Flexible packaging specification guidelines

CONTENTS

DEVELOPMENT (Continued)

64 Measuring commonly specified film attributes
68 Understanding oriented films
76 Common ways flexible packaging projects can failCONTents

EQUIPMENT

79 Seven tips for flexible line setup and cleaning
82 Seven best practices for training and maintenance
84 Seven things to keep in mind for operations and changeovers
86 A seven-point checklist for inspection and repairs
89 Trends in form/fill/seal equipment
92 Best practices for specifying flexible packaging equipment
96 Six tips on finding the right form/fill/seal supplier
98 Tips for working with flexible packaging machinery suppliers
100 What NOT to overlook on form/fill/seal equipment projects
103 Vendor evaluation methodology for form/fill/seal equipment
106 Six factors to consider when choosing between premade bags and a f/f/s system
109 Best practices when specifying flow-wrapping equipment
112 Key food safety factors driving equipment upgrades
118 The key role of equipment and packaging
120 Roadmap for a successful form/fill/seal Factory Acceptance Test
124 Determining when to rebuild or replace a form/fill/seal machine
126 Tips for a successful flexible packaging line start-up
129 Six common pitfalls to avoid on bagging machinery projects

CONTENTS

APPENDIX

132 Glossary of additives and modifiers
135 Detailed properties and attributes for film structures
140 Flexible packaging polymer selection guide
145 Cast vs. blown film characteristics

GALLERY

147 Flexible Packaging Gallery – Selected examples of flexible packaging innovation

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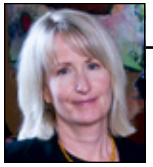

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Disclaimer

This Playbook's objective is to supply basic information on film requirements and material and processing options that can assist the reader in their selection and specification of films that meet converting, filling, and end-use requirements in a cost-effective, consistent matter. It is not intended to be a comprehensive, complete source, and will be superseded by new film options soon after publication; it is, rather, a starting point and guide for gathering more detailed and current information. From that information, a diligent user can quickly winnow down the wealth of options to those most likely to meet their needs.

The information contained herein is believed to be valid at the time of publication, but as innovation and commercial supply are continuously evolving, it is incumbent on the user to ensure its accuracy and relevance for a specific application at a specific point in time. Inclusion of information on materials or processes does not represent a recommendation or representation that they offer the best, or even a workable, solution to a specific packaging challenge, and the author and *Packaging World* accept no liability for decisions made as a result of the use of this Playbook.

RETURN TO CONTENTS

A flexible approach to flexible packaging

There often is no one, single best answer. But we can help; you're among friends and colleagues here.

Each Playbook in the series has been growing every year with valuable, useful information. For instance, the "Detailed properties and attributes for film structures" and "Polymer selection guide for flexible packaging" sections by themselves are worth the short time it takes to download this Playbook.

After interviewing and consulting with over 50 sources for the 2013 Playbook series, we updated many of the existing sections and developed completely new ones. Most of the legwork involved in-depth phone interviews with experts in the field—engineers and managers at leading consumer packaged goods companies, seasoned packaging service providers, and respected package design specialists.

We thank them again for their time and expertise. You can find a list of those individuals and companies that contributed on the pages before this Introduction.

All of our Playbooks are designed to be read easily both on screen and in printed form. The entire cost of producing and distributing this Playbook has been underwritten by the

continued

A flexible approach to flexible packaging

companies that have sponsored it. We thank them for their support, and we thank you for reading.

This Playbook is designed to serve as a handy reference to be valued and shared with others throughout the life cycle of your package development project. Moreover, this Playbook—like others in this series—is a living document. At the bottom of this page and all content pages, you'll find an "Add Comment" link that invites you to offer comments that will help advance best practices, fuel improvements for future editions of this document, and strengthen the canon of packaging knowledge.

Here's a sampling of reader praise for our previous editions:

"The Playbooks are an excellent introduction to the package design phase for non-packaging professionals... a great resource to share with senior management to help them understand that the product package can make or break a product in the crowded market."

"Brilliant presentation, allows a really functional step-by-step approach."

"The information the Playbook contains provides a helpful guide to improve our selection process and justification for new equipment requests."

"It is unfortunate that many packaging engineers tackle their projects alone with minimal feedback from different stakeholders. Senior management should read this Playbook to help them reinforce the idea that the product package is a critical key to a successful product launch—not an afterthought!" ◆

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Ten guidelines for effective front-panel design

Source: Lovelypackage.com

The hierarchy of information on any front panel should prioritize the main product and marketing messages while creating a template for brand extension to other forms, products, and categories.

Branding, marketing, and advertising all converge on the front panel of a retail package. Dedicated package designers would argue a package does all of that and more, and that nothing represents the brand more than the retail package. That's because the package is the last place the consumer interacts with the brand prior to making a purchase decision.

There are certainly no hard-and-fast rules in front-panel package design, and some categories have much more freedom to experiment. But here are some guidelines that will help you define your brand on the front panels of packages on today's over-cluttered retail shelves.

1. Determine the brand "position." Know your company, your brand, and your core values. Ask the hard questions again and again, and don't underestimate the savvy of today's consumers. Is there a unique value proposition? What is the primary product benefit, lifestyle advantage, or convenience gain? For a new brand or brand extension, remember that getting noticed is often the most important goal.

2. Explore the competitive environment. Use differentiation in a category for one goal: to give consumers a reason to pick up the package. Go to the retail environments where the package will live, and ask these questions from the perspective of the brand:

- Who am I? Do I represent something tangible? Do I inspire trust?

continued

Ten guidelines for effective front-panel design

- What makes me special? Where do I fit in among competitors?
- Why would they buy me? What's the most important benefit or advantage?
- How can I connect with consumers emotionally? What cues can I use?

3. Settle on a hierarchy. Information organization is a critical element of front-panel design. Broadly, the importance of the information hierarchy goes: 1) brand; 2) product; 3) variety; and 4) benefit(s). Analyze all the messages you want to convey and put them in order of importance. This doesn't necessarily mean that they'll be in that order, top to bottom, on the package, but it's a good reference point to start with. Having a very organized, consistent information hierarchy across multiple product varieties helps your customer find the variety they desire and allows for a satisfying experience. Saving the shopper time in picking out a product should always be a priority.

4. Make one element the hero. Is the personality of the brand strong enough to stand on its own? Determine what is the most important single idea to communicate about your product. If you're going to "own" something, what is that something? Align secondary brand messages under the primary umbrella message. If your brand is the hero, consider "locking in" a tagline with the logo. But make sure you're committed to that tagline for the long haul. Otherwise, look for inspiration outside the category, which can often lead to breakout design. Use shapes, colors, illustrations, and photographs to reinforce the hero of your brand story. Above all else, make it easy for repeat buyers to find you the next time.

continued

Ten guidelines for effective front-panel design

Campbell's felt that the usual brand-first priority could be subverted on these product extensions in a trade-off to make sure the consumers understood the product proposition.

5. Keep it simple. Less is often more—communication-wise. Be succinct, both verbally and visually. Three main visual cues are all that the typical eye will tolerate. Successful package design is often an exercise in constraint. Remove overloaded messages on the front panel. Limit marketing claims and benefit statements. Any more than two or three, and the points will be counterproductive. Too many benefits will dilute the core brand message, and it will actually cause the consumer to lose interest in the store aisle. Remember, most packages have secondary panels for more information. That's where shoppers look when they want to learn more. Use the secondary panels, but don't skimp on design for those either. If secondary panels are unavailable, consider a hangtag to tell a deeper brand story.

6. Manage stakeholder expectations. Expect some stakeholders to want to put all the information or marketing claims they have on the front panel. Remind them that a package is not an advertisement. Be prepared for the counterarguments by having a repeatable design development process. Back the process up with checkpoints and transparency and show progress with visual aids. Explain how the process is both expansion and contraction, and have everyone sign off on the process before starting. Quickly develop three to five options so you can establish a common language to talk about the objectives. Be prepared with questions and suggestions should a stakeholder come to you with a printer or converter already in mind before design begins.

7. Communicate value visually. Of course, having a transparent window that shows the product inside is almost never a bad idea. Consumers want visual confirmation of the choices they make. Aside from that, you can say things nonverbally with shapes, design, graphics, and colors. Use the elements that will best communicate attributes and equities, sensations and feelings, emotional associations, and textures. Create an association with

continued

Ten guidelines for effective front-panel design

a sense of place. Suggest use occasions with graphics that have the elements of that use occasion. Involve a lifestyle. Today's consumers judge products in relation to how the values of that brand fit into their values and lifestyle. Create a singular "reason to believe" that is capable of closing the sale in isolation.

8. Be mindful of category-specific rules. Each retail category has its own conventions. Some should be followed religiously. Some are important because bucking the convention can set a newcomer brand apart. For food products, however, the product itself should almost always be the hero. Spend the money on production and printing to create a photo-realistic representation of the ideal serving suggestion. Conversely, for pharmaceutical products, the brand and product's physical characteristics can be secondary—sometimes even unnecessary. The parent brand logo may not need to be on the front panel. Instead, emphasize the name of the product and what it does. Across all categories, though, it's advisable to err on the side of less clutter on the front panel.

9. Don't forget findability and shopability. Learn how consumers shop the particular category you're in. Make sure they won't be confused by the format or the information hierarchy. Remember, cognitively and psychologically, colors communicate ahead of everything else. Next come shapes. Words matter, but mostly as a support role. Words and typography are for reinforcement, not high-level brand communication.

Findability can be either about having a brand-first strategy or about creating a "blocking" element in the store aisle that draws shoppers in. Shopability is about having a consistent system of colors, shapes, materials, or front-panel hierarchy that guides both new and repeat shoppers in finding the specific product and variety he or she desires. If there are multiple

continued

Ten guidelines for effective front-panel design

lines under a parent brand, consider good/better/best strategies that indicate each value proposition clearly and succinctly. For instance, the relative strengths of different products in a line can be indicated by "strengths," or relative saturations, of color.

10. Plan for future brand extensions. A brand that is flexible enough to extend to other categories also has a core brand identity that it owns. After that, a successful brand platform is one that can grow by adding product varieties or lines, or by extending outside its original category. Test the versatility of a front panel's design by applying it to new products and to new categories. Look at a wide swath of imaginary products and extensions, not just the flagship variety. Make sure they all work together, united as a brand but easily understood as separate offerings.

Even plan for future redesigns of your core product line. Don't inhibit the future growth of your brand by creating a platform that is not both extendable and flexible. ◆

Top-level considerations when revitalizing packaging

The revitalized Purex packaging built on the brand's heritage foundation as it blossomed into full bloom, creating a dynamic and contemporary look via some skillful pruning and nurturing.

It's not always easy to decide when it's the right time to update, or "revitalize," packaging. There are many factors to consider, but the motivation is often out of many brand owners' hands. The current competitive environment is driving frequent package design changes in a number of ways.

Retailers are asking for new and better packaging, new entries are driving constant innovation, existing brands are piling on the SKUs, private-label products are changing the rules, regulations are requiring more information on packaging, and sustainability improvement requests are becoming ubiquitous. Here's what to consider when updating packaging design:

1. Explore the brand history and its equities. Study the current and past package designs closely. Consult previous design firms or advertising agencies. Marketers should dig deep for previous brand images in past packaging and advertising—and in consumers' minds. Know what the brand represents to its loyal consumers, where it has been, and where it can go. And—just as importantly—know what the brand is NOT. A brand shouldn't try to be everything to everyone. It's totally possible that the brand exists as an idea, or a value, that is not tied to words, colors, or shapes. It may have no tangible visual or verbal equities, but that is rare. What is the brand story that consumers connect with? How can you

continued

Top-level considerations when revitalizing packaging

enhance that emotional experience? What are the equities, the key visual messages, and the brand aspects that need to be future-oriented?

2. Expect the politics of heritage. Change can be difficult. Many brand owners have a sentimental attachment to the past. They believe that their brand logo or primary colors are a large part of their success, when the truth might actually be that those design elements are holding the brand back. In addition, some brand owners believe package design is an additive exercise, where more is better, when the opposite can often be true. Too many marketing messages can inhibit brand communication. And finally, some brand owners believe the package can do everything single-handedly. As much as a package represents a brand, most times a significant packaging change will benefit greatly from brand activation support from both marketing and advertising campaigns.

3. Understand loyal customers. What are your customers loyal to, exactly? How might they react to a change? Understand what consumers expect and what they look for. Learn how consumers shop for your product. Be aware that today's consumers are less brand loyal than in previous generations, so it's a delicate balance to create new excitement while remaining familiar and trusted. Sometimes it can make strategic sense to rely on the brand logo to carry a lot of weight. If you find that consumers have great loyalty, trust, and reverence for your brand in isolation, you may have greater leeway to experiment with bold designs.

4. Understand the strategic objectives. With every strategic decision come risks, so try to identify and target the brand's specific "problems." Keeping ahead of private-label competition and keeping ahead of counterfeiters are both good motivation, but frequent changes can dilute brand attachment when not managed with care. Defending your brand

continued

Top-level considerations when revitalizing packaging

Educating a consumer about packaging changes can sometimes make the new format less jarring to loyal customers.

doesn't just mean security features or hard-to-copy effects. Defending brand value today often means offering something new. Is there new ownership or management? Are you planning a new campaign, expansion, extension, or direction? Will there be room to revitalize again in a few years? Step back and remind yourself: Don't change merely for the sake of change. Any change has to make strategic sense.

5. Know when NOT to revitalize. Should you defend your brand before you find yourself in a defensive position? Look at the competitive set. Does your package look "dated"? Notice how print quality has been improving on many retail packages. Has your category left you behind? The truth is, not many products or packages look "cheap" today. If yours does, you'll stand out for the wrong reasons. Even if your packaging avoids communicating a wrong message, find out if it is communicating the right one. Maybe a new shape, structure, or material will help your package stand out. But will the investment result in a quick return on investment? Market research can sometimes tell you if there's opportunity for quick ROI by exploring new market territory. If you have the resources, pilot tests in limited markets offer the best evidence of ROI potential.

6. Hit the store shelves. One of the biggest mistakes in package design is designing a package without context. Packages rarely appear alone, even online. Most often, they live in hostile retail environments on overcrowded shelves. Make designers and marketers get out to the stores, experience real shelf sets, and understand the distinct challenges of different retail environments. And when revitalizing new packaging, test the new designs on mockup shelves or on virtual shelves online. Differentiating your brand from the crowd is often about going against the norm. Minimalist brand expressions can stand out amidst a sea of loud,

continued

Top-level considerations when revitalizing packaging

colorful packaging. But the opposite is also true. Whatever the setting, don't oversimplify. The simplicity pendulum has swung far out recently. It's now swinging back, but with caution.

7. Decide on "evolution" or "revolution." Take the long-range perspective. Where is your brand going? Is the risk of change manageable? Evolutionary designs are helpful for brands with a large, loyal following that do not want to alienate but still require a facelift to drive relevance with a new consumer group or to clarify on-package communication. Revolutionary designs are great for brands that want to set themselves apart from the competition or brands that are introducing a new product category because these types of designs are foreign to consumers. Since consumers have nothing to relate them to, the designs will be disruptive; however, they can also be unrecognizable if they don't look like they belong in the category. If you're reformulating a familiar product, that's another opportunity for a revolutionary design change. A package design change can communicate that something important has happened, and here's where marketing and advertising can be helpful reinforcement. Explain the reason for the revolutionary change directly to consumers in straightforward language. Don't make them stop and think—you risk losing them that way.

8. Reexamine the goal. What were the strategic objectives? How much change makes sense and mitigates risk?

- Was it a shopability issue? Did the category grow around you? Look at the competitive set.
- What do you want to communicate? What's new? Are you adding an extension? Reconsider the brand proposition.

continued

Top-level considerations when revitalizing packaging

Walkers revitalized this sub-brand with bright colors and a less formal personality, knowing well enough that its previous design did not hold much equity.

- Can the brand keep up through gradual evolution? Is the package at risk of appearing old, dated, or tired? Find the right compromise of new vs. old.

- Have you lost touch with consumer? Are you introducing a new formulation? Is there a new nutritional benefit? Then you can leverage a revolution.

But always maintain relevancy, visibility, and shopability. And make sure the brand promise of the packaging matches the value proposition that the brand delivers. For instance, it can be risky to overpromise with high-end packaging on a commodity product.

9. Create an emotional "visual language." For a brand looking to revitalize their packaging, it's important to identify a visual language and define the key principles that exemplify the emotional connection that your brand has with consumers. To get noticed in an overcrowded retail environment, brands need to stake out a unique emotional space. Packaging should be considered from a holistic viewpoint, including form, graphics, function, and communication. Sometimes, it's useful to identify a prototypical user, even if that's an oversimplification. Characterize that person's lifestyle, define it in words and images, and create a cohesive brand personality. Create visual mnemonics that will unite a brand under a single emotional framework.

10. Don't forget the basics. Brand recognition is still the first priority. But it's an emotional connection, not a cognitive one. Push It! Being a category leader in consumers' minds means leading in a way that addresses consumers' wants and desires. At the same time, caution is advised. Any change in brand position is a risk; only half of all packaging redesigns increase sales. Remember to synthesize a single primary message across all brand

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continued

Top-level considerations when revitalizing packaging

touchpoints. Distill marketing messages to two or three, at most. And, if possible, create a destination feel in the store. Whether or not you can secure placement in an endcap or a POP display, devise a packaging strategy that will create a successful "place" on shelf. This means creating a "blocking" effect, organizing the SKUs in logical ways, and making variety navigation easy for all shoppers.

11. Plan ahead, way ahead. First, make sure your new brand platform affirms consumer expectations. If you disrupt the cues that consumers use, then you will frustrate them, and they will move on. Planning ahead means planning for potential brand line extensions and brand expansion into new categories. Even if you don't go in those directions, the brand platform will be strengthened by the exercise. To take it to another level, plan the next redesign after the redesign you're doing. And if you're using a good/better/best strategy, confirm that it makes sense to consumers. For instance, make sure the bargain line doesn't tarnish the potential of the high-end line with reduced expectations.

continued

Top-level considerations when revitalizing packaging

12. Double-check that your communication comes through. Return to the start and the primary objectives. Packaging needs to answer—immediately and intuitively—two fundamental questions from a communication standpoint for a shopper: "What am I?" and "Why am I right for you?" If a package fails to communicate a clear answer to these two questions, then uncertainty rules the day, the shopper may become confused, and he or she may opt for a different brand. Visually, the goal is immediate brand and benefit recognition. If consumers can't recognize your brand's colors, shapes, or graphics instantly, you might be headed down a wrong and unproductive path. ◆

Consumer research and its limitations

The Baked Naturals Cracker Chips package represents Pepperidge Farms' first commercial application of this reclosing feature that is intuitive and easy to use.

Many graphic and structural designers make a useful distinction between exploration and validation. Though these professionals might be wary of letting consumer research define exploration, they are usually more than willing to admit research's valuable role in validating the effectiveness of new design ideas in their fullest expression.

The efficient use of research often benefits from recognizing the limits of what a researcher can learn and not over-interpreting results. Here are more best practices to follow when embarking on consumer research campaigns.

1. Identify what you hope to learn. Choosing a research method should first start with setting clear objectives. And get specific. What are the precise questions you're trying to answer? If you can't put the questions into words, it's unlikely that you'll know the answers when you see them.

2. Don't be research-driven. Use research in the right context. Research can inform the process, but it is dangerous to let research dictate or create design early in the process. Research can actually hold back a brand. Risk-averse companies tend to create research campaigns that reinforce preexisting attitudes and biases. Choosing which method to pursue will come down to weighing the pros and cons of each option against the objectives and the cost. Know beforehand whether or not you will get actionable results from your efforts.

continued

Consumer research and its limitations

3. Choose carefully. The type of research you should conduct is dependent on the brand and the risks associated with a change. Are you embarking on a major departure from what the brand has typically represented, or is it a small evolutionary change? A mix of qualitative and quantitative research is often advised in gauging the potential rewards—and risks—involved in a substantial revitalization project.

4. Know the limitations. Focus groups have limitations. Consumers don't understand their own motivations and can rarely articulate them well.. Also, focus groups often get dominated by a group "leader," and participants' responses become heavily influenced by that individual. Research requires great discipline to look at the right things the right way in the right context. Benchmark the consumer experience to gauge the success or failure of proposed packaging improvements or updates. Have ways to assess if your research is actually answering the questions you set out to answer.

5. Keep exploration open. It's human nature to reject the unfamiliar. By and large, consumers can't envision new ideas or predict how they might respond to them. Do not interpret data literally; that alone can lead to risk aversion. Add intuition and instinct to create new value. Ask open-ended questions, use rating scales to probe preferences, and engage in conversations. Use qualitative research on the front end to explore options or possibilities, use quantitative research to back up qualitative research and to prove that the insights are real.

6. Get out in the field. Get consumers to engage with you with diaries, in-store shop-alongs, in-home ethnographic observation, and personal demonstrations. Interviewing consumers at the point of sale can yield great insight into their purchasing motivations. In-home, ethnographic observations also yield telling insights into how consumers actually use the

continued

Consumer research and its limitations

Individually wrapped bananas, potatoes, and eggs are not new, but precooked, single-serve cobs of corn recently showed up at convenience stores in Japan.

packaging and product. Check out homemade "unboxing" videos of your category to discover what's working, what's not, and opportunities for innovation. But don't ignore a valuable resource—your own employees. Their familiarity with your product or package may bias their opinions, but it does not preclude them from being inventive. If you remain highly vigilant of skewed bias and political influence, their familiarity may actually prove to be a positive.

