

New Package Reduces Material Waste and Increases Sterilization Speeds

The Project: To create a surgical drape and gown package that improves material and production efficiencies.

The Solution: Develop automated thermoform fill-seal equipment to implement a new thermoformed pouch with a linear-tear feature.

The peelable seals often found on many competitive TFFS packages require a longer and therefore more expensive process.

By Lisa Arrigo, Editorial Director

David Rudd has spent the last three years at Cardinal Health working on packaging innovations for medical devices. As the company's senior engineering specialist and with 35 years of experience in R&D, he was instrumental in developing a successful new packaging design for the company's surgical drapes and gowns.

Cardinal Health is a healthcare products and services company headquartered in Dublin, OH. It manufactures and packages best-in-class surgical drapes and gowns through its Medical Products and Services group. Millions of drapes and gowns are packaged each year at its facilities in Mexico and the Dominican Republic.

To keep its competitive edge in the market, the company focuses on ways to improve production efficiency. A good example of this is Rudd's redesign of the pre-formed vented bags previously used to package surgical drapes and gowns. Rudd, a chemical engineer responsible for creating strategies that improve package cost, quality, and sterilization, was determined to have a more efficient packaging solution. He explains: "The pre-formed vented bags Cardinal Health was using to package its surgical drapes and gowns were producing material waste, both with the inefficiency of a circular Tyvek vent and the film thrown away when the bag is sealed."

Not only was the original package causing an unacceptable amount of waste, but it also was creating significant material and disposal costs. Each prefabricated bag needed about 30 square inches of film to be trimmed off and discarded. In addition, each required circular pieces of Tyvek, leaving 21 to 30 percent of the original material unused.

As a result, in 2003, Rudd and the company's packaging engineers began the task of finding a more efficient package to protect the company's surgical drapes and gowns. They started the work of formulating various configurations in order to produce an alternative that would use materials more effectively while maintaining

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package integrity. The final design, which was released this January, is a thermoformed pouch with a linear-tear feature.

The company partnered with Multivac, a manufacturer of packaging systems, to develop the automated thermoform fill-seal (TFFS) equipment needed to implement the new design. "We improved the package to provide a more robust packaging system for our drapes and gowns," says Rudd. "At the same time, Multivac's system reduced the amount of material waste produced by the packaging process. It was a win-win situation for both companies."

Thanks to TFFS technology, the new thermoformed pouch is being produced, filled, lidded, and printed all in-line, thus increasing production and material efficiencies. Multivac's Medical Division provided the technical expertise necessary to reconfigure an R240 machine, a compact rollstock system that produces the new thermoformed package to exact specifications.

"Multivac personnel provided superior machine design," says Rudd, adding that the two companies worked closely to ensure a smooth integration. "Technicians provided training in Spanish during and after the installation to mitigate any initial production problems and increase Cardinal Health's return on equipment investment. Multivac also responded to production roadblocks unrelated to the installation."

Rudd says the new packaging system provides the benefits he had envisioned. "The re-engineered R240 packaging system utilizes packaging materials more effectively by creating a customized cavity out of polyolefin films. Now, the only unused material is the film clipped to the chain drive on the TFFS machine. Additionally, the new design of the package requires a smaller rectangular shaped piece of Tyvek, eliminating remnants."

Michel Defenbau, Multivac's president and CEO, notes that the highly versatile design of the Multivac machine played a large role in the success of the project, which ultimately increased production speeds. Because the TFFS system is equipped with a Video-Jet variable data printer and a Bell-Mark flexographic printer, Cardinal Health is able to print product information on the top web of each package in-line rather than outsourcing the job. This feature allows Cardinal Health to change product codes quickly and maintain production speeds rather than storing large quantities of inserts. Rudd adds: "With information printed on the package, customers can now easily locate critical information, rather than relying on a loose paper insert."

Rudd says another benefit of the new design involves package security and the linear-tear feature. "This secure closure enables the package to withstand a more aggressive, faster ethylene-oxide sterilization process. The peelable seals often found on many competitive TFFS packages require a longer and therefore more

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expensive process. With the new system, Cardinal Health was able to increase production and reduce the value of the product held as work in process after sterilization."

Moreover, Rudd believes the new package also gives customers a product with better stacking capabilities than its predecessor. "The film material used for the previous bag required a slip agent to allow for easy filling. This slip agent did not permit the bags to sit well on top of one another. Now that the drapes and gowns are being placed into a contoured pouch and can be loaded from the top, there is no need for the material to be slippery, and the packages stack with ease."

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For additional information on the products and technologies discussed in this article, see *Medical Design Technology* online at www.mdtmag.com and the following websites:

• www.cardinal.com

• www.multivac.com

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