

Outside The Box

The latest technology in shrink wrapping enables multipacks of vertically oriented containers to be automatically wrapped with increased efficiency, reducing the need for manual intervention

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The processing, packaging and distribution needs for pharmaceutical products can be quite demanding. Most drugs must be produced, stored, filled, sealed, packaged and transported under conditions that ensure product integrity and maintain safety. The systems for handling many pharmaceuticals through every part of the supply chain – from manufacturing to shipping – must be done under compliance with FDA regulations. Some of these products are controlled substances requiring strict handling under FDA and Drug Enforcement Administration compliance. Many are aseptic, refrigerated or frozen and need to be handled in temperature-controlled environments, while others require a combination of special handling activities. Such constraints are endemic to the pharmaceutical distribution cycle.

Protecting the contents of these medicines is a critical objective for pharmaceutical producers. The industry is infused with a strong quality control emphasis, so raw materials, in-process fillers, packaging systems and finished products are continually checked for integrity.

With the healthcare supply chain in a state of flux, the challenge for pharma executives is how to leverage processes to reduce costs, while maintaining the flexibility required to mitigate risk across the supply chain for both prescription (RX) and over-the-counter (OTC) products.

The US Drug Supply Chain Security Act, enacted in November 2013, was designed to transform the way in which the domestic supply chain operates. The new regulations from the FDA are designed to ensure product

safety and stringent supply chain track and trace requirements. This places greater demands on manufacturers for real-time data capture of stock-keeping unit (SKU) lot codes, and will soon mean full serialisation traceability of product movement across the entire supply chain. These new mandates will require changes to current product labelling and barcode standards.

Shrink Wrap Versus Corrugated

Supporting this initiative, pharmaceutical and nutraceutical manufacturers, as well as pharmaceutical contract packagers, are converting more of their product packaging to the use of shrink wrap – particularly for multipacks – away from the use of corrugated. The demand for shrink wrapping has especially grown in application as a way to reduce the amount of packaging material needed, in addition to minimising storage and shipping cube space, which cuts packaging and transportation costs.

Not only does single and multipack shrink wrapping keep these products clean and dry, but it also adds a measure of tamper resistance, supporting product safety for RX and OTC drugs, hospital and laboratory supplies, and medical instruments.

Multipack shrink wrapping is also in demand because of its greater flexibility over corrugated packaging for supporting package graphics, placement of SKU lot codes, and track and trace data.

Combining numerous items in a singular shrink wrapped multipack package has multiple benefits to manufacturers, retailers and consumers throughout all areas of the pharma supply chain.

Vertical Orientation

However, shrink wrapping multipacks of vertically oriented containers – such as bottles, cans, canisters, jars, boxes and aerosols – can pose significant challenges for manufacturers.

In a conventional multipack shrink wrap set-up for wrapping vertically oriented products, once the containers are filled, they must then be laid on their sides on a conveyor and manually turned so that their logos are facing the same direction, and/or their barcodes are hidden. The only practical way to hold the items together to keep them from rolling while being wrapped is to use a chipboard carrier tray or 'boot'. They are then fed through a horizontal shrink wrapper that applies a polymer plastic film, and when heat is applied, it shrinks tightly over whatever it is covering.

Because the manual manipulation of the products is done off-line, many pharmaceutical manufacturers prefer to send out individually filled containers to contract packagers to turn the products and shrink wrap them into multipacks. The contract packager will then take the individual containers out of the boxes and put them on a conveyor along with a carrier tray, orient the positioning of the containers – ensuring the logos and barcodes are in the correct position – and shrink wrap them in multipacks. The contract packager will finally box, palletise and either send them to an external distribution centre, or return them to the pharmaceutical manufacturer for delivery.

This method not only adds extra costs, labour and time to the packaging process, but also necessitates a greater

use of packaging materials from the carrier trays and, frequently, film for double wrapping. Add to this increased energy consumption for further transportation, double wrapping and cartoning, and it altogether makes for a largely inefficient system.

Pharmaceutical and nutraceutical manufacturers, as well as contract packagers, have been in need of a way to shrink wrap these vertical product multipacks without the added labour and expense of conventional horizontal shrink wrapping systems.

Streamlined Process

The latest technology in vertical shrink wrapping eliminates these problems. Most critically, it can automatically wrap multipacks of products such as bottles, cans, jars or canisters directly from the fillers with the product standing upright. With no need for manual re-orienting of products prior to wrapping, containers can now go directly from filling through to wrapping, cartoning and distribution in-line, without interruption. Additionally, carrier trays are no longer required to position the individual containers for shrink wrapping.

Vertical shrink wrapping not only automatically wraps containers while in vertical positions, but the wrapper also trims the film underneath the package where it is hidden from view. It cuts away the film in one action to create a full bottom trim seal – instead of the traditional lap seal – to enclose the product. This makes a very secure and attractive package and offers more opportunities for pharmaceutical packaging designers.

The throughput speed of the wrapper is achieved by the sealing head, which uses servo-orbital-motion technology. It eliminates the need for the head to move horizontally with the product while the seal is being made. The orbital sealing head moves in an ellipse, always in the same direction, removing any back-and-forth motion by the sealing carriage, thereby dramatically increasing the throughput rate of wrapping. Importantly, the orbital seal head does not have to

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come to a complete stop during the cycle, which drastically reduces stress on the components. In this way, it uses inertia to its advantage rather than fighting against it at every cycle, as with a reciprocating box motion seal head.

Servo-control allows the motion of the orbital head to be electronically shaped to create the optimum path for each product, producing great seals, using the minimum amount of film, and cycling at the quickest rate possible. It permits extremely fast motion while also gently ramping into both the closed and open position at the last moment, eliminating any bounce during the sealing process. Seal time, temperature, and even pressure, can be controlled from the touchscreen control panel.

The servo-controls give precise product and film control. The result is a fast, reliable and flexible wrapper with minimal moving parts and maximum performance, capable of wrapping 150 three-container multipacks per minute, while using far less film than other methods might.

Barcodes and Labels

An important function in pharmaceutical packaging of multipacks is to cover the barcodes of the individual cans or bottles, so that the package can be identified as a multipack, and not as individual units.

The servo-precision of this new vertical wrapping technology ensures that the individual container barcodes can be covered by printed film. Because this wrapping technology does not require a carrier tray to hold products in place during wrapping, in applications where

the carrier tray was once used to hide barcodes from individual containers, the packager can now use printed film to correctly identify the unit as a multipack.

High-speed camera technology scans each item as it enters the system. Camera data is transferred to the controller, resulting in exact movement information to obtain the desired final product orientation. Servo-driven gripper wheels spin each container to the desired position, resulting in precisely aligned labels. This makes a very attractive and functional multipack.

Flexible Technology

Overall, orbital shrink wrapping technology affords pharmaceutical and nutraceutical manufacturers, as well as contract packagers, much wider flexibility to design and set up shrink packaging lines that custom-fit their specific requirements for multipack packaging: a welcome change from the difficult and time-consuming process demanded by vertically oriented products.

About the author



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