7. Convert briefs into visual languages. Packaging development and design briefs are usually all words. Brand experiences are mostly visual. Something has to budge. Mood boards, lifestyle cues, and personality profiles are a few ways to map out an area of fertile brand exploration. If possible, immerse designers and strategists in global cultures early, and create a vision of where the brand can go. Better to have unified vision of a strategy you can validate rather than trying to piece together validatable pieces of strategy.

8. Remember that packages don't live in isolation. Packages are almost never alone—on shelf, on countertops, in cupboards, or in the recycle bin. Eye tracking can be useful to gauge both where consumers' eyes go to first on a package and where their eyes go on crowded store shelves. Explore the principal motivations of purchase in your category. Try to discover what benefit claims spark motivation.

9. Use prototypes effectively. Try to get immediate, knee-jerk reactions to shapes, colors, or graphics before critical thought takes over subjects' opinions. Take advantage of the nation of "professional consumers" in the U.S. Get as many reactions as you can from each iteration, and, if possible, use frequent mockups to recheck reactions and compare data. (For more tips on using prototypes, see "Structural prototyping and the modern design process" in the Package Development Playbook.)

continued

Consumer research and its limitations

10. Involve yourself in the process. It's important to monitor the process early on so you understand the results later. Only if you understand what the results really mean can you know what is "actionable." Give everyone the tools they need to appreciate and participate in the process. Transparency into the process lets stakeholders track progress repeatedly along the way. Research might not always reveal how consumers discover unmet needs, but packaging can certainly reflect brand owner objectives, conscientious company cultures, or overarching human values.

11. Be more efficient online. Effective online research can often yield more honest qualitative responses from consumers who politely hold back during in-person interviews. Also, the speed of usable and actionable quantitative results is often much faster online. Realize, though, that surveys provide diluted information, and case studies should be considered as a frame of reference, not an absolute. Social networking traffic and analytical tools can be informative, but rarely is any research method prescriptive. It's more important to understand the factors at play and weigh their importance and relevance on a case-by-case basis.

12. You control the data, not vice versa. When you can boil piles of data down to digestible chunks, have as many sets of eyes look at it, across disciplines and departments. You never know where an insight might come from. Some firms now have a person dedicated only to analyzing research results. Closely analyze consumer relations reports, but be careful not to see things that aren't there. It's a natural human tendency across all research and science to see connections and causations that don't necessarily exist.

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continued

Consumer research and its limitations

13. Consider a dedicated human factors study. Packages convey value by elements such as effects, coatings, and smooth edges. A human factors study can measure many of these variables as well as unveil opportunities for "universal design" solutions. It's always useful to reduce the ways that a customer can use a package incorrectly. The best packaging is intuitive to use, but educating users about new packaging types is often appropriate. It's always a good idea to simplify the "unboxing" experience so that it guides users through the best order to assemble or use the product.

14. Avoid pitfalls that send you off course. Consumer research is directional and subjective—not prescriptive. Tightly define the roles you want your packaging to play. And continually return to the original research goals and the questions you were trying to answer to keep your eyes on the prize. ◆

Twelve tips for selling new packaging ideas to retailers

Source: Lovelypackage.com

A Jekyll & Hyde story emerges from Joe & Seph's flipped chef's hat/top hat, and the popcorn is packaged in a clear pouch with a die-cut header card to give the product a premium feel.

The biggest retail chains in the U.S. and Europe hold most of the cards when it comes to negotiating the look and feel of new products and packages for their shelves. When proposing new products or packages, whether informally or in person, it's critical to be prepared. Retailers are looking for new ideas, but they have to be truly new. Here are a few tips to impress the retail-chain gatekeepers.

1. Offer something new and different. Whenever possible, try to create a truly new packaging/product concept or brand presentation. You need a "Wow!" first. Find a niche that's underserved, or take the lead on an emerging consumer trend. And don't be afraid of being very product-specific. If the idea is a good one, it will be expandable to a broader strategy. Find a balance between differentiating from the current landscape and remaining relevant to current customers' lives. It's a balance that some in the industry call "meaningful disruption."

2. Develop a unique story. Think of the marketing angle as a fully realized story, and be able to present it that way. Then explain how the packaging presentation tells that story. Anticipate your competitors' stories, or ones you suspect that the retailer has heard before. Refine the story until it's brief and concise—and have a strong, committed point of view. Understand the realities of shelf sets and planograms, and make the case for eye-level placement for niche products.

continued

Twelve tips for selling new packaging ideas to retailers

A back-to-school promotion pairs string cheese with the Crayola brand, resulting in colorful, crayon box-like packaging for cheese sticks.

3. Create packaging that adds new value. Creativity is the only limitation in developing packaging that is more functional, is easier to open, is more fun to use, has an extended life, or turns into a "product" of its own. An easy way to add value with boxes and cartons is to experiment with still underutilized paperboard design features such as fifth panels, functional flaps, special cuts, surprise interior panels, and engaging sustainability stories.

4. Don't try to compete on price alone. Understand that most retailers now have several tiers of private-label products. They are constantly thinking about how to compete on price, which may not be so difficult, especially with their lower margin expectations. Nevertheless, be prepared to explain your pricing structure and tiering possibilities. Don't be surprised if the retailer asks to inspect your operations, and come prepared with a distribution plan to supply products "just-in-time." Whenever it makes sense, have an environmental story to tell. Retailers are keenly interested in environmental improvements in packaging and the metrics behind them.

5. Research the retailer. What is the retailer's particular market position? What are their long-term goals? What consumers are they trying to reach? What target marketing are they using? Armed with that knowledge, weave your own story into their story. Do your homework about the retailer's common shelving dimensions, stacking requirements, planogram layouts, and department delineations—and where your product fits in. Learn how your packaging will be handled through their particular distribution chain. Explore several merchandising options as far as how your package might sit on shelf, display, sell down, and restock.

continued

Twelve tips for selling new packaging ideas to retailers

Fresh Take meal solutions contain two compartments for cheeses and seasoned breadcrumbs for quick meat entrées in just five minutes. The two-compartment film pouch transforms into a "mixing bowl," held in a die-cut, peg-hooked paperboard sleeve with vibrant graphics and food photography.

6. Research the retailer's customers. Learn how the retailer's core customer shops, and respect the knowledge of the retailer. Ask yourself: How will this new product or package bring in new business or promote loyalty to the store? Often, retailers want their own custom packages of national brands so they can entice customers with exclusive deals or unique product propositions.

7. Come prepared with ROI projections. Research the bottom line, and make the case for fast ROI turnaround. Provide projected diagnostics on possible sales volumes and profit margins. Stick to direct product profitability that the retailer can expect—not secondary or tertiary profits that might come later. Use consumer research to find a successful compromise between what's right for consumers and what's right for the retailer. Understand the private-label competition, and how your product or package will complement the retailer's own products and packages.

8. Come prepared with visual aids. If production packages aren't available, have the highest-quality prototypes. Show visually what need there is in the marketplace that has not been met yet. Use virtual prototyping to show the package in a variety of store locations, and in a variety of optimized SKU sets. Show how the package might bring a stale category back to life with visual impact. Create a platform for a broader category push by expanding use occasions, crossing categories, or widening a category's customer demographic profile.

9. Be responsive. React quickly to any potential issues brought up by the retailer. Follow up promptly. Maybe your competitor is having issues meeting the retailer's expectations. Know what you don't know, and admit it. If possible, partner with the retailer in fine-tuning a strategy, and try to get face-to-face meetings with the retailer's packaging engineers.

continued

Twelve tips for selling new packaging ideas to retailers

10. Think seasonally, three seasons ahead. Seasonal packaging is a big driver for retail sales—and is planned well in advance. Be aware that custom films, labels, and containers can entail advance planning and machine modifications. But seasonal initiatives can also be achieved through secondary or POP packaging. Think about kitting options or even outsourcing gift packs. Be ready, however, for the added complexity that adding SKUs brings.

11. Be retail-ready and retailer-ready. Retailers are becoming more picky about how the product arrives at their distribution centers. Retail-ready often now means going from pallet to the shelf with almost no "unpacking" by the store staff, minimal secondary packaging to clean up or dispose of, and minimal shelf maintenance. (For more, see "Retail-ready best practices to be shelf-ready" in the Package Development Playbook.)

12. Learn the lingo. Will the initial visual Shelf Impact entice shoppers to pick up your package? Will the consumer's First Moment of Truth with the package be memorable? Will they want to learn more on Secondary Panels? Do you have a Unique Selling Proposition that is truly unique? Is there a Reason to Believe that could close the sale by itself? Does the front-panel design allow for Cross-Selling across categories? Can a group of your SKUs either create a Billboard Effect from far away or result in a Destination Effect through Color Blocking and Shelf Set organization? Will the User Experience with the package develop brand loyalty? ◆

Flexible pouches for cooking sauce see popularity growth

Adapted from material provided by Mintel's Cooking Sauces, Pasta Sauces and Stocks, 2015

Cooking sauces, originally packaged in jars and bottles, have seen a tremendous shift to pouches in recent years. The proportion of global cooking sauce innovations in stand-up pouch formats rose from 5% of total launches in 2011 to 33% in 2014. Flexible sachets, more often associated with dry or powdered sauces, are also growing in use. Compared with jars, flexible pouches are lighter in weight and can be easier to open.

According to Mintel's UK report, Cooking Sauces, Pasta Sauces and Stocks, UK consumers express strong agreement with jars being difficult to open. There is significant gender difference, with 28% of male consumers thinking so vs. 34% of females. Moreover, looking overall at the attributes associated with different types of food packaging, 13% of UK consumers consider glass packaging hard to open and only 9% think so of the pouches, as per Mintel's UK report, Food Packaging Trends.

However, pouches might be not a perfect long-term solution for cooking sauces. Though lighter weight and easier to open features are clear benefits, the formats often also have many disadvantages too. Flexible pouches do not always have transparent windows and hence deny consumers the ability to see the consistency of the sauce.

continued

Flexible pouches for cooking sauce see popularity growth

Increasingly, stand up pouches are featuring transparent base panels to enable that inspection and sense of openness and trust. However, new consumers are unlikely to be aware of this feature, leading some brands to point this out. Moreover, this increases the overall cost of packaging by adding extra features on pack.

Is hybrid packaging the future?

One of the pack types that potentially can replace pouches for cooking sauces in the future is one of the innovative hybrid packs. Creating composite food packs by combining different materials is still rare and unusual in packaging innovation, which is often limited due to increased production costs. However, there are a few examples available on the market, which demonstrates that hybrid packages can provide a great way to solve many packaging problems often experienced by consumers.

A rigid strong plastic frame is combined with thin flexible plastic that creates a lightweight but strong package. It is topped with a lid, which allows the consumer to easily close and reclose the box without worrying about storage after opening. This innovative pack type could win over pouches in the future as it provides more shelf space and easy stackability for retailers.

It offers multiple merchandising options both on shelf and around the store. It also helps with distribution as more product can fit on a pallet. Consumers might appreciate the lightweight of the package that removes the worry of being broken or spilled. Transparent film allows the product to be seen through the pack in store, and the easy-to-open lid allows the product to be stored for later or even be reused after the product is finished. ◆

Principal flexible packaging performance characteristics

This innovative package from Bolthouse Farms creates an interactive, functional experience for kids, who combine the seasoning with the carrots just prior to consumption.

For many years, packaging professionals summarized the functions of packages into three major "buckets": Protection, Utility, and Motivation. Here, we expand on those buckets for flexible packaging and learn how it can perform many functions.

1. Protection for delivery. A package protects a product—and itself—from the rigors of shipping, distribution, storage, and use. A consumer pays for a product and expects to receive the full value. Packaging plays a crucial role in delivering that value:

- Hermetic seals that completely contain the product, protecting it from spilling or contamination from the environment.
- Toughness that prevents breaching of package walls by outside physical forces or abuse.
- Tamper-evident features that help ensure the product integrity for use.
- Bundling multiple objects, including packages, together for transport or sale.
- Opening and reseal features that facilitate multiple package accesses or uses while securely containing the product.

continued

Principal flexible packaging performance characteristics

2. Protection for processability. The objective is to minimize waste through the entire chain of production and use of a product. A successful flexible package should be able to:

- Customize the force required to slide the packaging material or the package against other materials.
- Be optimized for packaging machine ease of operation or to prevent items from sliding relative to each other in distribution.
- Customize package sealing response to a wide variety of package machine sealing methods and conditions, permitting fast, dependable production of sealed packages.
- Withstand post-fill processing conditions such as freezing temperatures, high heat, humidity, and radiation sterilization.

3. Utility for consumer containment, freshness, and tailored transmission. Every product has its own needs for freshness and barrier properties. A flexible package can:

- Provide tamper-evident features that help ensure the product integrity for use—or that it's even still there.
- Offer opening and resealing features that facilitate multiple package accesses and uses while securely containing the product.

continued

Principal flexible packaging performance characteristics

- Be able to customize the rate of transmission of gasses through the walls of sealed packages.
- At the high-barrier end of the spectrum: Provide extremely low rates for long-term storage of sterilized food at room temperatures or medications in humid environments.
- At the low-barrier end of the spectrum: Provide very high rates for breathable produce packages, with the ability to create customized levels for individual produce items.
- Allow controlled venting of steam released in microwave heating to cook product while maintaining product moisture and avoiding leakage.

4. Utility for consumer-added functionality. Flexible packaging technologies have progressed to improve product storage and add preparation functions.

- Shelf life: Vacuum-packed food or personal items for long-term storage.
- Microwavability: Food that can be warmed or heated thoroughly in the package.
- In-package microwave "cooking": Packages that can "cook" a product in microwave ovens include those for popcorn, brown-and-crisp sandwiches, and freshly made pasta dishes.
- Ovenability: Retail packages that cook roasts, bake whole turkeys, etc. in conventional ovens.

Watch Video

Ovenable Thermoforms
www.bit.ly/pwt00431

Editor Pat Reynolds takes a look at a fresh meat innovation for pork tenderloin that can be cooked in a self-venting package made on a thermoform/seal system.

continued

Principal flexible packaging performance characteristics

5. Motivation at retail. Packages help motivate purchase decisions by presenting the product and its desirable attributes to consumers in a way that the product both stands out from the rest and engenders trust in its quality. Packaging appearance and style connect the consumer's needs and expectations to the product, and the package can truly become the product. The package should be able to:

- Provide a smooth surface for high-quality printed images, including the ability to bury the print beneath the outside package layer for extra gloss and sparkle and for resistance to abrasion.
- Easily incorporate pigmentation to provide uniformly colored packages that protect products against damaging light frequencies.
- Offer options for a variety of label shapes, including whole-body labels that shrink to conform to complex primary package shapes.

6. Motivation for repeat purchase. Packaging should reinforce the positive purchase retail decision in subsequent moments of truth. First, the value of the package should reflect the value of the product. In addition, the package can:

- Add functionality for more comfortable or efficient in-home use.
- Bring new use occasions to the user to expand or encourage consumption.
- Solve an in-home use problem with easier storage, refill, or disposal experiences.
- Surprise the consumer with an added-value feature. ◆

Trends in flexible packaging and features

Lundberg Family Farms' new rice pouch employs Velcro closure technology that allows easy opening and reclosing without having to align zippers.

Watch Video

www.bit.ly/pb-velcro

Trends often come and go before you notice them. Flexible packaging trends seem to have a longer life span than most, signaling that the format is here to stay. Here are some recent and developing trends we're monitoring.

1. More easy-open, easy-reclose options. A much wider range of opening treatments, fitments, and closures are available today than ever before, including linear tear characteristics, reclosable zippers that don't require any tearing of the pouch header to open, and screw-on spouts for liquid pouches. Machinery has advanced, too, with increased ability to apply these features in-line during filling and sealing, with minimal downtime issues.

2. Clear high-barrier films. A new generation of clear films and coatings is beginning to approach the barrier properties of foil and metallized films. This provides new opportunities to showcase appetizing products while avoiding flex-cracking problems associated with foil and some older coating technologies. These structures also offer the potential for microwave-compatible pouches.

3. Penetration into entirely new categories. Flexible packaging tends to sweep through entire product categories, though admittedly over a period of years. Classic examples include tuna fish and pet food, where retort pouches are now common after decades of can

continued

Trends in flexible packaging and features

dominance. More recently, baby food retort pouches (and thermoformed trays) are replacing glass jars. Flexibles are also being used for home and garden supplies such as fertilizers, where resealability is a key feature.

4. A quick look ahead. Now that ketchup in larger retail flexible pouches is no longer a novelty, other viscous condiments that can be more efficiently evacuated from a pouch are a prime prospect. Test market successes in Western and Eastern Europe, Asia, and Latin America will tell the early tale. Health and beauty products, such as shampoo and liquid soaps, might also be ripe for conversion. Further expansion in soups, stocks, and canned fruit is likely as well.

5. The slow roll of the cereal aisle. While flexible packaging has made inroads at both the high end (think granola) and low end (value cereals), experts agree that cereal makers simply have too much invested in existing bag-and-box equipment to expect widespread change anytime soon. Replacement is further complicated given the predominance of recycled paperboard cartons made from renewable resources in this application. Just because a package converts to flexible doesn't mean consumers in a given country—especially the U.S.—will accept it. The new global perspective means packaging structures or formats—including flexible innovations—originate anywhere in the world.

6. More layers in coextrusion. Though it sounds counterintuitive, the addition of layers into a flexible packaging structure can actually lead to improvements in economics and functionality. How? It allows for more precise control of the layers. Three- and five-layer film coextrusion manufacturing lines are limited by the size of the extruders and by the

continued

Trends in flexible packaging and features

This 1.5-lb package gives the Cargill sugar substitute brand a category first, presents a clean brand image, and makes it easy for consumers to use in baking.

design of the dies. More converters are moving to seven- and nine-layer coextrusion lines that provide more flexibility for desired functionality, thickness, and cost without overengineering the structure. One technique is to use less-expensive resins as bulking layers. Another is to split the barrier layer into two thinner layers, with one serving as a "backup" in case a pinhole breeches the other. This approach also multiplies the number of material interfaces a permeate must cross, further reducing permeation rates. Several technologies for splitting barrier materials into many layers are being introduced, with data showing more than linear improvements in barrier properties.

7. Shaped flexible packaging. The current generation of form/fill/seal packaging can produce more bag shapes and styles than ever. That's important for consumer packaged goods companies hungry for new shapes that stand out on the shelf. Shaped pouches that cut a mostly two-dimensional, curvy shape have been out for years, though mostly outside the U.S. Machinery manufacturers are working on efficient equipment for creating pouches with a conical or three-dimensional shape. A challenge here is to hold down the design waste inherent in more complex profiles.

8. More retortable pouches. A retort package is "cooked" after it is filled at high-enough temperatures long enough to kill bacteria and microorganisms that can spoil food. Several factors are driving the growth of retortable flexible packaging. They are easier to open than cans, weigh much less, and can have a smaller environmental impact versus metal cans and glass jars. Additionally, pouches can minimize loss from denting or breakage and enable package innovations such as cooking capability. And then there is the taste. Many believe the food from retortable pouches tastes better because of less-abusive sterilization heating

continued

Trends in flexible packaging and features

cycles. The flat geometry of the flexible package means that food closest to the surface doesn't need to be heated for as long or at as high a temperature before the food in the center has received the proper time and temperature exposure to ensure sterility.

9. Pouches' wide impact. Because pouch structures can be customized to meet a wide range of barrier requirements, a host of new product applications are emerging: liquid, viscous, powdered, granulated, and particulate. This growth will cross multiple markets, including food and beverage, cosmetics, healthcare, pet foods, automotive, pharmaceutical, and agricultural. While pouch-filling speeds are not yet up to par with those of many conventional container types, this gap is closing, particularly in the dry product arena.

