

New and Improved Tech

The latest technology in shrink wrapping has increased performance for manufacturers desiring to streamline their packaging lines, resulting in faster cycle times and higher throughput

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One of the major challenges for pharmaceutical executives is focused on leveraging manufacturing and packaging processes to reduce costs by optimising the flexibility and capacity of existing machining resources, while, at the same time, maintaining the safety and sterility standards needed to mitigate risk across the supply chain for both prescription (RX) and over-the-counter (OTC) products.

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

The processing, packaging and distribution needs for pharma products can be quite demanding. Most of these must be produced, stored, filled, sealed, packaged and transported under conditions that ensure integrity and maintain

safety. The systems for handling many pharma products through every part of the supply chain – from manufacturing

to shipping – must be done under compliance with government regulations. Some of these goods are controlled substances requiring strict handling. Others need to be handled in temperature-controlled environments or require a combination of special handling activities. Such constraints are endemic to pharma manufacturing, filling, packaging and distribution cycles.

Automated Shrink Wrapping

One area of critical importance for maintaining product safety and packaging integrity as these RX and OTC products are moved throughout the supply chain is shrink wrapping. Not only can shrink wrapping keep these products clean and dry, but it can also add a measure of tamper resistance. Shrink wrapping of pharma products has seen significant improvements in automation over the past decade, commensurate with increases in computing capability of programmable logic controls, improved performance of servo-driven motors and streamlined high-speed camera technology. Combined, these have enabled precise product and film control, which allows high-speed wrapping with precision print registration.

The result is fast, reliable and flexible shrink wrapping, with minimal moving parts, reduced maintenance and maximum uptime performance, while using the least amount of film possible.

Pharma manufacturers need equipment that is compact, efficient and capable of running both bottles and cartons with minimal changeover and also provides real time data capture of stock keeping unit lot codes for mandated track and trace requirements of product movement across the supply chain. The latest shrink wrappers meet these standards that are designed to fit a wide variety of pharma applications.

Side-Seal Shrink Wrappers

Side-seal shrink wrappers are generally considered the most flexible of the various wrapper styles and are often chosen by pharma contract packagers that are capable of wrapping a never-ending variety of packages.


These wrappers encapsulate products in a continuous tube of film, sealing along one side of the package and then separating the packages into individual units downstream using a cross-seal.

Keywords

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Sealing technology

Streamlining packaging lines



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Side-seal machines can run random products of infinite length.

Side-seal wrappers come in two basic configurations: two-belt and three-belt. Two-belt sealers are made more compact by eliminating one of the infeed belts and making the end-seal prior to the side seal. Two-belt units are often the logical choice when pharma manufacturers find themselves needing the ability to wrap longer products without greatly expanding the length of production lines. Three-belt side-sealers have the added advantage of being able to precisely space the products prior to entering the wrapping area.

Intermittent and Continuous

Side-sealers function in one of two throughput modes: intermittent-motion or continuous-motion. With the former, the end-seal carriage remains stationary and does not move with the product. This necessitates stopping the product stream momentarily as each seal is made. In a dual side-seal design, the end-seal is made prior to the side-seal. This design allows the system to fit in a smaller space, but also requires the product to be spaced apart prior to entering the infeed conveyor.

However, with the latter mode, the incoming stream of products does not stop while the end-seal is being made, thereby increasing throughput speed. Continuous-motion side sealers are ideal for pharma shrink wrapping applications that demand high throughput speeds with maximum package flexibility.

Lap-Seal

Lap-seal wrappers place a nearly invisible overlap seal underneath, making a very attractive package, while using the minimum width film. Lap-sealers use flat or single-wound film, which is pulled over a forming plow, overlapped under the package and sealed by use of either a static or thermal seal. As the products flow through the former, they are encapsulated in a continuous tube of film and cut apart downstream by the end-seal device. Lap-sealers are most popular in pharma applications that call for long runs of constant-sized products, as each product requires an individually-sized plow and a specific width of film to be stocked. High-speed lap-sealers can reach throughput rates of 250 packages per minute.

