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Rigid Packaging Less Is More

Rigid packages are being streamlined to hold more products—using fewer tools and less money in the process.

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Consolidation is the name of the game when it comes to designing today's rigid medical packages. A growing number of device manufacturers and thermoformers are designing single trays that hold many different products, from orthopedic implants to pacemakers. The main benefit of scaling down multiple-tray kits into individual trays is simple: with only one set of sealing tools required, production costs are much lower.

Sidebar:
[Redesign](#)
[Saves](#)
[Material,](#)
[Cost, and](#)
[Hassle](#)

"Reducing the number of trays overall is a growing trend because it cuts down on costs and reduces the number of parts in transit," says Dick Simmons, senior marketing director for the technical packaging division of **Alcoa** (Wheaton, IL). "It's simply more convenient, both for the manufacturer and the end-user," adds Scott Bestwick, president and CEO of **Tray-Pak** (Reading, PA).

In addition to streamlining design, some companies are exploring other methods of cost control. Through the investigation of new materials and processes, they are looking for new ways to make rigid packaging as cost-effective as possible.

Low Costs, High Production

Consolidation is definitely proving to be a money saver for companies (see sidebar). **Linvatec** (Largo, FL), a manufacturer of arthroscopy and power surgical instrument equipment, recently chose tray thermoformer **Perfecseal** (Oshkosh, WI) to design a new package to house surgical blades. Linvatec's challenge to Perfecseal: consolidate five different tray designs down to one, maintaining the existing sealing equipment. Perfecseal created a design that includes an inner protective shell for the blades and one outer tray that houses burs. The company formed the inner shell with a detailed interlocking grid pattern for more stability of the product. The overall package, made of Eastar 6763 copolyester from **Eastman Chemical** (Kingsport, TN), ended up being 25% smaller than the previous container, making it cheaper to ship and store. In addition, material costs were reduced by 16%, while manufacturing capacity went up 15%.

"This is really a huge trend right now," says Steve Olson, project engineer at Perfecseal's Mankato, MN, division, "particularly in the orthopedic area, where devices can require so many different pieces. When trays can be designed and manufactured with consolidation in mind, the same heat-sealing tools can be used for one product, which is a major advantage."

Perfecseal also recently worked with **Exactech** (Gainesville, FL), a manufacturer of orthopedic implant devices. Exactech went to Perfecseal when it chose to design a consolidated tray packaging system for a product that it introduced last year. The project was a direct collaboration of the two companies' engineers, resulting in a dual-tray system that nests an inner tray within an outer tray. Vertical sidewall ridges on the inner tray hold inserts that allow different-sized products to be packaged in a single tray.

"We designed it to utilize one set of tools per package, with a heat-sealing machine that seals from both sides," says Stephanie Riley, a packaging engineer for Exactech. "Our goal was to get rid of the foam inserts and reduce costs. It might not seem huge, but when you look at it as \$10 versus \$5 per package, it's considerable."

Riley says the product's two sidewall inserts are made from the same tooling, which accommodates both the inner and outer trays. "That not only streamlined the design time but also reduced the overall packaging costs by 30%," she says. In addition to accommodating an entire family of implants, the newly designed package prevents the porous coating from interfering with the packaging materials during shipping and handling. "We really wanted to protect the sterile integrity of the product and maintain the sterile barrier for the shelf life," Riley says.



Barger Plastics redesigned a spinal implant tray for Medtronic Sofamor Danek to accommodate a number of different product lines.

Olsen of Perfecseal says this particular product would have typically employed five different packages and package designs. “We basically cut that down to one,” he says. He adds that his firm also recently designed a package for an implantable pacemaker. “The only thing that changes with the product is its size and shape—the rest of the parts stay the same,” he says. “So we designed a package that allows the customer to use the same outer tray. During the engineering process, we design one common layout, where we can plug in different specs as needed.”

Alcoa’s Simmons calls consolidation “a distinct market advantage for us. If someone comes to us with 30 trays for a product and we can take that down considerably, it really sets us apart. That’s a way we can add value—by reducing the number of parts. In general, companies have fewer packaging engineers on staff, so they’re relying on us to take care of those needs.”

Simmons says that the single-platform design, with a common outer tray and a variety of inner trays, also benefits the packager in terms of capacity. “We can run much larger quantities of fewer trays and use fewer tools in the process,” he says. “It really increases the value of the tray for everyone involved.”

Streamlined Dispenser

Other packagers are streamlining their designs as well, and not just trays. **Clean Cut Technologies** (Fullerton, CA) just introduced the CCT cliplless dispenser, a rigid guidewire and catheter dispenser that is much smaller than its previous incarnation. “The client wanted a less-bulky product, and we wanted to lower our manufacturing costs, so it was a good fit,” says Howard Rowe, Clean Cut’s president. “Historically, guidewires and catheters have been packaged in coiled tubing of various lengths. However, this design has eliminated the need for bulky, clumsy, and costly mechanical retention clips.”

The CCT is manufactured with prequalified biocompatible high-density polyethylene (HDPE) tubing in varying inner/outer diameters and lengths to accommodate different product requirements. The product features the ability to bond a custom HDPE die-cut packaging card to the dispenser. This allows customers to place various components—such as stylets, needles, luers, adapters, connectors, and in-line labeling—onto the primary package delivery system.

“It is so much stronger than the previous design,” says Rowe. “The clips [were] clumsy and unreliable for operators and medical staff, so there’s definitely a benefit to the end-user as well. We feel this product is much better.”

Materials And Processes

While companies are increasing their focus on tray consolidation, they also continue to focus on rigid packaging materials, particularly new materials and processes. Tray-Pak, a manufacturer of thermoformed packaging, is launching several new products and process capabilities this year, with a special interest in rapid prototyping capabilities. “We are constantly looking at ways to make thermoforming more cost-effective,” says Scott Bestwick, Tray-Pak’s president and CEO. “It’s a lower-cost option to begin with, and we want to explore how to exploit that further.”



Medical device trays manufactured by Perfecseal reflect the trend of consolidation.

In addition, Tray-Pak is working on a 3-D thermoforming prototype designed to expedite the time-to-market process. “It’s basically a process that enables us to produce 3-D samples very quickly, all without tooling,” he says. “It is designed to streamline the process before it gets to the manufacturing stage.” The company is also slated to introduce Fusion-Pak this spring. “This is our company’s new brand of pharmaceutical packaging that combines the graphics of board printing with the strength and flexibility of thermoformed plastics,” he says.

Bestwick also notes that his customers are becoming more open to collaboration. “We have been reluctant in the past to ask for ideas, but we’re much more likely to work with

a company to refine a package prior to commercializing it,” he says. “Whether it’s in a design capacity or on the materials side, we’re generally seeing more companies sharing ideas at all stages of the process.”

Alcoa’s Simmons says that, in addition to streamlining tray design, his company is currently working to develop different rigid materials in its laboratory. “But for now, we still rely mainly on the industry workhorses, like PETG, polystyrene, and PVC to an extent.”

Bestwick sees an increase in the use of sealable PET, as an alternative to PVC. “There are a lot of restrictions on PVC in Europe, for example,” he points out. “That’s where we’re seeing more use of this type of PET in particular.”

Bestwick also expects greater use of polypropylene as a thermoforming material. “It really holds up to high heat better, is more stable, and is much more cost-effective than many of the other materials being used,” he says.

Whatever transpires in the future, it is a certainty that companies will continue to explore lower-cost materials. And with the success of consolidation, streamlined tray design looks to become an even-more-popular choice.

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