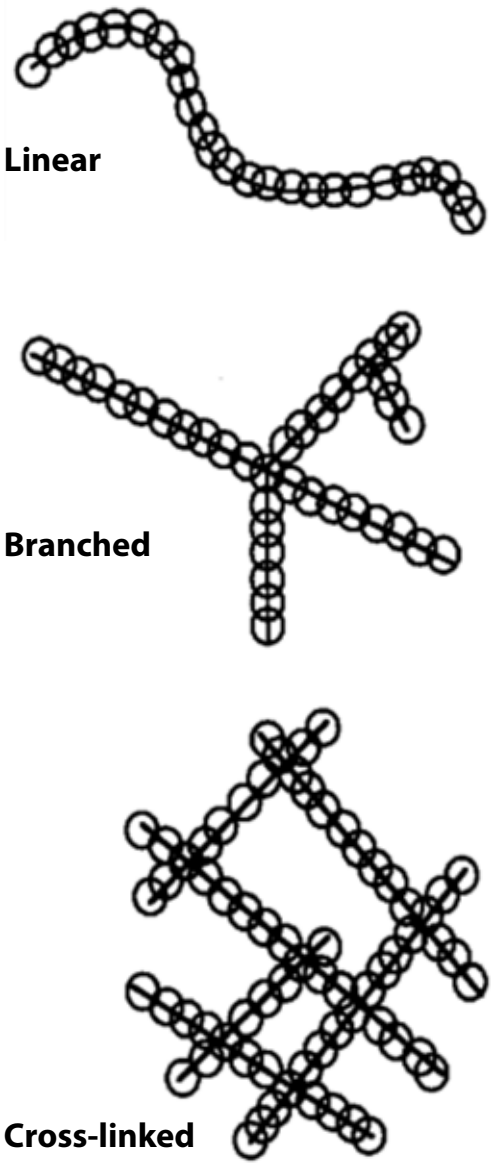
10. Sustainable packaging is taking on new forms. Many people play up the recyclability aspect of sustainability as it relates to packaging at the exclusion of the front end of a package's life cycle. The carbon footprint of various packaging types has to consider many factors. For example, pouches offer tremendous energy savings both in their production and transport. Comparing rigid containers versus pouches, you can ship one truckload of flat pouches that have the equivalent product-holding capacity of upwards of 15 to 25 truckloads of empty rigid containers. Packagers can also save hundreds of thousands of dollars in packaging material costs and secondary packaging operations systems due to simplifications of packaging systems, such as the elimination of labeling, capping, etc.

continued

Trends in flexible packaging and features

11. Waste-to-Energy is coming of age. Following a successful track record in European and Asian countries, Waste-to-Energy, or WTE, is becoming a more viable end-of-life option for flexible packaging materials in North America. Advances in municipal incinerator technology have tackled issues related to harmful emissions, increasing the likelihood that U.S. companies will support efforts to turn waste into electricity, synthetic gas, fuels, and recycled materials. WTE can reduce air emissions, landfill loads, energy usage, and costs. Also, by reducing municipal solid waste and generating energy that can be sold back to the local grid, organizations can help reduce energy costs community-wide. This, in turn, may feed into larger goals, such as compliance with corporate social responsibility initiatives. ◆

Flexible packaging polymer primer



Source: University of Michigan

With a beginning understanding of the attributes desired for a film package, the next step is winnowing down the huge selection of possible polymers to those that offer the best combination of cost and performance for your needs.

The word "polymer" derives from the Greek words poly, which means "many," and mer, which means "parts." There are naturally occurring polymers; polymer cellulose is the major constituent of plant cell walls and makes up about 50% by weight of most wood and over 85% of cottonseed hair fibers. Regenerated wood cellulose was one of the first polymer packaging films, and is still in use, with a resurgence of interest due to its natural, renewable source.

The main action in polymer films, however, is in synthetic polymers, which are produced by connecting simple molecules by a process called polymerization. The nature of simple monomers (Greek for "small parts") and how many and in what way they are connected lead to the properties that are unique to each different polymer type and its variants.

A polymer made from a single monomer is called a homopolymer; a copolymer is made from mixtures of two or more different monomers, each called comonomers. Comonomers can connect in different ways: along the main chain or backbone of the polymer molecule in ordered or random ways, or as branches of one polymer off the backbone of the other. A specialized subset of copolymers that is quite useful in packaging is an ionomer.

continued

Flexible packaging polymer primer

This copolymer is made primarily from a nonionic monomer (the most commonly used monomer for film polymers) and a small (generally <15%) fraction of an ionic monomer, typically an acid. After polymerization, the acid functionality is partially neutralized with metal ions, most commonly sodium or zinc, creating the opportunity for ionic bonds between branches of a single molecular chain or between adjacent chains; these ionic bonds contribute greatly to the toughness and sealing properties of ionomers.

Choices of specific polymerization conditions (temperature and pressure), number of reaction steps, batch or continuous reactors, and type(s) of catalysts are used to direct the polymerization reaction toward the molecules of most interest. Given the huge variety of monomer choices and steady advances in polymerization technology, many different polymers exist, and more are continually being developed. It is important to realize that due to the normal variation present in materials and processes, a polymer resin pellet will contain a distribution of molecules of differing molecular weights and chain configurations. Polymer chemists and film engineers examine these differences, as they translate into differences in polymer and film performance. When significant changes to the molecular distribution of a type of polymer can be consistently reproduced, a new grade or even polymer subfamily may result. ◆

Learn More

"Flexible packaging polymer selection guide" in the Appendix

Top 12 factors in the digital printing equation

A multilayer flexible bag protects this air-based energy-boost product, only about the size of a lipstick canister, and digital printing on a flexible substrate gives the brand another boost.

It may be difficult to see through the hype surrounding digital printing, because the actual packaging market penetration, by percentage, is still quite low. Its early success has been in labels for food and beverage products, but it is poised to move to other categories and other substrates, such as folding cartons and flexible. It's important to plan ahead and think of all the factors that warrant consideration when preparing to go digital.

1. Run size. Digital printing is growing in markets that require specialized, frequently updated labels like wines and craft beers. Small brands or brands with many SKUs benefit most from digital printing. The short changeover times and reduced material waste can make it an economically advantageous option. The run numbers are getting higher as to competitiveness on price, and lower as to competitiveness on speed.

2. Speed to market. Traditional print methods like flexographic, gravure, and offset sometimes take weeks to prepare the plates or rolls and get the printer run-ready. CPG companies these days, whether through poor planning or for a competitive advantage, can't want to wait more than a few days before getting new designs out the door, especially with seasonal or promotional campaigns.

3. The cost of materials. In a way, comparing digital to flexo is comparing apples to oranges, but careful consideration of all the numbers reveals where the cost savings can be

continued

Top 12 factors in the digital printing equation

realized. Settle on the cost of materials first, and then compare total costs. Waste, as already mentioned, is a significant factor in assessing printing costs long-term. Standard overrun percentages are often lower with digital, and with the ever-changing demands of customers and retailers, labels in storage often become obsolete, and that can be a substantial loss to absorb.

4. The cost of time. The cost-of-time equation, both short-term and long-term, is being scrutinized more and more these days. The limiting factor in any production chain can clog up design and management processes in unseen ways. It's difficult to focus intently on the next project when the current one is on hold or held up in prepress.

5. Variability of SKUs. Beverage companies with many flavor varieties, diet options, and performance lines can see the benefits of localized, on-demand printing. But even without a multitude of SKUs, many upstart brand owners are introducing multiple designs within a single SKU. A wine maker, for instance, packed every case of one varietal with 12 different label designs, albeit all aligned in a theme.

6. International presence. Even if foreign expansion is only on the horizon, it is worth factoring into your long-term printing plans. Foreign language requirements on packaging continue to evolve and become more specific. Digital is a go-to solution for national brands expanding into international markets, because even dominant players sometimes have to start with small volumes. Plus, they want to appear committed to the market with well-designed and well-produced multilingual packages. For those companies, asset management software is also a must.

continued

Top 12 factors in the digital printing equation

7. Promotion opportunities. Two examples of consumer-directed, design-your-own packages are telling. Heineken beer in Europe has run several campaigns that allow customers to order six-packs of beer, through the mail, that arrive with the customers' own personal designs. Jones Soda in the U.S. uses only customer-submitted label designs on their products. Fans send in pictures, and Jones decides which to use in broad distribution.

8. High-end effects. Digital printing does not allow as much expandability to add effects, embossing, or die-cutting in-line. However, more brand owners are testing out the cost efficiency of "combination printing," which runs the packaging substrate through two different print cycles.

9. Comfort with your print provider. Be careful that your print provider is knowledgeable in digital printing inks. The chemistry of digital inks can be tricky because of the way inks adhere to the substrate. Different substrates have different "surface tensions" regarding the energy of the ink transfer, its adhesion, and the post-printing treatment.

10. Converter flexibility. Plan ahead. It's common now to start printing on digital and, as volumes increase, switch over to flexo printing. Sometimes digital is used as a test run, a proofing process, or as a seamless supplement to flexo. Communicate with your printer about what you should expect their practices to be. Make sure your printer guarantees a seamless substitution with proof copies and production run samples. Once they have proven a high level of quality assurance, they may not—by agreement—alert customers of when they substitute digital for flexo.

continued

Top 12 factors in the digital printing equation

11. Cross-substrate color matching. Be aware that it's not always easy to match what was produced digitally with a different process on different substrates, such as flexible film or paperboard. That's why some printers will do a "dumbed-down" test run on digital to show what's possible on other printers. Digital on flexible substrates has limitations that include limited web widths, lamination time limits (within 24 hours), and longer run minimums.

12. Potential hidden costs. One of the commonly cited benefits to digital printing is saving the early investments that are often required with other methods. Aways expect and require an extensive analysis of every project, apples-to-oranges comparisons, and transparency into your printer's processes as well. ◆

Implementing brand protection strategies – top considerations

Brand protection technologies, such as this color-changing sealant, are best employed within a multilayered, comprehensive deterrence strategy.

Many brand owners are afraid of the perceived high cost of brand protection. Those same brand owners likely pay high insurance premiums on their factories and businesses. The "brand insurance" that brand protection can provide is a minor investment considering the potential loss to brand reputation and the bottom line in the event that consumers lose trust in the product on the shelf.

Getting started on a brand protection path is made even more daunting because of the many tactics and technologies that have proliferated in the past decade. Brand owners have seen many come and go, yet they are still expecting a magic bullet that will solve all their brand protection needs. This will likely never come, so a layered strategy combining several technologies is advisable. To help you choose the best tactics, here are the key factors to consider.

1. Understand the problem. First, step back and understand your brand's particular situation in its entirety. What are the threats? Is there counterfeiting, diversion, gray market threats, or all of the above? What investment would alleviate or help alleviate the problem? What other gains or ROI could you gain from a brand protection program?

2. Know every situation is different. A strategy will only be effective if you understand the problem—and the mindset of the perpetrators—first. The best place to start

continued

Implementing brand protection strategies – top considerations

is with the imagined, or real, criminals. What are their motivations? What are the opportunities they perceive? What are they hoping to accomplish? What lengths must they go through to achieve their goals? How easily can they be put off their goals?

3. Be aware of intellectual property rights. Try to quantify the value of the loss to your company in IP terms alone. And know exactly what elements of your brand you "own" both legally and in consumers' minds. Copycat brands in foreign markets might not be counterfeiting in the strictest sense, but they can still do great damage to the brand reputation just by association.

4. Gauge the urgency. Is counterfeiting tarnishing your brand right now? Might a health risk cause the company to lose substantial market share? What are the worst-case scenarios? Can you prioritize the degree of damage to your brand of potential scenarios? How much prevention or deterrence will protect your IP in the most important markets?

5. Rein in your expectations. Brand protection is more about deterrence than prevention. It's not necessarily about crime with a capital "C." Usually, the goal is not to lock up perpetrators around the globe and prevent future crime. That is most often an unreasonable goal. It's more about criminology, understanding the criminal, and applying situational crime prevention or deterrence. The goal is to disrupt the nature of the crime and frustrate the motivations of the perpetrators. Make the effort of the crime more trouble than it's worth for the criminal.

continued

Implementing brand protection strategies – top considerations

6. Favor prevention mode over reaction mode. You've already lost part of the battle if you're only trying to react to a past counterfeit incident. You end up targeting a threat too specifically, and wasting investment in one area that would probably be better spent on a broader strategy. Remember, criminals are resilient and highly adaptable.

7. Know the enemies and their environments. The concept of intellectual property can be very different in other countries than what many assume as the norm in the U.S. In some countries, what the U.S. considers a crime may not be a crime—and counterfeiting activities may even be subsidized. Instead, think of the problem as broad-based "fraud," and as an attack on your company specifically.

8. Consider all the possible enemies. Realize that economic motivations may inspire many possible perpetrators, and try to envision the fraudsters that are threatening your brand the most. The perpetrators may be organized crime or they might be government sanctioned. They might be opportunists looking for one-off payoffs with a fast turnaround, or they might be hobbyists that are just exploring what's possible. They could even be your own employees looking for a score or looking to settle a score.

9. Plan a multidisciplinary approach. This includes crime science and supply chain management as well as packaging science. This is necessary for several reasons. The more elements in the brand protection strategy, the more difficult the package or product will be to counterfeit. In addition, supply chains are growing in length and complexity, and companies are often using suppliers without ever having face-to-face meetings. You can't control all of these factors, but you can have a strategy that works despite the complexities—and one that takes advantage of complexities.

continued

Implementing brand protection strategies – top considerations

10. Don't believe all the claims of new, hyped "tactics." Packaging technologies are always moving forward, and sophisticated supply chain management tools are attacking problems in new and unique ways. Some of these tactics and technologies are great solutions on paper; however, they may still be seeking practical, real-world problems to solve.

11. Don't advertise your strategy. Unless you're asking your consumers to be participants in your supply chain verification, don't add a "Be Aware" label on your package. The strategy to engage consumers regarding the potential of counterfeits and as product authenticators deserves careful consideration. This is just as likely to scare away potential customers as it is to deter the perpetrators of the fraud.

12. Don't try to anticipate future regulations. The serialization, track-and-trace requirements that California is planning will affect the pharmaceutical industry profoundly. Many pharmaceutical companies are adopting or preparing to adopt the California standards because it makes sense to have only one standard both nationally and internationally. But federal legislation has been introduced that could potentially preempt the state's law. Also, it's still not clear how the U.S. federal government plans to protect food supply chains as part of the Food Safety Modernization Act (FSMA). A wait-and-see approach may be warranted rather than jumping to tactical solutions.

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continued

Implementing brand protection strategies – top considerations

13. But do *something*! The value of a brand is immeasurable, and it is often built on trust. This asset is not worth risking while waiting for legislative solutions. Today's consumers "assume" a modicum of due diligence from brands to protect them from fraud and health risks. Often, making the first move to a brand protection strategy is the biggest hurdle. Many entry-level strategies, though, do not require prohibitively high investments and can be scalable for future expansion. But tactics having tangible expenses cannot be implemented without a comprehensive risk assessment and anti-counterfeiting strategy. ◆

Best practices in flexible package development

A high-end, value-added line of retail seafood products takes advantage of a tray-making technology that reduces the brand's carbon footprint and projects a "deep blue sea" theme.

There are many factors to consider when developing and commercializing a new flexible, semi-rigid, or rigid composite package that incorporates one or more films. Here are 12 best practices you can follow to design a flexible package that meets your product's marketing and production requirements now and in the future:

1. Define all the requirements. Many consultants and converters alike still find this step to be a stumbling block. Define not only the objectives and parameters for performance and cost for the package itself, but also the equipment angle. Common parameters include barrier properties, package style limitations, format constraints, special product compatibility needs, regulatory requirements, easy-opening goals, reclosability, graphic impact, and printing method. Is it going to be packed in one plant, or on six lines on machines from three different manufacturers in two plants hundreds of miles apart? Knowing all the requirements can help you engineer the best structure both for today and for the future.

2. Understand all the product protection needs. Just saying you need a six-month shelf life is not enough. Know what will compromise the product the most in those six months. Will it be oxygen, moisture, or light? Moreover, when determining shelf life, don't overlook the distribution environment. Will you be shipping at high altitudes? Does the supply chain subject packages to extremely hot or cold temperatures? ...high humidity? ...very dry conditions? As more products receive broader distribution, packagers need to be

continued

Best practices in flexible package development

A colorful, flexible bag created for new 100% SuperNatural popcorn ensures product freshness, while providing enticing, high-quality, flexo-printed graphics.

aware of all the possible impacts. Confirm how many times your packaging will be "touched" from your packaging line through your supply chain to store shelves.

3. Understand the total system costs. Don't focus on the cost of the roll of film. Determine the total cost to get a salable product to the consumer. Switching to another structure that saves a few dollars on film costs will cost you more if it causes rejects and leakers during production. This can have particularly dire consequences if you're producing product at full capacity, because you take a double hit for every failed package—on product cost and on lack of profit from selling that package. Substituting higher-performance materials, such as ionomers or copolymers, can replace commodity polyethylene as the sealant layer, maintain desired stiffness, reduce leakers, and enable faster sealing speeds.

4. Coordinate all suppliers and converters. Early in the process, meet with your converter and form/fill/seal equipment manufacturer (and contract packager, if appropriate) to coordinate a flexible packaging specification that plays to everyone's strengths. This is better than independently imposing a predetermined spec. If you have a package with more stringent requirements, also include the converter's upstream raw material provider. Such up-front coordination and open discussions can optimize production and help avoid problems, especially with newly developed material structures.

5. Match the material to the machine. Because the machine should be designed to run at specified speeds and efficiencies, the material must perform at the same specifications. Often a material has been optimized for current equipment but will not perform the same on new equipment, especially as newer equipment is generally rated to perform at higher

continued

Best practices in flexible package development

outputs. Involving the material supplier early can eliminate any packaging performance issues and allow time if modifications are required.

6. Budget time for review and modifications. Don't expect quick fixes to be cost-effective. It's better to have a measured, well-documented approach illustrated by these "Three Rs":

- Review engineering drawings. Ensure that they match the actual machinery. Manage modifications using Critical-to-Quality, Critical-to-Function, and related methods consistent with an accepted quality management program.

- Risk assessment documentation. Understand, document, and update safety requirements that apply to your new installation, as well as problems that can arise if safety issues aren't addressed in an effective, timely manner.

- Read the fine print of all documentation. Contracts and engineering drawings are critical documents. Account for unexpected snags and the means of resolving them to keep your operation, service, and supplier relationships on track.

7. Assess existing packaging lines. Sometimes, small changes on the packaging line or in the distribution environment can enable the use of less or thinner materials in the package itself. It could be something as simple as the types of rails used in a conveyor system, or ensuring they're maintained properly so there are no sharp points, or properly maintaining packaging machines with regular cleaning and aligning of the seal jaws to improve seal consistency and minimize temperature and pressure requirements.

continued

Best practices in flexible package development

8. Track cumulative variances for better machinability. The issues that can cause jams and related problems vary with the application. But it's critical to define tolerances and add up the effects of variances, such as in film feed, label application, or other factors. One isolated variance may not impede efficiency, but several can cumulatively conspire to foul up a machine or line.

9. Investigate consolidation opportunities. If you have four flexible package structures that are fairly similar, consider using a single structure for all of them. One or two may be overengineered, but you may end up saving money due to economies of scale. Also assess with your film supplier the impact on film costs of a slightly shorter or narrower package, and smaller or different seals. The savings are sometimes surprising.

10. Look at flexible packaging as part of a system. Don't overlook opportunities to save a few dollars by minimizing secondary packaging waste. Learn about the exact conditions your package will be subject to, and the secondary packaging's role at each step. Will the package be used mostly in retail-ready situations? Sometimes spending a bit more on a thicker corrugated shipper can net you savings by enabling the use of a thinner package structure.

11. Schedule a plan for optimization. Often with a brand-new flexible package, the structure is overengineered to prevent failures or surprises in the field, and the package is larger than it needs to be to provide tolerance with the equipment. But it's equally common to move on to the next project, with little time or thought given to optimizing that structure—until a sudden cost-cutting directive from above causes a mad scramble at the supplier to suddenly cut costs or risk losing the business. To avoid this scenario, build a plan

continued

Best practices in flexible package development

for optimization up front. Either plan to optimize the package as soon as it's out in the field and performing well, or schedule periodic reviews six or 12 months down the line. That way, both the packaging department and the supplier have a known timetable with which to work toward optimizing the package structure.

12. Root out waste for efficiency and sustainability. Examine every aspect of your new flexible package, and the process behind it, to reduce waste. Doing so can simultaneously reduce costs and improve sustainability. For example, optimize overengineered packages whose added material provides no added value. Likewise, root out machinability issues, inefficiencies during changeovers, and, broadly, all wasted time, labor, energy usage, and materials. Having to discard lengths of film or boxfuls of labels that weren't run properly through the line will do no good for the environment or your bottom line. ◆

Learn More

"Glossary of additives and modifiers" in the Appendix

Flexible packaging specification guidelines

Scotts creates a no-mess, no-guesswork lawn spreader that works with pouched lawn-care products that snap into place and provide controlled-flow dispensing.

How do you get started with the process of deciding what film or films to use or include in a flexible structure or rigid package with film barrier? Plenty of polymers and film production methods are in common use in the industry. A basic understanding of the choices available and the strengths and weaknesses of different approaches can simplify the selection process and get you moving faster toward a good solution.

This section and those that follow will provide a look at the basics of an area of technology that is fundamental to the flexible packaging industry, has application to some semi-rigid and rigid packages, and affects every consumer who purchases packaged goods. Let's get started.

1. Start at square one. Before even starting to think about polymers and production options, it's important to first know what to focus on. The goal is to specify the attributes or properties that matter in converting and end use for film structures that work in such a way that the supplier can make satisfactory structures consistently and efficiently and that the converter and end user receive materials that consistently meet their needs at a cost appropriate for the use.

2. Take an integrated perspective. It's critical to appreciate the multifaceted goal of a flexible package project while breaking down the essential elements of this goal so they guide us in our choosing and specifying activities. Remember that this is not an exercise in

continued

Flexible packaging specification guidelines

choosing just a couple of elements. Flexible packaging development requires a coherent, integrated approach that needs all elements in place to succeed.