L-Bar

L-bar shrink wrappers are named for the L-shaped seal configuration, which simultaneously makes the end- and side-seals of one package, as well as the front-seal of the trailing package. Generally chosen for pharma applications where speeds are slow to moderate – eg up to 50 packages per minute or where space is limited – these sealers can be affordable and versatile wrappers within a certain range of product sizes. Available in different seal sizes, the most common limiting factor with L-sealers is product length.

Vertical Continuous-Motion for Multipacks

Vertical continuous-motion shrink wrappers are applied to wrap products in the upright position. These systems wrap products, such as bottles, cans,

jars or canisters into multipacks, directly from a filler process.

Multipacks have quickly grown in popularity as manufacturers have found them to be a great way to offer special pricing promotions or package different forms of the same item in variety packs. However, shrink wrapping multipacks of vertically-oriented containers, such as the aforementioned, poses 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 down on their sides on a conveyor and manually turned so that their logos are facing in 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, which 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 manufacturers prefer to send out the individual containers after filling to contract packagers and have them orient the products and shrink wrap them into multipacks. This method adds additional costs, labour and time to the packaging process.

The latest technology in vertical shrink wrapping eliminates such problems. With no need for manual re-orienting of the products prior

to wrapping, containers can now go directly from filling to wrapping to cartoning to distribution in-line without interruption. The latest systems are capable of wrapping 150 three-container multipacks per minute while using a minimum amount of film. Additionally, carrier trays are no longer required to position the individual containers for shrink wrapping with this latest technology.

Streamlining these shrink wrapping systems are innovations in technology that are enabling faster product throughput, with less downtime, less maintenance requirements and more efficient usage of film.

Servo Orbital-Motion Sealing Head

One of the latest and most pivotal technologies to impact the performance of automated shrink wrapping is servo orbital-motion sealing head technology.

In conventional shrink wrapping systems, a box-motion is performed by the sealing head. This refers to the rectangular-shaped path of the sealing head, in which the device making the end-seal moves horizontally with the product as the seal is being made. When the seal is complete, the head raises, and the carriage returns to engage the next package and make the next seal. The box seal executes rapid movements back and forth and requires a large and heavy carriage assembly to mount the sealer. This creates considerable inertia, requiring significant force to stop the carriage in its forward and backwards motions. Bumpers are typically used to provide hard stops for the sealer carriage, causing shaking that usually occurs on the fast returns, forcing the system to pause while the photo eyes and sensors settle out. Speed of cycle time is compromised with this type of reciprocating motion.

Depending on the package size, there are times when the head sealer cannot get back into position in time for the next seal.

Servo orbital-motion technology eliminates the need for the sealing 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, eliminating any back and forth motion by the sealing carriage, thereby dramatically increasing the throughput speed of the wrapper. The orbital seal head does not have to come to a complete stop when cycling, which drastically reduces stress on the components. It uses inertia to its advantage instead of fighting against it with every cycle, like 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 fastest rate possible. It allows for extremely fast motion while also gently ramping into both the closed and open position at the last moment. This eliminates any bounce during the sealing process.

Horizontal Sealing Technology

However, improvements in horizontal box-motion sealing technology have taken place as well. A hybrid pneumatic cam system allows very fast movement of the sealing-head carriage back and forth to seal and separate packages without the harsh stops and starts inherent in conventional horizontal sealing shrink wrapping systems. This allows maximum throughput speeds with long-term reliability and minimum maintenance.

Supporting this is motion trim technology, which electronically

minimises the motion of the end-seal device, and side-seal technology, which ensures consistent, high-quality seals across a wide range of film types and gauges.

With standard auto-spacing control – horizontal as well as vertical photo eyes – and the ability to precisely vary conveyor speeds to relax the film between products, horizontal sealing technology has reached a new level of performance for pharma manufacturers.

Packaging Line Performance

This latest technology in shrink wrapping enables a significant leap in performance for those pharma manufacturers desiring to streamline their packaging lines. Reduced labour, material usage and operating costs, as well as faster cycle times and higher throughput, are the key benefits.

The new technology also affords pharma manufacturers a wide latitude of flexibility to design and set-up shrink packaging lines to custom-fit their specific requirements – a capability that can make their product packaging lines a showpiece of efficiency and return on investment.



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