3. Specify what matters. Specifying means quantifying, and this is critical as both a guide for the supplier and as a means for the user to ensure they get what they need, want, and expect. Focusing on what matters means understanding real requirements and not including an attribute or property in a specification just because it can be measured, or because you saw it in another specification. Opening the door to specifying things that don't matter leads to increased cost for all parties involved. Failing to include things that matter opens the door to surprises and failures in converting or use that lead to increased cost for all parties. There is a thinking person's balance to be struck here, and some leeway in judgment, but realize that neither extreme in specifications efficiently serves all parties' needs in the end.

4. Specify what works. A solid understanding of real requirements leads to being able to match up film options in a robust manner. Where lots of experience exists, leverage that knowledge to simplify the process, adjusting other aspects of the film to meet the unique requirements for the specific application. If you are heading into uncharted territory for either the supplier or user, take the time to test and understand the limits of satisfactory performance. A beautifully formatted specification that describes in detail a film construction that doesn't work is worse than useless—it runs the risk of misleading everyone as to what film to use.

continued

Flexible packaging specification guidelines

5. Specify what the supplier can make consistently and efficiently. Very few, if any, situations can tolerate high rates of unacceptable material. Mismatches between a film specification and a supplier's capability only serve to drive up costs and put at risk the smooth flow of the value chain. The user has the responsibility to describe what they understand to be their requirements, and the supplier has the responsibility to accurately represent their capability to consistently and efficiently make the film.

6. Point out potential mismatches. Identifying a potential mismatch may lead to a productive conversation in which "what matters" can be refined, leading to better supplier capability, the realization that other suppliers may have the needed capability already in place, or an agreement that it will take time for any supplier to move up the learning curve to meet the needs. Keeping a mismatch a secret is a dangerous practice that all too often comes to light at the worst possible time.

7. Specify what can be delivered at an appropriate cost. The value of a film structure only can be set in the context of the end use. High-value goods with high failure costs can justify more costly, higher-performance packaging to ensure secure and fully functional delivery. For lower-value commodity goods, where consumer or industrial end-customer switching costs are small to nonexistent, the critical need for cost efficiency drives the selection to lower package performance and overall cost-in-use.

continued

Flexible packaging specification guidelines

"Detailed properties and attributes for film structures" in the Appendix

8. Drive to the best outcome. Be sure to maintain an overall, or total, cost-in-use mindset. The invoice price of the film structure is only one component. Carefully examine and understand all the places where the performance of that structure impacts cost. You'll determine accurate cost-in-use and make much better decisions. Industry veterans relate cases where bulking up a sealant layer slightly resulted in increased film cost that was more than offset by a reduction in incurred costs associated with seal failure in terms of downtime, lost product, and lost sales to the end user. Cost-in-use applied smartly avoids the "penny wise, pound foolish" trap that comes from too simplistic a view of procurement of films.

9. Acknowledge the natural tension around price. There is always tension between suppliers and customers around price and film choices and specifications. Suppliers appropriately seek to be realistically rewarded for quality, service, innovation, and reinvestment. Customers understandably seek consistent quality, security of supply, and competitive and predictable costs. In the long term, "you get what your pay for" and "you get paid for what you deliver" generally hold true, even though short-term shifts in the balance between supplier and customer may seem to distort the equation. The real bottom line here is profound: Poor film choices and specifications subvert the supply relationship, resulting in higher costs for both parties. ◆

Measuring commonly specified film attributes

Jade Monk's tea powder sachet construction provides a barrier against oxygen and moisture, has a premium appeal, and uses limited plastic with a heat-sealable paper/poly/foil/poly construction.

While it's possible to describe a flexible package's functions in general terms, measurable and quantifiable attributes or properties that relate to these functions will ensure a package is successful for a specific application. The types of attributes or properties to consider when determining "what matters" include:

- Thickness
- Basis weight
- Tensile properties
- Tear strength
- Puncture- or impact-resistance
- Abrasion-resistance
- Maximum and minimum service temperature
- Optical properties
- Heat-seal characteristics
- Dimensional stability
- Surface energy
- Coefficient of friction
- Barrier properties
- Chemical-resistance
- Regulatory compliance
- Environmental impact

continued

Measuring commonly specified film attributes

Measure against internal and external standards

These attributes and properties provide a good starting point, but they will not cover all possible end-use requirements. For instance, you would want to know the static dissipation when packaging electronic componentry.

More important is knowing why a performance attribute is important. (For more, see the Appendix in this Playbook: "Detailed properties and attributes for film structures.") Take care to understand whether an attribute is expressed as an inherent material property that can be extrapolated to different thicknesses, or whether the attribute is thickness-dependent.

ASTM International publishes a globally recognized and accepted set of standards for testing many materials, including polymer films. These are the default standards in North America. Given the growth of global supply and trade in films, you will encounter other standards from time to time. International Standards Organization (ISO) and Deutches Institut für Normung (DIN) are prime examples.

Where standards published by different organizations are equivalent, the published standards will indicate this. Unless you know for certain, however, it is risky to assume that just because the property name is the same that the results are comparable.

continued

Measuring commonly specified film attributes

Compare apples to apples when testing performance

One caution when reading specifications and comparing properties of different materials is to take care to ensure the data are presented in such a way as to allow valid comparisons. Start by being sure you know exactly what property is being reported. Then recognize there are differences in how these properties can be measured and reported. Make sure you understand the specifics of:

- The exact test method employed.
- The conditions at which testing was done.
- The units in which the results are reported.

The same method at different temperatures, humidities, etc. can yield wide variation in your results. Measurement units can be converted relatively easily, but the impact of varying test conditions on results will differ by material, and it is dangerous to expect all materials to respond similarly. Even seemingly minor differences in test methods can influence results. ◆

continued
Measuring commonly specified film attributes

Understanding film manufacturing techniques

Conceptually, making a thin polymer film is an easy proposition—just melt one or more polymers, force the melt through a long, narrow opening, freeze the extruded melt into a solid film, and wind it into a roll. Like most important things, there is a rich and extremely varied menu of material and process variables that offer the opportunity to create widely differing useful films. The opportunities, and the devils, are in those variables.

Setting aside material for the moment, there are four film-making processes, each with their own pros and cons:

- Extrusion
- Cast film
- Air-cooled blown film
- Water quench blown film

Download a full primer on these processes here:
"Understanding film manufacturing techniques." ◆

Understanding biaxially and monaxially oriented films

BY TIM BOHRER

Solid-phase orientation processes create very significant changes in film properties that can be quite valuable in packaging structures. These changes permit films that are lighter weight and thinner than standard blown or cast films to satisfy performance needs by generating significant increases in such properties as tensile strength, toughness, heat stability, tear initiation resistance, and barrier.

Virtually all solid-phase film orientation takes place in-line with polymer extrusion. This is due to cost and uniformity requirements for packaging applications. Solid-phase process choices include:

- Biaxial or monaxial orientation
- Flat or tubular format
- Simultaneous or sequential machine direction (MD) and cross-machine direction (CD)

continued

Understanding biaxially and monaxially oriented films

Flat biaxial orientation

Flat biaxial orientation is the most prevalent film orientation process. Most of the biaxially oriented polypropylene (BOPP) and polyester (BOPET) films used in packaging are produced using the technique detailed below. Very large units, capable of producing finished film over 300 inches wide, are being installed around the world, bringing down processing costs per pound and creating plentiful supplies for the growing global flexible packaging market.

The Process: A unit commonly called a tenter frame line performs flat biaxial orientation. The term "tenter frame" refers to the CD orientation section. The process starts with a plasticating extruder feeding a first module that operates similarly to a cast film line. (For more on cast films, download the "Understanding film manufacturing techniques" PDF here.)

With flat biaxial orientation, there are multiple chill and surface finishing rolls to handle the much thicker sheet that is formed. Orientation (or "stretching") thins the polymer web proportionally to the orientation or stretch ratios. For example, to get to a 1-mil finished film with 5:1 stretch ratios in both MD and CD, the process must start out with roughly a 25-mil web of quenched polymer.

Once the extruded sheet has been quenched and its temperature stabilized, MD stretching is accomplished by pulling the sheet using rolls rotating with progressively increasing surface speeds; stretching takes place in small gaps between successive rollers. The small gaps minimize the potential for "neck in," which is a reduction of the width of the web during the drawing or thinning processes.

continued

Understanding biaxially and monaxially oriented films

Following MD stretching, endless chains with clips grasp the edges of the moving web and carry it into a multistage hot-air oven. The first oven stage is used to equilibrate the web at the desired temperature; this is followed by CD stretching, as the two tracks carrying the chains and clips are gradually moved farther apart, making the sheet wider. Further temperature conditioning in the final oven sections provides annealing or stress relaxation for dimensional stability and cools the film prior to winding.

Applications: BOPP and BOPET are workhorse flexible packaging films, principally in laminations, where they can be used in as-oriented form, but often are vacuum-metallized, where the films themselves do not offer sufficient barrier protection. BOPP is widely used in salty, dry snack packaging, as it offers better moisture vapor barrier than BOPET. BOPP also has the lowest density of the commonly oriented packaging films, yielding more than 6% more area per pound of film at 0.70-mil thickness than 0.48-mil BOPET.

BOPET is a popular surface film in laminations where its superior stiffness, heat-resistance, and oxygen-barrier properties compared to BOPP make it a good choice for a wide variety of products. BOPET is more stable through printing and laminating processes than BOPP and is often preferred where high-quality graphics are required. It is the surface film of choice for retort pouches because of its dimensional stability through retort sterilization.

continued

Understanding biaxially and monaxially oriented films

Simultaneous flat film biaxial orientation

Machines to simultaneously biaxially orient flat films had been sought for years, and workable systems are now available from machine suppliers. These machines are also equipped with clips that grasp the edges of the moving web, but in this case, prior to any solid-phase orientation. A variety of mechanical strategies are used to simultaneously move the clips farther from each other in both MD and CD.

The Process: CD separation of the tracks to achieve CD orientation is also used here, but the significant difference compared to sequential flat orientation is the need to also create MD separation of clips at the same time. The most sophisticated machines employ individual servo motors for each clip. These can be computer-controlled to create precise profiles of MD orientation while clip track CD separation takes place.

Suppliers of such machines claim that simultaneous flat orientation is capable of creating more balanced, superior mechanical performance than can be achieved in sequential orientation and also offers the ability to reach higher orientation levels. These units are also claimed to permit the orientation of complex multilayer films, including those incorporating ethylene vinyl alcohol, that are difficult or impossible to produce in sequential orientation processes due to mismatches of orientation and crystallization temperatures.

Applications: The greater mechanical complexity of these lines has limited their adoption, but as property advantages are validated in the market, and unique films introduced, we should expect to see more of these lines installed.

continued

Understanding biaxially and monaxially oriented films

Simultaneous tubular film biaxial orientation

Simultaneous tubular film orientation, commonly known as the "double-bubble" process, offers a smaller scale of operation and more flexibility in changing orientation ratios than the very large-scale tenter frame lines just discussed. The main advantage of the double-bubble process—the lower scale of capital investment—is offset by lower product uniformity and process control challenges and low output per line. Some BOPP is produced on double-bubble lines, and biaxially oriented nylon/polyamide (BON or BOPA) films are produced using double bubble as well as flat biaxial orientation lines.

The Process: Simultaneous biaxial orientation is inherent in the tubular, or double-bubble, orientation process. As the name implies, the first half of the production line looks very much like a standard blown-film line, but rather than slitting the edges and separating the two sides of the collapsed tube, that tube is carefully reheated and reinflated with high air pressure, expanding the diameter while simultaneously being pulled by a collapsing nip operating at a higher lineal speed than the nip sealing the beginning of the second bubble. Film is then wound in the normal manner. Generally less annealing is accomplished in this process than in the flat orientation process, yielding films with lower temperature stability and more residual shrink.

Applications: Sausage shrink films take advantage of this shrink in the form of BOPA coextrusions with EVOH processed using the double-bubble process as one example of unique properties from this approach. BOPA is superior to BOPET and BOPP in oxygen barrier and has much better puncture-resistance; these properties can often justify its higher cost compared to the other films for demanding applications.

continued

Understanding biaxially and monaxially oriented films

Monoaxial orientation

Creating deliberately unbalanced properties in the MD and CD can provide valuable and unique performance advantages tailored to specific applications. Solid-phase orientation performed solely in the MD is termed MDO and in the CD, commonly termed TDO.

Shrink-sleeve label films are created by both MDO and TDO processes, depending on the configuration of the film relative to the desired direction of shrinkage in the formed sleeve. TDO shrink sleeves are typically created using a tenter frame and oven section like that used for the TD orientation step of biaxial flat film orientation. For these films, substantial shrinkage at relatively low temperatures is desired, and minimal annealing (stress relaxation under tension) after orientation is applied.

In standalone coextrusions and lamination films, polyethylene films post-extrusion machine direction-oriented are expanding in use, as increased MD stiffness, optical properties, and barrier, as well as TD tear strength offer downgauging opportunities and a better appearance.

The Process: Easily installed add-on modules to blown-film lines permit modest MDO of films to build additional stiffness in the MD of films treated in this manner, as well as improvements in film barrier properties. The process technology for MDO is similar to that of the MD orientation step in biaxial orientation; post-quenched film is temperature-conditioned and stretched between a pair of differential speed rollers in close proximity to minimize the unsupported gap where orientation occurs.

"Cast vs. blown-film characteristics" in the Appendix

continued

Understanding biaxially and monaxially oriented films

Applications: For cereal liners, this has allowed down-gauging and cost reductions at equivalent packaging line and product protection performance, while offset by lowered resistance to tearing in the MD. Use of tougher copolymers in blends or coextruded film layers can somewhat alleviate the tendency for "splitting" but must be balanced against the achievement of desired strength and barrier properties.

Oriented film summary

The improvement in mechanical, optical, and barrier properties of oriented films makes them compelling choices for flexible packaging structures. Of the biaxially oriented films, BOPET offers performance at low thickness, high stiffness, good heat-resistance, and a reasonable balance of oxygen and moisture vapor barrier.

BOPP offers superior moisture vapor barrier and the lowest density of the BOPET, BOPP, and BON triumvirate. BOPA provides the best oxygen barrier and exceptional toughness and puncture-resistance. Standard versions of all three films, which tend to offer good balance in mechanical properties between MD and CD, are widely sourced and specified for their unique contributions to packages.

DOMINO

Replace, print and save

Domino's NEW V230i all-electronic thermal transfer overprinter (TTO) offers the best solution for overprinting variable information on your flexible film or labels, delivering the highest reliability combined with graphic quality image results – overprinted information actually resembles the quality of your original artwork! For your convenience, we designed the V230i to easily replace your troublesome printer. A typical printer retrofit takes less than an hour so that you are only minutes away from realizing Domino's sizeable benefits.

Replace- It's easy to replace your existing TTO printer- production ready in under an hour.

Print - The V230i prints reliably from low to high speeds producing the highest quality, variable information images that appear to be part of the original packaging graphics.

Save - The V230i's "Economy Mode' employs bi-directional stepper motors to use less ribbon while maintaining the same, dark image on your package - reducing your cost of consumables by up to 60%.

Scan the code to find out more about the V230i

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Domino. Do more.

continued

Understanding biaxially and monaxially oriented films

Single-, or mono-, direction orientation yields films with more specialized, unbalanced directional properties and must be carefully considered to take advantage of these unique attributes. Orientation processes are an important part of the polymer processing arsenal to convert pellets of plastic resin into valuable packaging films. ◆

Common ways flexible packaging projects can fail

These facial wipes are made from 100% natural certified organic cotton, and the packaging incorporates renewable and recyclable resin for a significantly lower carbon footprint than its competitors, according to the company.

Flexible packaging for consumer goods is gradually claiming market share in a number of categories. Whether you're the first to market with flexible in your category or trying to ride the wave, it's best to proceed with caution. Here are some serious considerations to keep top-of-mind while developing a new package.

1. Not understanding consumer needs. A household-cleaning product in a stand-up pouch seems like an innovation ripe for the market. Aside from convenience and refillability, sustainability gains would also be achieved. But what was a popular package format for similar products in Europe did not fly so well in the U.S. For good or bad, U.S. consumers are curious creatures of habit and, sometimes, doggedly resistant to change.

2. Not understanding retailer needs. Avoid shortsighted design that consumers may like but that doesn't work well in distribution systems or on store shelves. Retailers will reject packaging out of hand if it doesn't move through their supply chain efficiently, fit on their shelves the way they like, or sell down neatly and easily.

3. Under-marketing the advantages of flexible packaging. With a new packaging format in a category, education is advisable. It's arguable that some less-than-stellar flexible packaging introductions of the past might have caught on had the brand owner marketed the key advantages to consumers right on the package. Advertising

continued

Common ways flexible packaging projects can fail

campaigns can also help consumers become more comfortable with a new user experience. Another strategy is to lower the price of a product in a new flexible package, temporarily, to entice consumers to abandon the legacy packaging format.

4. Poorly defined or changing requirements. Not doing your homework up front in terms of fleshing out the package requirements is a sure-fire recipe for failure. Alternatively, rushing a new film or package format to market without fully investing in validating the idea using test rolls of film can also be trouble. Finally, changing requirements halfway through a project may not cause failure, but will likely result in a missed launch window, extra costs, or delayed sales and profits.

5. Too many projects under way at once. The "mental make-ready" time of having to constantly switch mental gears between different projects can add delays, introduce mistakes, and reduce the overall quality of work and design. You're better off knocking out projects sequentially with fewer distractions.

6. Poor supplier coordination. Flexible package development snags often occur due to unclear, inadvertent, or incorrect assumptions surrounding package size, shape, material, and machinability. Avoid these bottlenecks by bringing together both machinery and materials suppliers, setting clear expectations, and including them on your team communications. Ensure that everyone reviews and commits to a common timeline, and jointly discuss any potential technical hurdles to avoid misunderstandings. Proper coordination will reduce the potential for things to go wrong, add clarity and responsibility, speed up resolutions, and minimize finger-pointing later when problems occur.

Heinz Leak-Free Single-Serve Juice
www.bit.ly/pwt00427

Editor Pat Reynolds takes a close look at a uniquely functional dispensing spout applied to a stand-up aseptic pouch marketed by a Heinz division in the Netherlands.

continued

Common ways flexible packaging projects can fail

7. Poor internal communication. When things do start to go wrong, a culture where bad news gets hidden will just make things worse. Creating an open communication climate where bad news gets reported and acted on immediately will yield positive results in the end.

8. No contingency plan. Selecting a given construction and discarding all other possibilities can be risky. It's not impossible for a new structure to pass all the tests and still have failures out in production and distribution. Starting over from scratch will waste valuable time. The better alternative is to work on multiple constructions in parallel during the package development process. If your chosen construction fails, you don't have to go back to the drawing board at the last minute.

9. Not enough closure. Spouts and closures for flexible packages are becoming more and more sophisticated. Though often small in size relative to the bottle, pouch, or tube container it caps, closures can have the biggest impacts for consumer functionality, ease of use, and comfort. A spout or closure is often the primary point of interaction the consumer has with the product and package. Don't downplay its importance; make sure it works as advertised, with few failures, if any. (For more, read "Closure best practices that keep possibilities open" in the Packaging Development Playbook.) ◆

Seven tips for flexible line setup and cleaning

Properly setting up your flexible packaging line will help you avoid downtime later on. Regular cleaning of your machinery is one way to keep your line running smoothly, while keeping an eye out for anything that could develop into a bigger issue down the road.

1. Fit the machine and packaging to the product. First, make sure the packaging material and structure are right for the product. Then find the right machine for the job. Then make sure the packaging substrate and structure are uniform and undamaged for efficient operations. Finally, inspect all incoming materials for consistency, which is essential in keeping the line running.

2. Choose carefully between continuous motion and intermittent machines. If you use continuous motion, you need to keep it continuous with certain films, as temperatures are a little higher. If you're on a line that starts and stops, you've lost control of the temperature of the film on cooling rates. This tends to cause some wrinkles in the film and make the package look bad. It can happen with any film, so know when to use a continuous machine vs. an intermittent machine.

continued

Seven tips for flexible line setup and cleaning

3. Demand high-quality substrates. Make sure you have good quality poly woven laminate bags for running on automatic lines. Good quality bags remain standing after filling. Do not accept distorted bag bundles from supplier. Keep pre-made poly bags in a temperature- and humidity-controlled room; otherwise, they tend to stick together due to electrostatic van der Waals forces.

4. Keep a clean work area. Pay attention to the correct design of the aspiration system for a bagging line handling powdered solids in order to have a nearly 100% clean operation. After each shift, clean the entire area and aspirate the control panel. Think of cleaning as the best preventive maintenance. Every three months, take a component of the system, deep clean it, and re-lubricate it with the correct lubricant. Regularly check for air leaks, adjust settings, and change damaged parts.

5. Clean on a schedule. Ensure that the sealing jaws are cleaned regularly during every changeover and, if possible, apply a dry PTFE spray to avoid film-sticking problems. This helps run the machine with minimum stoppages due to sealing issues. Keep your forming tube/ shoulders clean and free from debris. Not only will this allow you to pull film straighter, it will also allow you to pull a more consistent length of film through the shoulder.

6. Document all cleaning procedures. Machines handling raw product invariably get dusty and dirty. Regular and proper cleaning helps improve efficiency and enable quicker troubleshooting when the need arises. Document a Standard Operating Procedure (SOP) for the cleaning so each shift delivers consistent results.

continued

Seven tips for flexible line setup and cleaning

7. Pay extra attention to sealing equipment. Spills on conveyors often get transferred to other equipment. Keeping the seal bars and platens clean is essential for repetitive and sustained heat sealing. Make sure liquid does not splash back into the seal area. Having the operator 100% responsible for clean machines heightens operator awareness and encourages autonomous maintenance. After establishing a clean sealing surface, then it's important to understand the temperature, pressure, and dwell time variables. If possible, have the settings visually displayed and recorded hourly. ◆

Seven best practices for training and maintenance

Investing in well-trained personnel means you won't have to worry about the efficiency of your flexible packaging line. Here are eight tips to keep in mind:

1. Require comprehensive training that is verified. Inexperienced operators and maintenance personnel will damage equipment, deliver poor performance, and become a safety hazard. Management's commitment and involvement in maintenance are critical. Back up with daily operator checklists and feedback, both a.m. and p.m. Also implement weekly and monthly checklist inspections and be prepared with quick remedial actions and proper serviceable spare parts.

2. Retain highly skilled and well-trained employees. Staff should be trained to use proper controls for fine-tuning the speed and efficiency of output. Ideally, operators should be rotated every three hours. Avoid line stoppages by making sure a machine set for a particular size remains in that setting until the batch size is completed. Have the line clearance implemented by quality assurance. And only authorized engineering team members with prior approval permissions should be allowed to change or modify settings.

3. Talk to those who know. Talk to the machine manufacturer about the ins and outs of the machine. They know more than anyone about the equipment. Many mechanics are not as skilled as they think they are. The manufacturer might alert you to a feature or advantage of the machine that you, or the operator, never thought of.

continued

Seven best practices for training and maintenance

4. Memorize the manual. Or know the manual intimately. You should spend hours reading the manual and knowing it inside-and-out and backwards-and forwards. Try to always have in mind the operation cycle and its exact motion so that you can predict an upcoming problem coming from the sealing material or a machine malfunction. Mostly be there 120%—the machine needs you.

5. Make preventive maintenance a weekly routine. There are a lot of moving parts on bagging equipment, and they all need regular maintenance and inspection. Oil all the cams and bearings on a rotating maintenance schedule to avoid machine stoppages that will damage the film. Have operators clean the press and sealing jaws daily and check the tightness of all connectors. Every time there is a stoppage for more than a couple of hours, dry-clean the machine.

6. Perform modular maintenance on heavily used parts. Maintenance procedures on these parts can be as frequent as every 48 hours, depending on the line. Train your operators to listen to the machine as it is running, so they can learn to hear a minor issue before it becomes a large one. Consider automated greasing of machines and monitors that protect from over-greasing. Service fill valves regularly, lubricate filler properly, and check uniformity of capping torque on all capper heads.

7. Keep preventive maintenance procedures in place. Train all operators to install the parts in the filling area and de-install them after filling is done. Operators are trained to handle minor to moderate machine problems and to immediately attend to any unusual sound or abnormal vibration. Any change is closely considered in the context of risk and maintenance down times. Clean machines externally with proper, approved sanitizers that do not cause stains or rust to stainless steel. ◆

Seven things to keep in mind for operations and changeovers

Once you've done the training, it's time for the day-to-day operations of your flexible packaging line. Here are seven best practices for you to consider.

1. Use your resources wisely. Try to keep the same operator on the same machine as much as possible. Over time, machines develop little idiosyncrasies that may cause them to react differently than expected. By keeping the same operator/machine combination together, you will get more out of your equipment.

2. Engage operations team directly. It is critical to get the plant floor operators and technicians directly involved in the productivity improvement efforts. One way to do this is with a plant floor client application that provides the operators with a real-time "score" as they are running. This process can also be used to collect additional information from operators related to running the lines; for example, recording when operators stop the line for a changeover or for cleaning.

3. Find the equipment's "sweet spot" speed. Run the equipment at its sweet spot for each product. Continuous steady-state production at a less than maximum, sustainable speed often produces more output in the long run. Maxing out the machine in speed can produce lower quality output or increase downtime. Before pushing the limits, earn the right to incrementally increase the speed while maintaining control and consistency. The sweet

continued

Seven things to keep in mind for operations and changeovers

spot is roughly about 80% of the cycle rate of the machine. The sweet spot is usually higher for stable and tight variances on containers or materials as well as for products with curved corner edges.

4. Sweat the details. Ensure placement of film in the right position. Inspect consumables like heating elements, Teflon tapes, and back-up rubber (if the machine is impulse-sealing). Clean serration and seal surfaces with a mild brass wire brush after heating the seal jaws if the machine is a continuous-heater type. Clean the knives and remove any molten polyethylene.

5. Mind the changeovers. When changing to a different size or width of roll stock, take the extra time to make sure that everything is centered as much as possible (by roll and web tracking device). By having this centered, you are not exerting forces upon the film that try to push or pull it in one direction or another. A wandering web can cause less-than ideal back seals.

6. Color-code changeover parts. This both ensures regulatory compliance and makes it easier for production personnel to identify which parts are needed for specific products or groups. Conduct proper operator training and operating reevaluation to ensure that all operators are following the same procedures. It doesn't take long for unsupervised staff to begin deviating from normal maintenance procedures and SOPs.

7. Schedule periodic inspections. Inspections by the manufacturer or a designated service representative ensure that the system is functioning at its optimum level. Inspections also provide early detection of problems. Early detection allows staff to correct problems at a time convenient to ongoing operations. Better that than repairing the system after it has failed and the unit has shut down. ◆

A seven-point checklist for inspection and repairs

The best way to maximize your machinery's uptime is to schedule regular inspections. Catching minor issues before they develop into major repairs saves you time and money.

1. Verify your vision system. Before you invest in a vision system, make sure the system is proven with a professionally done feasibility study. A great systems integrator is one who has a preferred or certified award from the system supplier. Don't be fooled to think because a system uses a new smart camera it will be any easier to implement. The basics of lensing, lighting, and staging have to be done before you start. Then your team needs to be ready to do simple troubleshooting like refocusing or calibrating.

2. Check your monitors. Check that the photo mark detection and scan head functionality works properly. Prepare the batch printer contact/non-contact type by suitable ink filling and cleaning. If the machine has a programmable control panel, check if there is a provision for single-touch playback. You should bring the film with its photo mark to the center of the jaws to avoid wastages. Check that the alarms that stop the machines for safety and operational mistakes are in working order.

3. Use the weekends for thorough physical inspections. Have "wear-and-tear" parts available to prevent long down times. Don't allow operators to touch magnifying glasses on machines. Have engineering teams perform all height adjustments and magnifying

continued

A seven-point checklist for inspection and repairs

glass adjustments. Record and track downtimes on each and every machine, and analyze every three months. If downtime is more than 5%, then dedicate immediate attention to finding the root cause.

4. Don't forget about the bearings. A broken bearing can be your worst nightmare. These are what keep any part in motion moving. If one cracks or breaks, your whole operation can come to a screeching halt. So inspect them all the time and keep them lubricated. And check out food-grade silicone spray if you haven't yet.

5. Check tightness of vacuum. On roll stock packaging machines, it is important to know that your vacuum system is tight each day before production resumes. Some machines come with a static check mode in the program, which is a good start. The seal circuit should also be tested by installing a ball valve in line with the infeed vacuum line, so it can be closed while monitoring a vacuum gauge for leak-down rates. If leaks exist, use standard isolation methods to find the area of the leak and correct it.

6. Manage the risks. Make a risk assessment for each component of the machine, asking what could cause this component to fail or stop. Check each machine against the risk assessment list before each shift, so it starts with a "clean bill of health" for the next shift. When a failure occurs, ask what might have gone wrong, or what might have been missed, in the last assessment. Small steps of improvement should produce a better success rate and higher productivity over time.

continued

A seven-point checklist for inspection and repairs

7. Automate key performance indicator (KPI) data collection. If you don't know about it, you can't fix it. Many plants are stymied by a lack of accurate information that would allow them to understand why they are stuck at current productivity levels. Or, there are so many opportunities it is difficult to know what problems to attack first. Fortunately, real-time performance management software is now available that allows companies to automatically collect accurate, real-time performance data from various sources. This allows a complete characterization of line performance through continuous tracking of OEE and other KPIs in real time, and the relation of these to every equipment failure— including frustrating short stops that might just be a few seconds in duration. ◆

Trends in form/fill/seal equipment

Here are some of the latest trends in form/fill/seal equipment:

1. Ultrasonic sealing. Some f/f/s machinery manufacturers are debuting ultrasonic sealing capability, which has several advantages over traditional heat sealing. First, ultrasonic sealing has the ability to seal through certain food particulates. Ultrasonic technology suppliers claim this means a drastic reduction in rejected bags and a much lower chance of leakers, a critical issue for oxygen-sensitive products like shredded cheese or lettuce. There is also the potential for film savings. For example, on a typical pillow-style bag made with a laminated structure, traditional heated end seals are typically 3/8 in. wide. But ultrasonic seals are just 2 mm wide. That could mean a savings of more than 1/2 in. per bag. Some industries may be able to reduce the headspace in the finished bag, since having product in the seal area is no longer a concern. This could result in further film savings and machine increases. Also, there's the potential to reduce or eliminate the sealant layer in film structures, reducing material cost. Finally, ultrasonic sealing systems have the potential to "detect" whether a package has a potentially bad seal by measuring the time and power required to make an acceptable seal. If either parameter falls outside of a preset window, it could indicate a poor seal, allowing the bagger to reject the package for manual inspection. This could reduce or eliminate the requirement in some industries to manually check 100% of bags for leakers, saving labor and increasing throughput. The downside? Not all film structures can be sealed with ultrasonic technology. And ultrasonic sealing adds quite a bit to the system cost when compared with traditional heat-sealing systems.

continued

Trends in form/fill/seal equipment

2. Faster changeover and more reliability. Packagers are focused on reducing both planned and unplanned downtime. This is driving machine builders to reduce the number of adjustments for changeovers on their bagging machines. This can be as simple as adding color-coded centerlining features, clearly marking where to move a given knob or adjustment for precise, repeatable changeover settings throughout the machine. Or it can involve reducing the amount of time required to change a roll of film to less than 60 seconds.

3. Improved sanitation. A heightened focus on food safety has resulted in a demand for equipment that's easier to keep clean, with fewer or no cracks, crevices, or areas for particles to be trapped. In the dairy industry, a common standard referenced in machine-build specifications is AAA, which concentrates on cleanability, functionality, and durability. The recently implemented FDA Food Safety Modernization Act (FSMA) means that food companies are accountable to the Food and Drug Administration (FDA) to help ensure that their suppliers are making safe ingredients. It has two major themes: prevention and accountability. Prevention means that food companies need to have controls in place during manufacturing to assure the safety of their products and to prevent problems (not just react to them after-the-fact). New cleanability guidelines for food packaging machinery are a big part of the new regulations.

4. Better networking. Many f/f/s equipment manufacturers are beginning to make it easier to network their machines into a plant supervisory control system. A key benefit is compatibility with centralized plant automated data collection systems. This can lead to enhanced line control—in some cases, the f/f/s machine can slow down or speed up automatically based on signals from upstream or downstream equipment, ensuring a smooth and balanced production line.

continued

Trends in form/fill/seal equipment

5. Advanced servo technology. Proprietary "black box"-style controls are on the way out, and off-the-shelf controls are in. Many machine builders are beginning to switch to integrated servo drive/motor units, where the drive is literally built into the motor. Benefits include less wiring for the machine builder, which can reduce or even eliminate the control cabinet, as well as simplify troubleshooting. Also, the drive/motor combos signal when they begin to fail, and make it easier to quickly swap out a bad motor/drive to quickly resume production. Servo technology itself is increasing to the point where machines can produce bags at higher speeds and accuracies. Better diagnostics help detect and prevent potential failures. Controllers that accommodate open standards such PackML are gaining traction, thanks to flexible packaging-specific software functionality, such as controlling film registration or regulating sealing jaw temperature.

6. Higher speeds. Some horizontal pouch-filling equipment utilizing multiple lanes is approaching speeds of 1,000 packages/min. This capability makes it possible to entertain the idea of replacing high-speed machinery infrastructure currently running glass jars and metal cans. Vertical equipment continues the trend toward continuous-motion operation to achieve speeds upward of 200 bags/min for some laminated film structures, and up to 130 bags/min for low-density polyethylene.

7. More flexibility. For years, the single most important driver in f/f/s machine design was speed, often at the expense of flexibility. Machinery had to be purpose-built for specific bag styles or sizes to achieve very high speeds. Today, however, flexibility is the primary driver. Machinery builders are being asked to provide machines that can produce multiple bag styles, sizes, film structures, and reclosable features, without sacrificing speed. ◆

Best practices for specifying flexible packaging equipment

There are numerous best practices for specifying flexible packaging equipment. Here are 10 you should know:

1. Test until failure. Remember, you don't test for the first sign of success; you test until you see the first sign of failure, in order to understand machine and process limitations. Check out different conditions such as varying temperatures and humidity levels during Factory Acceptance Testing. This is especially important when incorporating combination weighers, which demand precise, accurate, reliable product flow and package positioning, especially at bag openings.

2. Match the material to the product and machine. If these aren't in alignment, you're in for trouble. If they are aligned, you'll avoid waste, delays, and chaos. You can't have a 10-pound bag with nine pounds of product; you also have to harmonize the bag opening with the machine. Understand film rigidity, coefficients of friction, and fitments before you select equipment. Don't underestimate the number of variables to consider.

3. Understand the unique requirements of your product. There are scores of suppliers whose offerings look fairly similar at first pass. Before you start contacting vendors, however, understand your requirements. Are you subject to USDA or FDA regulations?

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continued

Best practices for specifying flexible packaging equipment

Are you a dairy that must comply with 3-A Sanitary Standards? Different standards and regulations require compliance with specific engineering design and construction requirements.

4. Pay attention to the details of the machine. A focus on cost often clouds the details. How a machine works may be more important, in the long term, than what it costs today. There are hundreds of reasons some machines cost less or more than others. Is the entire machine servo-controlled? Are adjustments totally mechanical? That could cause a three-hour changeover. How does the machine adjust? Be a stickler in understanding the construction of the machine. How do you feed in product and control the flow?

5. For form/fill/seal machines, simpler is better. There's no need to purchase unnecessary options; typically they represent potential breaking points, and these machines cost enough without the extras. Because

continued

Best practices for specifying flexible packaging equipment

heavy dies are commonplace in f/f/s applications, make sure you have a good way to remove and repair them. Access to parts for maintenance may be especially critical, as new technologies offer, for example, ultrasonic sealing methods, die-cutting of pouch package shapes, and the ability to add spouts—in some cases all within the f/f/s process. Consider access to all sides of the machine, and think carefully where it will be placed in your plant.

6. Loosen up. When thermoforming and flow wrapping, incoming material may be too tightly wound. This can be a root cause of equipment problems. Also, make sure that your equipment can handle larger rolls.

7. Have a well-considered waste strategy. With an increasing focus on environmental and sustainability issues, it is important to know how you will handle waste. What processes (e.g., shredding) will you employ to deal with it?

8. Think long term. The typical life of a machine is 20 years, and initial capital cost issues fade over time. Don't let them distort your thinking. Remember to analyze operating costs along with performance and efficiency, and remember to account for the cost of consumables, down to the ink used on coders. Thinking in terms of Total Cost of Ownership for the full life cycle of your capital equipment enables you to more clearly analyze machine effectiveness and performance parameters. Additionally, long-term analyses lead to optimal repair-replace decisions as machinery nears the end of its service life.

continued

Best practices for specifying flexible packaging equipment

9. Assess the speed to value. CPGs are looking for flexible machinery lines to run at faster rates to accommodate the expectations of plants using rigid packaging lines. But flexible packaging isn't rigid, and this can be quite challenging. Speeds are increasing as continuous motion replaces intermittent-motion machinery, and as multi-up formats gain popularity in fill/seal and f/f/s processes. For example, instead of a single bag-per-cycle machine topping out at 180 bags/min, a new machine producing four or more bags per cycle may prove a big plus for a plant seeking to undergo a rigid-to-flexible conversion.

10. Consider addition by division. Splitting the line into primary and secondary packaging subsystems may be advantageous, especially when separate suppliers are involved. Consider using the supplier of each segment of the line as a subcontractor to integrate the elements with which they are most familiar. ◆

Six tips on finding the right form/fill/seal supplier

Here are some tips to keep in mind when shopping for suppliers of form/fill/seal equipment:

1. Be transparent and consistent. Suppliers can only quote solutions based on what you've told them. If you're not consistent with the information you provide to suppliers, you're not getting apples-to-apples comparisons. Avoid keeping small pieces of information from suppliers because they seem inconsequential. Often, they can be quite the opposite.

2. Look for industry-specific experience. A company whose strength is in snack packaging may not be the wisest choice for a frozen entrée application. Manufacturers of f/f/s equipment often build areas of strategic expertise around certain industries and applications. Request customer references for applications in your industry.

3. Find out if they play well with others. When things go well, everyone slaps one another on the back. But when a project runs into trouble, you don't want suppliers pointing fingers at one another. Ask for a customer reference on a difficult install and find out what the supplier did to make it right. All suppliers experience bumps in the road to multivendor installations; reputable suppliers work diligently to maintain a sterling reputation with customers and the industry at large.

continued

Six tips on finding the right form/fill/seal supplier

4. Investigate relationships with film vendors. Consider avoiding machinery vendors that only work with one or two material suppliers. A machine that is designed to run film from one or two suppliers may not be as robust as one made to work with multiple films from different vendors. Look for equipment vendors that have worked with films from multiple sources.

5. Don't make assumptions based on past history. Don't automatically eliminate a supplier because of a supposedly poor reputation or a bad experience from long ago. Conversely, don't skip customer reference checks from a supplier with a supposedly good reputation. Things change all the time, and companies that provided bad service years ago may provide good service today, and vice-versa.

6. Look to vendors that have strong strategic alliances with other OEMs. Because integration is vital across a line, it's important that suppliers recognize their core competencies and develop working relationships where other expertise is needed. Seldom will a plant install a complex line using a single, turnkey machinery supplier. More commonly, there will be some need to integrate additional new and best-of-breed machinery, or even existing equipment. No one company is a master of all the technologies involved in today's flexible packaging; be wary of any presenting themselves as such. ◆

Tips for working with flexible packaging machinery builders

BY DAVID HOENIG

Once a machinery builder is selected, you're looking at a lead time of several months while your machine is being built. Here are some tips to keep the project on track:

1. Deal with the right person. Find the person on the supplier side who has the proper technical knowledge and authority, rather than going through the supplier's salesperson in the hopes that they can translate. Ideally the person you deal with will be the one responsible for the design of the equipment.

2. Documentation control. Create one action document that lists who is doing what, and the status of each item, rather than sending 1,000 e-mails. Have formal and scheduled design reviews where you review the document together and assess status. This can be accomplished over the phone; it doesn't necessarily need to be face-to-face. Make the supplier take ownership of maintaining and updating this document throughout the project.

3. Don't be a stranger. You're likely spending a lot of money on a new bagging machine. Plan to check in with the machine builder with regularly scheduled visits during the course of the project. Even in the best-run machinery builder companies, regular customer visits compel action surrounding your project. If they know you're coming in, they're more likely to ensure that attention is paid internally to ensure they're on track in preparation for your visit.

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continued

Tips for working with flexible packaging machinery builders

4. Test materials. Pay attention to the machine builder's request for testing materials. Factor in the time required to have the rolls printed with a registration mark, slit to your desired width, and shipped to the equipment supplier. Avoid allowing a delay in providing materials as an excuse for a late Factory Acceptance Test or machine delivery. And if you are not sure of your final film structure, the machine builder's floor is not a bad place to test the options. ◆

What NOT to overlook on form/fill/seal equipment projects

BY SHAWN FRENCH

Here are a few areas that sometimes don't receive sufficient attention on form/fill/seal machinery projects:

1. Integration of the bagger with the scale. The scale and the bagger are not always from the same vendor, and frequently are not from the same country. Two of the larger scale manufacturers are in Japan, and the majority of baggers are made in the U.S., the U.K., Germany, and Australia. These pieces of equipment are usually integrated at the packager's plant. Care must be taken to understand the "stack-up", or the total vertical elevation of the scale and bagger, well in advance of installation.

Often, the scales are mounted to an overhead platform, and the bagger sits on the floor. Typically the platform is designed and erected prior to the arrival of the scale and bagger on-site. If the engineering is not done properly, machines don't fit! If there is a metal detector placed between the scale and the bagger, that adds another layer of complexity in the design.

For fragile products (snack foods, cookies, etc.), minimizing the drop from the feed system to the scale to the bagger to the discharge conveyor is the key to good design. Also, if the bag is going into a tray that will sit on the retail shelf, ensure proper orientation of the bag exiting the bagger and prior to tray loading, so that the bag faces the right way at retail.

continued

What NOT to overlook on form/fill/seal equipment projects

Regarding controls, the communication between the scale and the bagger is important. Does the scale tell the bagger it is ready with a charge, or does the bagger tell the scale it is ready to make a bag? There is also the downstream machine that needs to be ready for the bag to be sent.

Bottom line: Take time to really look at the entire system, interface points, product drops, bag orientation, operator access on platforms, space for cleaning, etc., because once it's installed, it's hard to change.

2. Controlling the amount of air in the package. Air trapped in the bag can be a good thing (for product protection) and a nightmare on secondary packaging. It can make loading into a carton or tray very difficult and can require additional components or features to allow the downstream equipment to function properly. Sometimes packages are flushed with an inert gas to extend the shelf life of the product. This is very common in snack foods (for example, chips and nuts). F/f/s vendors offer devices to remove some of the air with stationary guides or plows, as well as with "adjustable bag deflators," which can be mounted to the horizontal sealing jaws. Changing their position can modify the amount of air in the bag.

3. The design of the seal. There are a multitude of seal designs and knife types. General types for backseals are fin and lap seals. Different films require different seal jaw materials and designs. Bags can have gussets, flat bottoms, or four-corner side seals to improve presence on the shelf. Within the seal, there may be easy-open features that can be

continued

What NOT to overlook on form/fill/seal equipment projects

designed into the seal jaws. Extremely large seals may be a waste of material and provide an opportunity for optimization. The package designer and the equipment engineer should work together with the equipment vendor to determine the optimum seal design. Variables such as serration design (pitch, angle, depth), impressions per inch, total number of impressions, orientation of serrations (horizontal versus vertical versus diagonal), and knife type are decisions that need to be made. These are great areas to rely on the expertise of both the packaging material and packaging equipment suppliers. ◆

Vendor evaluation methodology for form/fill/seal equipment

BY PAUL ZEPF

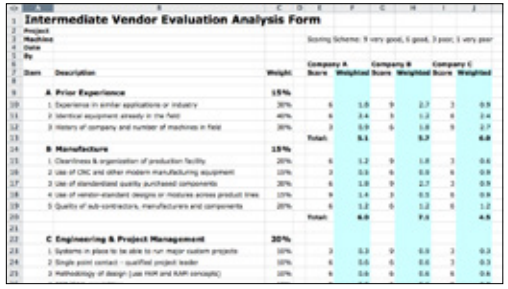
When evaluating form/fill/seal machinery suppliers, it's important to follow a disciplined methodology to eliminate as much subjectivity as possible. What follows is an Intermediate Vendor Evaluation Analysis methodology that is well-suited to f/f/s equipment. Broadly, the process breaks down into four phases:

1. Canvass the field. Before you put together your Request for Quote (RFQ) document, take some time to broadly canvass the field of suppliers and look at options, getting a rough idea of prices and capabilities. A simple checklist of requirements will suffice at this stage. You're just looking for a rough guide—don't hold them to it without furnishing a formal RFQ.

2. Write your requirements document and RFQ. Put together a detailed requirements document of what the project will require, and use that as the basis for the RFQ. It's critical to have everyone on your cross-functional team review the RFQ before it goes out to the vendor, to ensure that it addresses areas important to each team member.

3. Issue the RFQ. You'll want to issue your RFQ to ideally three, but no more than six, packaging suppliers. With the responses you get back, rate them using the Intermediate Vendor Evaluation Analysis spreadsheet tool (see download link, left).

Download Spreadsheet


Intermediate Vendor Evaluation Analysis

http://awgo.to/561

continued

Vendor evaluation methodology for form/fill/seal equipment

4. Conduct the Intermediate Vendor Evaluation Analysis. When you get quotes back from vendors, rate their responses and plug them into the Intermediate Vendor Evaluation Analysis spreadsheet. Make sure your entire cross-functional team's input goes into the scoring procedure! This can be achieved either by everyone sitting around a table and achieving a group consensus score-by-score, or by having each team member score the vendor quotes separately, and then compare results—whichever works best for your team. This team scoring approach is especially critical if the machine or technology is a first-time buy.

The Intermediate Vendor Evaluation Analysis is designed for critical machines on the line, including a f/f/s machine. This spreadsheet tool separates the assessment of the machine builder from the machine. The tool rates each vendor across seven key areas, including prior experience, manufacturing capability, engineering and project management, company management, support, delivery, and references.

Use the bottom tab to select a second worksheet that allows the rating of the actual machine itself across nine key areas, including technical risk assessment, throughput, reliability and maintenance, changeover, machine design, ergonomics, operator interface, safety, and cost.

To mitigate against the tendency of giving a middle-of-the-road "5" score to ambiguous criteria, restrict your scores to a 1, 3, 6, or 9 (on a hypothetical scale of 1 to 10, where 10 is best). This will force out a differentiation. If you don't have prior experience with the vendor, it helps to speak to the vendor's other customers who have similar products, and use that as the basis for your scores.

continued

Vendor evaluation methodology for form/fill/seal equipment

The spreadsheet provides a total weighted score for each vendor and machine. While the spreadsheet can't pick a vendor or machine for you, it can be a system for helping to make sense of and evaluate the mass of information you're receiving from vendors.

Some tips on filling out the spreadsheet:

1. Maintenance and spare parts. To judge the number of high-maintenance parts, ask the supplier about the spare parts kit they provide as standard, including wear components. Look for fewer wear components and fewer overall components, as well as whether they are minor versus major machine components. Check how easy it is to swing away the seal jaws without tools to gain access to the sealing area for easy cleaning. Look for standardized components that can be purchased either locally or from multiple sources.

2. Complexity of design. To assess the complexity of the machine design, look at how many parts or components a subassembly has to accomplish a given task. If one machine has two parts and another has 10 to accomplish the same function, the one with the smallest number of parts in general has the most efficient design. But make sure to take flexibility into account. If the machine with 10 parts allows for far more bag sizes and styles, that's to your advantage.

3. Weigh cost accordingly. In North America, CPG companies tend to focus overly on cost, not on value. The spreadsheet gives a default weight of only 10% to cost, but like any number in the spreadsheet, you can modify it as you see fit. At your company, that number may be higher, but a best practice is not to exceed 20%. Cost shouldn't be the overriding determinant of whether you buy a given machine—functionality should. ◆

Six factors to consider when choosing between premade bags and a f/f/s system

You're looking to add flexible pouch capability in your operations—a very popular choice. You now have a choice between two reliable and time-tested pouch-filling methods: You can make the packaging in your facility, or utilize premade bags. Here are some factors to guide your choice:

1. Get educated about the fundamentals. Form/fill/seal, whether horizontal or vertical, is dedicated. It is capable of considerably higher volumes and faster speeds, with a lower cost per bag. However, it requires the packager to become his own bag maker, ordering rollstock, dealing with scrap, etc. Not every operation is set up for that method. Premade bags offer a lower cost of entry, and are made by experts in bag-making technology that can constantly invest in new technology, equipment, and materials. They also offer some styles of bags (stand-up, gusseted, etc.) that are not readily available with f/f/s. However, the packager does not have as much control over construction of the bags when they are bought premade. Keep in mind that a pouch-filling machine needs a full-time operator to load the pouches, whereas on the f/f/s machine, the operator can focus on other things while the reel of film runs.

continued

Six factors to consider when choosing between premade bags and a f/f/s system

2. Consider a shortcut calculation. For some packagers, a shortcut calculation takes volume into consideration. Overall volume below a certain number of units per year indicates that it makes more sense to use premade pouches—the volume number can be anything from several hundred thousand units per year, to 1 million or more. If you cannot predict robust growth, the payback may be very long for a f/f/s system.

3. How many different pouch styles? If you will be making many different pouch sizes, shapes, or styles and need to change over a number of times in the same day, the premade pouch machine (PMP) is probably better suited for the flexibility you require. If you have longer runs and higher output, and only one-to-four different sizes or styles, the f/f/s is the better option. Rollstock for f/f/s is inventory that can be used for multiple bag sizes, etc., whereas using premade bags can potentially leave you with a lot of inventory for a discontinued product.

4. Take into account product shapes, sizes, and variability. Rollstock can be an ideal choice if there is a consistent size and shape of product, such as, for example, uniform blocks of cheese. Because premade bags can shrink to adapt to nonuniform sizes, they are more adaptable to a more variably shaped product, such as a tri-tip roast.

5. Prepare to deal with the scrap. Scrap is a greater concern when using rollstock and making packaging on-site compared to premade products, since excess material is concentrated in the facility where the bags are manufactured. A horizontal f/f/s machine can typically have scrap rates in the 1% to 3% range, yet run at high operating efficiencies of 94% to 98%. Packagers do not have to deal with scrap with premade bags, but obviously the cost of dealing with the scrap is built into the price you pay for the bags.

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continued

Six factors to consider when choosing between premade bags and a f/f/s system

6. Don't neglect the FAT. Factory acceptance testing (FAT), which is not as important with premade bags, is extremely important for f/f/s. Both sides should discuss in advance what will be accomplished during the FAT. (See "Roadmap for a successful form/fill/seal Factory Acceptance Test") In both the PMP and hf/f/s cases, the quality of the pouch material is important for good efficiency, and consistent machine maintenance and operator training is key to success. Ultimately, you will need to review the combination of capital equipment cost, pouch material cost, number of pouch formats, and your expected annual output, and run the numbers to calculate the expected payback and return on your investment. ◆

Best practices for implementing flow-wrapping equipment

Source: Bosch

For effective flow wrapping, make sure your supplier has all the pertinent information about the product, its characteristics, and the film you plan to use.

Flow wrappers are a cost-effective way to package products. Because they are often used for baked goods and other products whose dimensions and other characteristics can change, a thorough knowledge of the product and process is the key to success.

1. Communicate with your chosen equipment supplier. Your supplier needs all the pertinent information about the product, its characteristics, and the film you plan to use. Especially if it is a new product, dimensional specs and variations need to be addressed up front.

2. Ask plenty of questions. If you've always done manual wrapping, and this is your first flow wrapper, you may not even know what questions to ask. Back-and-forth visits between your plant and the supplier's facility will acquaint them with your particular products.

3. Do your best to submit samples for validation. Baked goods, in particular, vary in dimension by their very nature. Muffins are top-heavy, icing complicates things, and not every bagel is the same size. Submit as many relevant sample variations as possible to the supplier: fresh-baked, after shipping, frozen, etc.

continued

Best practices for implementing flow-wrapping equipment

4. Do your preinstallation prep work. As the packager, you have some preinstallation work to do after the contract is signed and before the truck pulls up at your door with the new machine. If your supplier assigns you a project manager, so much the better. If not, here are some things to remember:

- All utilities need to be ready for the new machine: electricity, air, water, steam, drains, etc. The morning of delivery is not the time to call an electrician.
- Prepare the area where the flow wrapper will be placed, and remove any obstacles in the path of the machine, from the truck to its new location.
- Make sure you have a forklift, or arrange to rent one. As one supplier commented, "This is not a toaster that you just plug in."
- A conference-call "walk-through" with the supplier, before the machine is shipped, can prevent any last-minute snags.

5. Perform a Factory Acceptance Test at the supplier's facility. Take the time, and assign the personnel, to do a proper FAT at the supplier's facility, with the film you plan to use. These evaluations can help identify necessary tooling changes or other considerations and determine the best procedures for maximizing equipment efficiency. Work out where operators will be stationed, make sure conveyors will fit and are laid out correctly, and perform any necessary electrical inspections, USDA sanitary inspections, etc. An additional benefit: you send to attend the FAT will feel responsible and "own" that piece of machinery. (See "Roadmap for a successful form/fill/seal Factory Acceptance Test")

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continued

Best practices for implementing flow-wrapping equipment

6. Don't neglect operator training. In general, the use of flow-wrapping machinery requires staff with select skills to maintain the equipment. Are adequate personnel available to service the equipment once it's installed? If not, the advantages of such equipment could be lost in downtime. It's much easier for operators to learn about the new machine in the supplier's facility, during the FAT, because there are fewer distractions. It's also much more convenient than trying to schedule training time at your plant after installation. Take the time to make sure your operators and technicians know how the flow wrapper should work, and know what to do if something breaks. ◆

Key food safety factors driving equipment upgrades

BY DR. DAVID ACHESON

Many factors are driving change in the food industry, not the least of which is impending new regulatory requirements that are part of the Food Safety Modernization Act (FSMA). However, food companies are currently being driven by a whole lot more than compliance with new regulations.

Pressures that food manufacturers and producers need to pay attention to are legion, including:

- Reliance on a global food supply chain
- Changing science that is connecting illness with foods more than ever before
- Consumers who expect great quality at low price with zero risk
- The propensity for both mainstream and social media to weigh in on food issues
- New regulatory requirements.

These are among some of the major factors driving upgrades in food processing and packaging facilities. Let's take a closer look at these factors:

continued

Key food safety factors driving equipment upgrades

Reliance on a global food supply chain. In the U.S. alone, there are more than 170,000 food manufacturers, processors, and distributors; about 2 million farms; and 1 million restaurants and foodservice outlets. Every one of them is driven by safety, quality, and compliance. The FSMA is only the latest regulatory "stick" in a long progression of technologies, standards, best practices, and a mix of mandatory and voluntary guidelines.

In the U.S., 15% of the food consumers eat is imported from more than 150 countries and territories. This includes about 80% of seafood and more than half of the fresh fruits and vegetables U.S. consumers eat. Import shipments of FDA-regulated products, for instance, have been growing at 13% annually. The country is dependent on imports, not because it has lost the skill to produce these foods domestically, but because it's more cost-effective to import it.

Changing science that is connecting illness with foods more than ever before. The science of food safety is changing. There are some people who hold views like the small business owner who says: "I don't need to worry, we've been making this product the same way for 50 years, and I've never had a problem." Just as likely, he's never had a problem because he's never gotten caught. Times—more properly, science—has evolved to uncover sources of risk.

For example, 2007 marked the first salmonella outbreak linked to peanut butter in the U.S., which was found to have heightened risk in the post-processing stage, after roasting and grinding and prior to packaging. Advances in science have identified many more sources of

continued

Key food safety factors driving equipment upgrades

risk. In addition to peanut butter, these other "low-risk" foods have been linked to new U.S. outbreaks of foodborne illness since 2006:

- Bagged spinach
- Carrot juice
- Canned chili sauce
- Broccoli powder on snack food
- Pot pies
- Dog food
- Hot peppers
- White pepper
- Raw cookie dough

How has the science of food safety advanced? By "connecting the dots" from multiple reports and linking illnesses with causes and sources. Along with this capacity has come a greater ability to measure lower levels of chemicals and pathogens; greater fidelity of epidemiology to understand the characteristics, causes, and distribution of food safety incidents; and improvements in genetic testing.

In turn, Class 1 food recalls—defined by the FDA as having a "a reasonable probability that the use of or exposure to a violative product will cause serious adverse health consequences or death"—were reduced for salmonella from 43% in 2010 to 21% in 2011. Allergens are in the crosshairs, having risen from 31% to 43% of Class 1 recalls in the same period.
(See chart on the following page.)

continued

Key food safety factors driving equipment upgrades

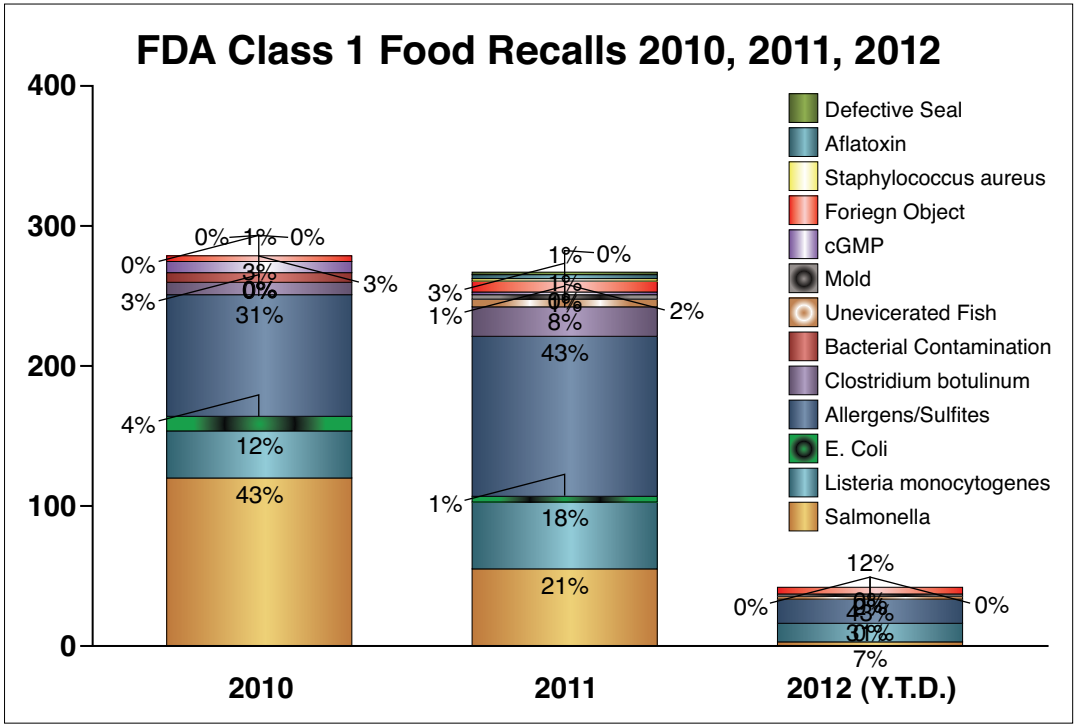


Chart shows the proportion of 13 causes of FDA Class 1 food recalls – the most serious kind. Such recalls for salmonella were reduced from 43% in 2010 to 21% in 2011; allergens are now in the crosshairs.

Industry measures to prevent incidents and to promptly address them once they happen are critical in risk reduction. One of the critical factors in achieving such results is the development of new and better equipment systems and automation applications.

Consumers who expect great quality at low price with zero risk.

Consumers expect top quality at low prices with zero risk, and demand that supermarkets, which stock tens of thousands of SKUs, deliver that variety of foods all year round, without regard for the seasonality that once governed food choices. They have zero tolerance for unsafe food, and place primary responsibility for safe food on the producer.

continued

Key food safety factors driving equipment upgrades

The propensity for both mainstream and social media to weigh in on food issues. From traditional print and TV outlets to Internet outlets such as social media, reports of recalls reflect consumer concerns and amplify them. The media tend to focus on food safety, partly because of consumer concerns and partly because recalls present a readily available source for stories. As a result of media reports and public awareness, a food safety incident has great potential to damage a brand.

Sometimes, the media and the "blogosphere" can take food safety concerns to an unfair extreme. The scare over "pink slime," for example, was purely a media creation. This was simply a meat protein processed to separate-out the fat, and used for many years for products including hamburger patties. The product and process were safe—arguably safer than other meats for the heat process used—but the term went viral, and consumer pressure effectively resulted in the 2012 shutdown of several plants producing it.

While it's impossible to eliminate all irrational fears and sensational headlines, it is possible to reduce them by stepping-up efforts to prevent brand damage, and greater food safety is the primary way to do this.

New regulatory requirements. Ensuring food quality, food safety, and compliance go hand-in-hand to help companies protect the public as well as their brands, new regulations play a key role in driving food companies to upgrade their equipment.

continued

Key food safety factors driving equipment upgrades

As food companies step up their efforts, the additional regulatory oversight and authority granted to the government adds additional pressure to ensure the safety of the food supply.

The increasing number of recalls for allergens and the rising numbers of warning letters from FDA are a testimony to both new recognition of problems and ramped up enforcement actions. Some of the key areas that are creating concerns for the manufacturing and processing industry that can be addressed by equipment and packaging manufacturers include:

- Environmental contamination
- Challenges with cleaning equipment
- Allergen concerns

Failure to pay attention to controlling risk around these critical issues can and does result in significant negative brand impact, which has to be protected by balancing safety, quality, and compliance. ◆

The key role of equipment and packaging

BY DR. DAVID ACHESON

As food companies are constantly looking for ways to control food safety risks, they increasingly recognize the need to ensure that their processes are fully validated and verified on an ongoing basis to be doing what they are supposed to do to control risk. They realize that they must control environmental risk and especially allergen risk.

Below are some of the key areas food production and packaging professionals should expect their equipment and packaging manufacturers to focus on in order to help production and packaging facilities maintain leadership in FSMA compliance:

Design equipment that is focused on "built-in FSMA compliance needs." Considerations include…

- Systems that can be easily validated.
- Systems that provide the key monitoring data that will determine the verification of validated systems as they operate to control risk.
- Systems that allow the electronic capture of data for the ongoing new record-keeping requirements.
- Systems that can be built into product tracking systems.

continued

The key role of equipment and packaging

Ensure that equipment can be readily cleaned to avoid environmental contamination concerns. Considerations include…

- Being sensitive to the growing need to address allergens. This includes features for easy equipment cleanup (dry or wet), as well as fail-safe mechanisms to ensure the correct label is applied.

- Designing systems that facilitate the gathering of ingredient and finished product information to ensure accurate and easy capture of product tracking data.

- Having a comprehensive understanding of the regulatory requirements around food packing and Food Contact Substances, defined as:

"Any substance intended for use as a component of materials used in manufacturing, packing, packaging, transporting, or holding food if such use is not intended to have any technical effect in such food."

Examples of food-contact substances include polymers (plastic packaging materials), pigments, and antioxidants used in polymers, can coatings, adhesives, materials used during the manufacture of paper and paperboard, slimicides and biocides (antimicrobial agents), and sealants for lids and caps."

Packaging and equipment companies that are sensitive and knowledgeable about the current pressures on food companies will have a market advantage in this growing area of complexity and the need to protect brands. ◆

Roadmap for a successful form/fill/seal Factory Acceptance Test

Here are some tips for a successful Factory Acceptance Test (FAT) for form/fill/seal equipment:

1. Furnish a FAT plan. The FAT is the time to discover failures or issues, determine reliability, verify efficiencies, and explore how the machine should handle failures. This plan actually should be prepared up front and submitted to the supplier as part of the Request for Quote (RFQ). Although you'll pay for the test, most equipment suppliers will agree to a provision that if the machine fails, any subsequent test is free. Your test plan should specify how long the machine should be dry-cycled (24 hours recommended), and how many packages should be produced and at what speed—in other words, the length of time (two-minute stress runs, no more than five minutes for quality production runs, etc.). It should also specify disposal plans for the finished packages.

2. Know the difference between a Factory and Site Acceptance Test. One of the biggest areas of confusion surrounding the FAT is if it should simulate how the machine responds under actual factory conditions. That's actually the purpose of the Site Acceptance Test (SAT). In the machinery builder's plant, it may be difficult or even impossible to simulate both the production volume and the conditions of your product, especially for more than a few minutes. This is especially true if the product will be packed at a certain temperature, or has a certain consistency or rate of speed coming out of an oven, fryer, or freezer. Much

continued

Roadmap for a successful form/fill/seal Factory Acceptance Test

time, energy, and money have been spent in vain trying to address "failures" in the machine builder's plant, only to find that the machine works perfectly once in production at the customer's plant.

The purpose of the FAT is to verify the desired functionality of the machine. The purpose of the SAT is to confirm that the machine runs your product to your specifications in its operating environment. Knowing the difference can save you and the supplier time, money, and aggravation.

3. Ensure you're using the correct film. Use the film that will be used during actual production.

4. Train the right people. If training is provided as part of the FAT, make sure those being trained are the production people who will run the line, not the engineers. Also, consider a "train the trainer" strategy as part of the FAT process before the equipment even ships.

5. Test part replacement. Test how long it takes to replace the most common wear parts. Determine how to remove a defective part.

6. Assess safety. Complete a review of the equipment from a safety perspective. Look for poorly guarded areas and pinch points. Run your hands across the machine (carefully) to detect sharp edges and burrs. Is making the machine LOTO (Lockout/Tagout) easy to accomplish, or are there unexpected sources of energy that could cause injury?

continued

Roadmap for a successful form/fill/seal Factory Acceptance Test

Lockout/Tagout refers to the act of disabling all sources of energy, such as electricity and compressed air, while physically locking down the machine so that it doesn't cause injury due to movement while the machine is being worked on.

7. Assess the design rigorously beforehand. Because of the difficulty, if not impossibility, of replicating the factory environment with exactitude, consider the FAT for what it is: an approximate test. Just as important are the design intent, specifications, and execution.

8. Follow a detailed "failure" script. This can be time-consuming, but is important. Make an inventory of the type of failures that you've experienced or might experience, as well as expected outcomes. For f/f/s equipment, this checklist could include:

- Hit the e-stop, and then restart it. Ensure the machine doesn't jam itself on start-up, and that there are few or no wasted bags.
- Trigger or block each sensor to see how the machine responds and restarts.
- Starve the machine of product to see if it stops producing bags.
- Break the film web to see how the machine responds.
- Disable the knives to prevent them from cutting; see if the machine detects bags being made without being cut.

continued

Roadmap for a successful form/fill/seal Factory Acceptance Test

- Block the date/lot code from being applied (if applicable). Does the machine detect the bag with the missing code?
- Induce a failure in the auto splicer (if there is one) by cutting the film web halfway through. Does the machine gracefully shut down?
- Run the machine at very low and very high speeds. Are there critical differences in the way it forms, fills, and seals a bag?

Also examine the physical characteristics:

- Did it fill the correct amount?
- Does the filled product look presentable (if it's a clear bag)?
- Is it a clean seal?
- Is it a clean cut?
- Is there any crushing?
- Are there any leakers? ◆

Determining when to rebuild or replace a form/fill/seal machine

BY PAUL ZEPF

Here are some warning signs that may indicate it's time to either rebuild or recondition your form/fill/seal machine:

1. Speed and efficiency reductions. If a technician has to babysit the machine in addition to or instead of the operator, it's a definite warning sign. If a f/f/s machine's uptime availability drops much below 97%, it's a sign. That may sound high, but it's not—considering that each machine on the line must operate at a monthly availability of at least 97% to get an entire packaging line OEE (overall equipment effectiveness) to be above 85%. Gathering data to document these reductions is often the only way to justify a return on investment on something new.

2. Quality decreases. When you find the machine can no longer consistently make a good bag, its time may have come.

3. Changeover time increases. Usually this means it takes more tinkering to get it right. The cost associated with this type of downtime can really add up.

4. Maintenance increases. Some companies use specialized maintenance software like MP2 to not only help keep maintenance running smoothly and avoid surprises, but also track equipment maintenance trends to provide the big picture.

continued

Determining when to rebuild or replace a form/fill/seal machine

5. Component obsolescence. Parts are no longer available from or supported by the machinery manufacturer or third-party supplier, including old PLCs, proprietary controllers, or even outdated servo gear. When it becomes more expensive and takes longer to source critical parts, it may be time to look for a new machine.

6. Requirements change. Marketing may want a new bag format, size, film thickness, or zipper or fitment. Replacing may be a better option than modifying the bagger to do what it wasn't designed to do. ◆

Tips for a successful flexible packaging line start-up

Here are some tips for a successful line installation and start-up:

1. Don't wait until the last minute to involve operators and production people. Often it's the engineers and the purchasing people who seem to know everything about the project, yet it's the production people who have to live with the equipment. Get the production manager, operators, and maintenance people involved near the beginning of the project. They don't need to be at every meeting, but they should be at the critical ones. They should be very familiar with the equipment once it reaches your floor.

2. Pay the supplier to install it. Engineers often think they can save the company money by installing the equipment themselves, but having the supplier install its own equipment or at the least oversee installation in what it considers to be the correct way can save you money down the road.

3. Staff the start-up with your best production people. Don't choose a mediocre operator. Staff it with your sharpest operators who can teach other operators. While the oldest staff members will have the most experience, younger personnel sometimes are more open to newer technologies and may learn more readily from the supplier how to properly run and change over the equipment. This is especially critical if the machine is brand new technology for the plant, or is considered critical equipment for the company.

continued

Tips for a successful flexible packaging line start-up

4. Find the line's correct "rhythm." Actual production conditions of infeed systems can cause inadvertent starting and stopping of vertical bagging equipment, which is a sign the machine is running too fast for the rate of product being produced, even though it may have been engineered for that speed. This can result in increased failures and rejects. Be willing to dial back on the speed; each line has its own rhythm, which may differ slightly from the designed speed. A slower speed may result in more cases out the door at the end of the day, thanks to fewer rejects and less downtime.

5. Minimize the supplier technician's actual contact with your f/f/s machine. Normally during an install, everyone stays away from machine-builder technicians while they perform their work. This is a mistake. Rather than working with the equipment directly, have the supplier technician try to show your staff how to make the adjustments themselves. Your team will learn by doing. When that technician walks out the door for good, you don't want the operator or mechanic having never solved problems or made adjustments during actual production conditions.

7. Document what you learn from the supplier technician. Depending on the complexity of the equipment, it may be worth it to keep the supplier technician in your factory an extra few days. During that time, follow that technician and learn everything you can to fill in any knowledge gaps among operators. Shadow the technician with a camcorder, snap plenty of photos with a digital camera, and write down what you've learned.

continued

Tips for a successful flexible packaging line start-up

8. Document last-minute changes to line layouts. Often during installation, adjustments are made to how equipment is positioned on the actual floor, deviating from the line layout drawings prepared at the beginning of the project. Take the time to go back and modify these drawings so that the line layout drawings reflect the actual packaging line as built. Down the road, you'll avoid lost time caused by a mismatch between what the drawing says and the reality on your floor.

9. Finish your punch list. During the Factory Acceptance Test or start-up, it's common to compile a punch list of minor adjustments and then never follow it up once product is being successfully produced. Unfortunately, this can lead to problems down the road that impact product quality, such as a guiderail causing an inadvertent scuff on a pouch. Operators are less likely to bring these problems to anyone's attention "because it's always been done this way." The punch list should be reviewed and approved by engineering, production, and management, with ownership transferred from engineering to production in a formal sign-off procedure.

10. Spare parts. Things do fail during start-up. Don't forget to request a spare-parts list and order the critical spares so they are delivered prior to the equipment arriving at your factory.

11. Performance criteria. Linking a vendor payment to the equipment's performance at start-up can be a strong incentive for the vendor. As part of a Site Acceptance Test, consider an extended testing period, covering enough shifts (or even weeks) to really understand the machine's abilities and limitations. Be fair to the supplier, though, when demanding so much—don't delay tests, or introduce a product change or variation, without consideration of the supplier's time. ◆

Six common pitfalls to avoid on bagging machinery projects

Form/fill/seal or bagging machinery projects fail for a number of reasons. Here are six stumbling blocks to watch out for:

1. Unrealistic expectations on both sides. Sometimes project engineers at CPG companies set an unrealistically high threshold level of performance, either to help justify the project internally, or to pad the number under the assumption that the machinery builder will fall "short" but will still meet the actually desired speed. The machinery builder may feel pressure to commit to a performance requirement while suspecting, or even knowing, it's an unreasonable goal. First, the contract will be awarded, and second, once the project starts, it's too expensive for the CPG customer to back out. The games we play! Both sides are now set up for failure and disappointment. Better to have a frank discussion over the real performance requirements and align expectations before the project starts.

2. Poor vendor/application fit. Most machinery building companies are founded or run by engineers, and most engineers have never met a problem they didn't think they could solve. When it comes to f/f/s machinery, most machine builders have built up an expertise in certain types of applications. Machine builders that stretch too far by taking an application that's too far from their core competency, or that are simply overloaded, may end up disappointing their CPG customer.

continued

Six common pitfalls to avoid on bagging machinery projects

3. Poor or incomplete project scope. Finding out halfway through a bagging machinery project that the machine needs to make a gusseted stand-up pouch, or that a reclosable zipper or fitment needs to be applied, is a sign that insufficient thought was put into the requirements up front. This leads to delay, increased costs, and disappointment.

4. Not adjusting the schedule for changes. Changes do happen, but projects get into hot water when the CPG company expects machinery vendors to accommodate changes without impacting the delivery schedule. Machinery builders, eager to please, often do a poor job of policing these requests. The manager of an eight-week machinery project that's already slipping into nine weeks may use a change request to internally "justify" that delay. ("We're going to be a week late anyway, so sure, we'll take on that request.") In reality, such a change may turn it into a 12-week project, much to everyone's surprise and dismay.

5. Insufficient expertise among buying team members. The cross-functional buying team is a common approach to selecting packaging equipment. Certain members of that team may have a strong, but not necessarily informed, opinion about which machine to buy. For example, while someone from a nontechnical field such as finance or marketing may be able to provide a different perspective to the team, they may not have the technical expertise to know if a particular machine or supplier can deliver a solid solution beyond a sales pitch. To make the best team buying decision, it may be worthwhile to invest in consensus training. The result: Individual members may not agree all the time, but the group will operate more efficiently as a unit, versus being held hostage by individual members who lack the proper expertise to make a sole decision.

continued

Six common pitfalls to avoid on bagging machinery projects

6. Missed launch windows due to different interpretations of lead time.

It's not unusual for the customer and the machinery builder to make completely different assumptions about what "lead time" really means. If a machine builder is quoting a 20-week lead time for a new machine, it may define lead time as the time from when the order is placed to when that machine is ready for a Factory Acceptance Test (FAT). That could turn into trouble if the customer's expectation is that "lead time" extends to when the machine is up and running on the plant floor. Not accounted for is the FAT itself, subsequent training, potential further modifications, shipping, installation, and start-up. To avoid scheduling problems, make sure everyone agrees on a common definition of lead time. ◆

Glossary of additives and modifiers

It is rare that the polymers used in film packaging applications will meet end-use needs without modification of some kind. A wide variety of additives and modifiers is available, and the following list describes broad categories and the performance reasons they are employed. The film producer typically adds them at the time the main polymers are melted in the extrusion process.

COF Modifiers - adjust the coefficient of friction (COF) to match converting, packaging, and end-use requirements, generally by reducing the COF of tacky films. Slip agents work by blooming from the bulk of the polymer to the surface and provide lubrication without degrading clarity, but can interfere with adhesion in printing and laminating. Antiblock agents are small inert particles that act through roughening the surface of the film to reduce contact area and force needed to slide; while they do not generally impact adhesion, they do increase film haze.

Colorants - used to create opacity, to either increase the impact of printed graphics, protect products sensitive to light, hide products that are not particularly attractive at time of sale, or create a unique color for marketing purposes.

Antioxidants - while some amount of antioxidants is generally formulated in the resin by the resin manufacturer to protect the resin from oxidation during the heat of the extrusion operation, film makers may choose to increase the amount if excessive thermal abuse is anticipated, or in some cases, it is added to the film with the intent of small amounts transferring to the product to protect it from oxidative spoilage.

Fillers - used to reduce the cost of the film by substituting a lower-cost material, generally a small particle-size mineral, for some of the polymer. Can also improve dimensional stability at higher temperatures. Caution must be used to prevent excessive loss of strength properties.

Antistats - primarily used for electronics packaging, as polymer films tend to develop static charges when moved over stationary or even rotating surfaces. If not dissipated, those charges can damage sensitive electronic components.

Oxygen Scavengers - used in packages for highly oxygen-sensitive products to intercept permeating oxygen molecules and prevent them from reaching the package interior. Newer technology permits activation of the scavenging functionality at the time of packaging, maximizing the effectiveness of the additive.

Desiccants - think of them as moisture scavengers; desiccants are sometimes added in coextruded layers adjacent to high-performance layers whose key properties are susceptible to deterioration from exposure to water. Desiccant-containing layers in ethylene vinyl alcohol-containing structures are most common.

UV Absorbers - the resin manufacturer generally formulates in the amount of UV absorber needed to protect the polymer itself. In unique cases, UV absorbers can be added to protect food that is highly sensitive to UV exposure.

Nanoparticles - a burgeoning field of exploration and development, with film makers attempting to take advantage of nanometer-scale particles to cause significant property increases in films. The most work done thus far shows that small amounts of high aspect-ration synthetic clays added to PA6 and PEs or PP can increase oxygen and moisture vapor barrier as well as stiffness and thermal stability. Commercial products for these systems are available. ◆

Detailed properties and attributes for film structures

BY TIM BOHRER

The following table provides a quick overview of the property types listed above and is intended as a starting point for understanding why a particular property may be important. Most strength properties are directional, with the potential for widely varying levels in the machine (MD) or cross-machine (CD) directions; the CD is sometimes referred to as the transverse direction (TD). It is important to understand where the MD and CD will be aligned in the final package as you begin to select appropriate properties and levels to match use requirements.

Films and film-based structures are almost always converted in roll form, and generally sent to packaging machines that way, however premade bags and pouches are also extensively used to feed packaging machines. ◆

Attribute/ Property	Brief Definition, What is Being Quantified	Relates To	Comments
Thickness or gauge	The dimension of the film in the thickness direction	Affects most physical properties; important for setting clearances on packaging machines. Often the first attribute in describing a film (i.e., 2-mil LDPE blown film)	For film, typically expressed in mils (1/1000's of an inch) or gauge (100 gauge = 1 mil) for English units, in metric units, micrometers (microns) is typically used for flexible structures
Basis weight	Weight per unit area of a film or structure	Composite specific gravity; material usage. A commonly specified attribute, especially when film is sold on a per-pound basis; used to convert between per-pound or per-area pricing.	For films, pounds per 1000 in2 (#/msi) most often used English units, grams per m2 (gsm) for metric units

Attribute/ Property	Brief Definition, What is Being Quantified	Relates To	Comments
Tensile properties	Ability of a material to resist a direct pulling force; multiple properties from a tensile test help characterize materials & structures	Stiffness; amount of elongation/stretch before permanent deformation and force needed to accomplish; machinability; 'hand' or feel to consumer	High tensile-strength films are stiff and can handle high levels of tension in converting and packaging machinery without significant elongation; stretch films need high elongation before permanent deformation to tightly hold multiple products; low-stiffness films often used in personal care packaging for softer 'hand'
Tear strength	Ability of a material to resist tearing, both tear initiation and tear propagation resistance can be important	Toughness and ability to withstand distribution stresses; ease of opening by consumer	Polymers with unbranched molecules tend to be more directional in tear properties than polymers with branched molecules. Biaxially oriented films tend to have high tear initiation resistance, but low tear propagation resistance.
Puncture- or impact-resistance	Ability of a material to withstand a direct impact	Toughness and ability to withstand distribution stresses; resistance to puncture by products	Puncture or impacts stress films in all directions - MD and CD and directions between, making films with balanced properties more resistant to puncture
Abrasion-resistance	Ability of a material to resist surface damage when in moving contact with other materials or items	Maintain original appearance during distribution, especially when adjacent packs move relative to one another; ability to run on package machinery without damaging surface; for surface-printed films, an analogous property termed "ink rub" is more a measure of ink adhesion to the film, but is measured in a similar manner	Films in glassy state (below Tg) or highly crystalline states generally resist abrasion better than films in rubbery state (above Tg) or amorphous states. 'Softer' materials in multilayer structures are often protected with 'harder' materials located in surface layers
Max. & min. service temperature	The temperature range over which a film should be considered suitable for use	Suitability of a material for distribution or use at temperature extremes	Problems can arise if materials are brittle at low-use temperatures or soften excessively or even melt at higher-use temperatures
Optical properties	Visual appearance of a film; includes transparency, surface haze and gloss, and roughness	Match of material to marketing needs (shiny vs. matte surface; product visibility vs. hiding; contact vs. noncontact clarity)	Rough surfaces that induce surface haze can negate otherwise highly transparent bulk; contact clarity results when products conform to surface roughness and overcome surface haze effects

Attribute/ Property	Brief Definition, What is Being Quantified	Relates To	Comments
Heat-seal characteristics	Characterization of a materials' ability to be heat-welded to itself or another material; for films, the temperature range in which adequate seals can be formed, the pressure required at different temperatures, and the strength of the resulting seal, both immediately after sealing (hot tack) and following cooling of the seal area. Can also measure at use temperature if different from room temperature	Ease of making desired-strength seals on packaging equipment at desired run speeds; compatibility of a structure with different sealing configurations on equipment; ability to maintain desired seal strength at temperature extremes; ease of seal peelability for opening packages	Broader windows of time, temperature, and pressure make it easier to achieve satisfactory seals; for easy-open, the balance between too low a seal strength that fails prematurely and too high a seal strength that cannot be readily peeled by consumers is often challenging to achieve
Dimensional stability	The ability of a material to maintain its original shape and/or size when exposed to environmental changes; % shrinkage at a specified temperature is most common, but changes due to relative humidity can also be important for some uses	Stability of package during converting, filling, and distribution; match of material and processing conditions to create needed shrink for bundling or other shrink-film applications	Two main classes of need; complete dimensional stability at use conditions or controlled shrinkage amount and force induced at specified temperatures
Surface energy	A measure of the ability of a film's surface to be wetted by calibrated solutions	Printability; ability to laminate to other materials; ease of using adhesives to form seals vs. heat sealing; choice of inks and adhesives; propensity to self-adhere or block; static charge propensity	All polymers have 'natural' surface energy levels that can be raised through several treatment techniques; corona discharge is typically used for films, and minimum levels are targeted for satisfactory adhesion of inks or adhesives; excessive levels can make films unusable due to blocking

Attribute/ Property	Brief Definition, What is Being Quantified	Relates To	Comments
Coefficient of friction (COF)	The resistance to moving a film in surface-to-surface contact with itself or another material; often termed 'slip'	Machinability; stability of package displays; ease of package handling	Too high a COF can make it impossible to move a material relative to other surfaces; too low a COF can make it virtually impossible to control rollstock or individual packages because they are too 'slippery'
Barrier properties	Ability of a film to resist penetration of a specific chemical. Transmission rate quantifies barrier for a specific structure, and is not normalized for thickness - extrapolation to other structures can be a source of confusion. Permeability quantifies barrier as a material property, and is normalized for thickness (typically 1 mil or 25.4 micron). Can be used to scale barrier performance for different thicknesses, assuming that all other aspects of the film (including layer ratios for multilayer structures) also scale linearly.	Product protection and shelf life; resistance to absorption or permeation of desired chemicals from product; resistance to permeation of undesired chemicals from environment to product	Requirements vary greatly depending on product and its spoilage characteristics; the lowest-cost means to create the needed barrier characteristics in a filled package very often is the primary driver for film selection. Moisture vapor barrier and oxygen barrier are the most typically specified, but barrier characteristics for other gases can be important; in certain cases, low barrier may be required. Confusion over the use of the terms permeability and transmission rate is common, even in specifications.
Chemical-resistance	Resistance of a material to changes in properties induced by contact with specific chemicals. Tends to be a rating rather than a precisely quantified property	Stability of packaging material for specific product formulations; ability of material to contain specific products	Films and structures made from films can be highly vulnerable to certain products; listings of chemical compatibility are a good place to start for new uses

Attribute/ Property	Brief Definition, What is Being Quantified	Relates To	Comments
Regulatory compliance	Ability of a film or a structure containing that film to comply with all applicable governmental regulations concerning use in its intended manner	Ensuring that specific structures meet regulations for packaging specific types of products under specific exposure conditions	Users typically rely upon their package suppliers, which in turn rely on their material suppliers to provide written assurances that the materials and structures they supply meet the applicable regulations; regulations vary by country and region, although U.S. FDA compliance assurance is often accepted elsewhere; compliance must be assured, not assumed
Environmental impact	An evolving set of measures that attempt to characterize the most important and recognized impacts of a film through part or all of its life cycle from raw material acquisition through fabrication, converting, end use, and end-of-life	Providing a benchmark for package producers and users for current packages; providing a consistent method for comparing alternate package structures and estimating changes in environmental impact from making changes in package materials or configurations	End users and retailers are driving changes in packaging based on multiple measurement methods and criteria; many details of measuring and specifying performance are in the process of being defined and developed; this rapidly changing area requires constant monitoring
Specialized property	Depends	Unusual end uses	The other properties shown handle the vast majority of end uses, but some unusual, low-volume or newly evolving uses may require specialized measurements to define what works

Flexible packaging polymer selection guide

BY TIM BOHRER

From the huge numbers of synthetic polymers available, a more limited selection is typically used for packaging films. This section will name them, describe some key characteristics, and list primary uses.

While some of these polymers are commonly used in monolayer films, many find best usage in coextruded films, where thin, well-placed layers efficiently utilize their unique advantages while minimizing cost or detrimental impacts on the film. Some of the films (single or multilayer) are used as is, while others are combined with other materials, such as other films, foil, paper, paperboard, or thermoforming sheet. ◆

Polymer Name	Symbol	Common Uses	Comments
Polyethylene	PE		
Low density	LDPE	Workhorse resins in packaging, delivering bulk, sealability, stretch, shrink, clarity, and puncture-resistance; used extensively as monolayer films or in coextruded structures.	Wide historical use; long chain branching provides good melt strength and easy extrusion processing. Many grades with flow properties tailored for different processing applications and end uses. Generally considered a low barrier material.
Linear low density	LLDPE	Applicable for most LDPE applications, with potential gauge reduction due to increased tensile, impact, and puncture properties.	Copolymers of ethylene, principally with hexene and butane - termed 'linear' since side chain branches are shorter, and typical LDPE long chain branching is absent. Typically narrower molecular weight distributions.

Polymer Name	Symbol	Common Uses	Comments
Medium density	MDPE	Boil-in bags, sacks, shrink film.	Better temperature-resistance than LDPE, with higher stiffness. Good shock- and drop-resistance, less notch sensitivity and stress-crack resistance, but lower H2O barrier than HDPE.
High density	HDPE	Retail bags, stiffness and H2O barrier layer for many dry foods not needing O2 or high flavor barrier; label release liner.	Highly linear polymer creates highest density of the polyethylenes; attains higher crystallinity as well, which accounts for greater stiffness and WVTR superiority.
Metallocene polyethylene (ethylene-hexene copolymers with specialized catalyst technology)	mPE, MVLDPE, etc.	Lamination film for many uses, including barrier, f/f/s packaging, stand-up pouches; heavy-duty bags; ice bags.	High polymerization productivity metallocene catalysts create narrow molecular-weight distributions and resins with excellent cold temperature toughness, impact strength, and puncture-resistance; very good hot tack and strong seals. The next generation of copolymers being substituted for many conventional LDPE resins.
Ethylene vinyl acetate copolymer	EVA	Heat-seal and impact-strength layer in multilayer films.	Easy to process and variation in VA level allows tailoring to different end-use applications. Low VA content for dry food applications; higher VA content as sealing challenges increase.
Ethylene acrylic acid copolymer	EAA	Heat-seal layer or to bond foil to PE; higher performance end uses include dentifrice tubes and medical device and pharmaceutical packaging.	Low seal initiation temperature, very good hot tack; increased ability to seal through contamination over standard PEs.
Ethylene methyl acrylate copolymer	EMA	Tie layer in coextruded structures, in monolayer films creates soft, elastic structure with good drape.	One of the earlier tie layers for coextruded films to bind otherwise incompatible polymers. Soft drape finds use in multiple healthcare applications.
Ethylene methacrylic acid copolymer	EMMA	Sealant layer, for meat, seafood, poultry, cheese, personal and healthcare, dry foods, and liquid packaging; skin/stretch-packaging film.	Easy to process and low extrusion temperature minimizes taste/odor issues. Good hot tack, seals through contamination, and makes strong reliable seals.
Partially neutralized ethylene acid copolymer or terpolymer	Ionomer	Sealant layer, especially for meat, seafood, poultry, cheese, personal and healthcare, and liquid packaging; skin/stretch-packaging film.	Outstanding seal properties - hot tack, seal through contamination, low seal initiation temperature; clarity, drawability, oil-resistant; tough; abrasion-resistant. Somewhat difficult to process, with high COF and static levels.
Ethylene methyl acrylate acrylic acid terpolymer	EMM-AA	Adhesion or tie layer, compatibilizer, heat-seal layer.	Promotes adhesion between variety of polar and nonpolar materials, including PE, PP, PA, PET as thin coextruded layer or additive.

Polymer Name	Symbol	Common Uses	Comments
Ethylene vinyl alcohol copolymer	EVOH		
Polypropylene	PP		
Homopolymer	PPH	Widely used on oriented films (BOPP) for stiffness, clarity, gloss, and yield. Metallized, heat-seal, or other functionally coated BOPP grades get large use in snack and other food packaging. Cast films have excellent clarity and gloss, with stiffness for many overwrap applications; flower and textile packaging, bread, cake, confectionary. Specialty grades as low-extractable sealant layer for retort pouches. Cavitated BOPP grades are density-reduced, provide softer hand, opacity, and are used extensively in candy bar wrap and frozen novelty wrap, and for labels.	Lowest specific gravity of commonly used polymers means more square feet per pound. Higher melting point than PE, but lower crystallinity than HDPE. Orients at high draw ratios for good property development. Superior grease-resistance to PE. Can be used in monowebs or laminations and processes at high speeds on wide variety of f/f/s packaging lines.
Copolymer (typically with ethylene)	PPC	For cast or blown film applications requiring higher impact-resistance.	Ethylene comonomer increases low temperature usability in monofilm applications.
Polyester			
Polyethylene terephthalate	PET	Principally used on biaxially oriented film (BOPET), where it is widely used as a printed top film in laminated structures. Food and nonfood items packaged in BOPET-based structures. Metallized and other barrier coatings (SiOx, AlOx, PVOH) perform well on this base film. Base for metallizing and lamination in susceptor packaging.	Higher temperature-resistance and dimensional stability than other oriented films. Higher specific gravity than most common packaging polymers, but develops excellent stiffness and other mechanical properties. Excellent product compatibility. High crystallinity from orientation retains clarity but builds very good barrier. BOPET commonly used at 48 ga with some grades at 38 ga available.
Glycol modified PET copolyester	PETG	Shrink labels for containers.	Responds well to monoaxial orientation. Does not crystallize to same level as PET, yielding lower barrier properties and heat-resistance.
Polylactic acid	PLA	Lamination, envelope, and carton window film. Shrink labels. Candy twist wrap.	Bioderived polymer, with supply today from by-products of wet corn milling operations. Lower temperature stability and resistance than PET.

Polymer Name	Symbol	Common Uses	Comments
Polyamide	PA		Moisture absorption plasticizes film and increases crystallinity with some post shrink. PA is a good candidate for biaxial orientation by either tenter frame or double-bubble process yielding BOPA and for high quench-rate film forming to get good transparency. See below process section for details.
Polyamide of caprolactam	PA6	Vacuum packaging of meat, cheese, seafood, nuts, and other products sensitive to oxygen. Used in coextruded films with EVOH to provide backup O2 barrier for high-moisture foods.	Excellent toughness and good O2 and flavor barriers. Excellent drawability and resistance to stress cracking. PA6 has better impact, flex fatigue, solvent- and grease-resistance than PA66.
Polyamide of hexamethylenediamine and adipic acid	PA66	Vacuum packaging of meat, cheese, seafood, nuts, and other products sensitive to oxygen. Used in coextruded films with EVOH to provide backup O2 barrier for high-moisture foods.	Excellent toughness and good O2 and flavor barriers. Excellent drawability and resistance to stress cracking. PA66 has lower moisture absorption and higher temperature-resistance than PA6.
Polyamide of metaxylene diamine and adipic	MXD6	Used as coextruded layer or blended with PA6.	Highly crystalline PA with increased O2 barrier properties that show reduced moisture sensitivity. Thin layers used in conjunction with or blended with conventional PA will provide performance improvements.
Vinyl chloride			
Polyvinyl chloride	PVC	Fresh meat and produce wrap; cling film; shrink film for bundling and labels; twist film for confectionary and other foods.	Low O2 barrier perfect fit for fresh red-meat 'bloom' consumers associate with freshness. Medium H2O barrier. Different degrees of cling achievable through additives. First shrink-sleeve labels were commercialized using PVC.
Polyvinylidine chloride	PVdC	Coextrusion layer for O2 and H2O barrier.	O2 barrier level maintained for wet foods or humid environments. Somewhat difficult to handle in extrusion.

Polymer Name	Symbol	Common Uses	Comments
Cellulose films			
Regenerated cellulose		Twist wrap; baked goods and produce packaging; cheese and live yeast packaging; ovenable and microwavable packaging; soft goods wrap.	Bioderived films from wood pulp, regenerated cellulose comprised the earliest clear packaging films. Naturally low H2O barrier for breathability to retard mold growth, but still with good flavor and aroma barrier. Coated grades can provide both high barrier and stiffness, gloss, and clarity.
Cellulose-containing films		Twist wrap; baked goods and produce packaging; cheese and live yeast packaging; ovenable and microwavable packaging; soft goods wrap.	Bioderived, made from at least 95% wood pulp. Naturally low H2O barrier for breathability to retard mold growth, but still with good flavor and aroma barrier. Coated grades can provide both high barrier and stiffness, gloss, and clarity.
Polystyrene			
Crystal polystyrene	PS	Envelope and carton window film, produce wrap, lamination to thermoformable PS, and impact-modified PS sheets for rigid packaging.	Amorphous film that develops good stiffness through orientation. (OPS) Low barrier to all gases, good for breathable applications. High gloss and clarity.

Cast vs. blown film characteristics

BY TIM BOHRER

This article summarizes how the differences between cast and blown film processes translate into film attributes. These are general rules of thumb that will largely hold for a type of polymer.

There are principally two major impacts on film characteristics of the differences between the cast and blown processes. The first is quench rate, with is much higher for cast than blown film; the higher quench rate for cast film results in lower crystallinity in semi-crystalline polymers, like polyethylenes, polypropylenes, polyamides, PET, and EVOH, all key packaging film components.

Quench Rate Affected Characteristic	Cast Film	Blown Film	Generalized Comments (cast lower crystallinity than blown)
Stiffness, tensile, toughness	Lower	Higher	Cast films softer, often desirable for soft goods overwrap applications
Clarity	Higher	Lower	Much more haze in blown films, especially those containing HDPE
Barrier	Lower	Higher	Blown films offer more barrier per pound, both moisture vapor and oxygen
Solvent resistance	Lower	Higher	Blown films more resistant to wider range of solvents

Quench rate impact on cast and blown films

The second major process impact is the creation of some melt orientation in the MD only for cast and in both MD and CD for blown. The result of this is a more directional film from cast

continued

Cast vs. blown film characteristics

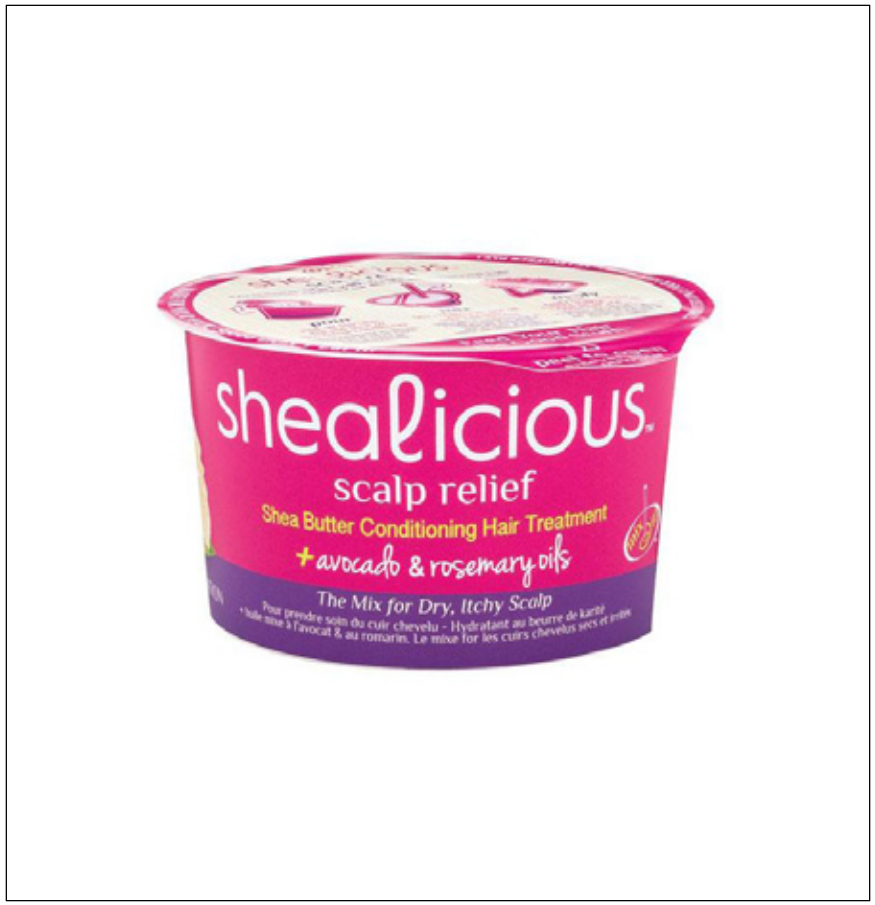
and a more balanced film for blown. The relative advantages and disadvantages of blown vs. cast resulting strictly from melt orientation have a few more subtleties than the strictly quench rate effects, for some applications.

Melt Orientation Affected Characteristic	Cast Film	Blown Film	Generalized Comments
Stiffness, tensile	Higher in MD than CD	Balanced to slightly directional	Cast easier to fold across CD, which could simplify some packaging operations.
Tear initiation	Lower in MD than CD	Balanced to slightly directional	Balanced tear initiation typically translates into more durable package.
Easy opening	Lower MD tear propagation	Balanced to slightly directional	Directionality a potential benefit of cast if MD can be positioned correctly in pack.
Shrink	Higher in MD	Balanced to slightly directional	Most pallet and other shrink film applications benefit from balanced properties.
Elongation	Higher in MD	Balanced to slightly directional	Cast stretch films offer high tear resistance, gloss, clarity and consistent cling. Blown stretch films, while hazier, offer excellent puncture resistance and high force on the load. Knowing the use needs leads to an understanding of which is preferable.

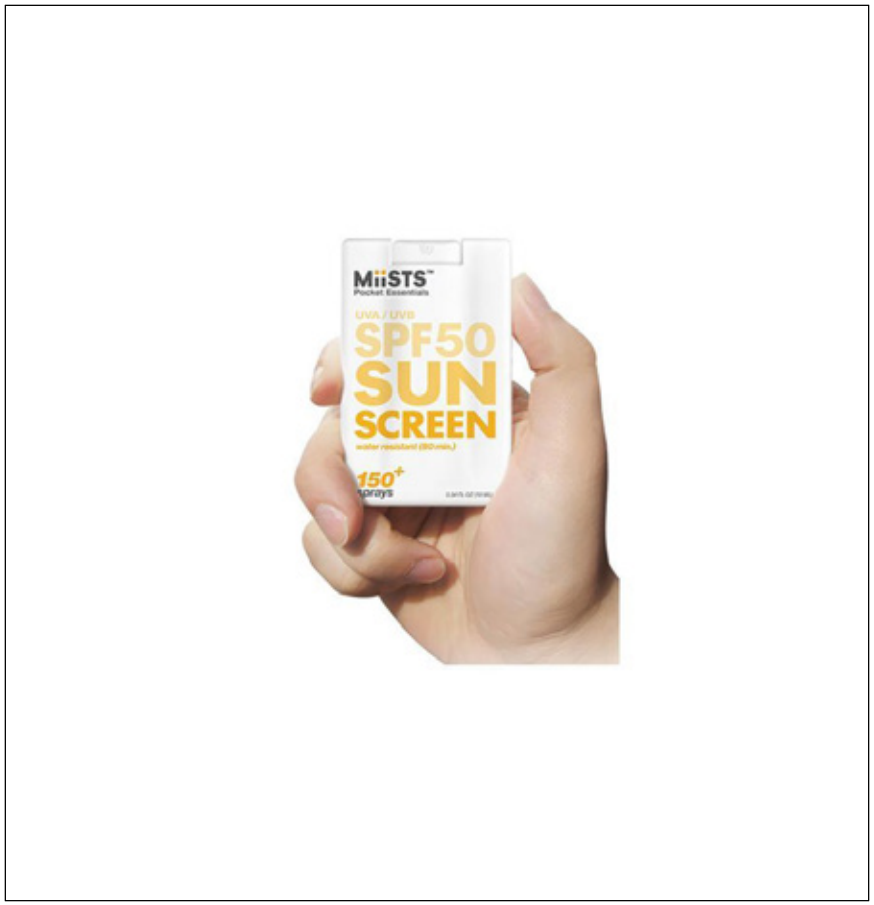
Melt orientation impact on cast and blown films

It must be noted that the quench rate and melt orientation impacts and differences between the two processes do not occur in isolation, and all the characteristics of the end use need to be considered in determining which film is better suited. ◆

Ana's launched its authentic Mexican-style salsa in IPL's SkinnyPack package, a square, injection-molded tub with flared sides made from rigid PP "posts." Four panels of flexible, printable PP material are fused with the posts during the injection-molding process to create the sides of the container. The film is labeled using the In-Mold Labeling process, with four-color labels converted by Precision Press.



The yogurt cup inspired two-chamber, stock polypropylene cup, from a proprietary supplier, holds 2.5 ozs. of shea butter conditioner in one chamber and 0.5 ozs. of 100% pure, therapeutic oils in the other. There are three Shealicious varieties—moisture lock, scalp relief, and shine booster—each with their own mix of oils.



The MiiSTS bottle is ultra-slim—just 5 mm deep at its thinnest point—and is fitted with a pump housing that allows the user to spray the product and renders the package leak-proof. Holding 11 mL of liquid, the bottle provides up to 150-plus sprays and is shelf-stable for up to several years. The package is recyclable when the pump housing is removed.

South African company KiddieKix, a producer of all-natural children's health products, adopted NatureFlex™ renewable, compostable film to wrap its cereals and dried fruit snacks. The film offers high seal strength and integrity, excellent gas, aroma, UV light, grease and chemical resistance, dead fold and anti-static properties, and enhanced printing.

The 1.76-oz Chia Protein Bars from Health Warrior are packaged in wrappers that evoke natural fibers and are decorated with pre-Guttenberg-style printing. The typefaceis presented in all caps, reminiscent of ancient Greek lettering. In addition, the type is slightly distressed to give the impression it was inked using a hand-carved wooden stamp.

Duke's brand mayonnaise from Richmond, VA-based C.F. Sauer is now reaching store shelves in a spouted pouch and retail-ready case format, which is quite unusual for the category. The flexible film supplier Brock mentions, Ampac, became the supplier of the rollstock used by Sauer for its novel package.

Eliffine has a light structure due to its mineral filling and lamination-free barrier properties. It does not contain any solvent-based bonding chemicals because it is not subject to lamination processes, and it is recyclable. ElifFine provides stiffness, high strength, and tearing resistance together with barrier properties of traditional polyethylene films.

The Progresso chili pouch is designed with a tear notch at the top for opening and a clear bottom that allows consumers to see the quality ingredients inside. To convey the chili culture through its package graphics, Progresso selected brand agency CBX, which selected a hearty, inviting bowl of chili as the primary graphic.

The flow-wrapped package, designed with Mediterra's strategic branding partner, uses a clean white background with one of three color bars on the bottom of the front panel, identifying the bar as being in the Savory, Sesame Energy, or Yogurt & Oat category. Bars are wrapped in a multilayer PET/metallized cast polypropylene film.

Designed by Brooklyn-based branding company Red Antler, the packaging is positioned to be clean, modern, and premium, while telling the story of Kura's New Zealand origins without feeling too rustic. Emphasis was placed on flavor, choosing colors that felt fresh, vibrant, and delicious. This drove the color choice of the logo.

The Caffè Molinari SpA coffee packs use an eco-friendly integrated packaging system using NatureFlex™ includes an aroma protecting bio valve, designed and patented by Goglio Plastic Division. The pack construction with the valve complies with the EN13432 industrial composting norm and is certified to OK Compost's composting standard.

Now that you've had a chance to review this, we'd love your feedback. Share your thoughts!

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