Goodbye bulls-eyes and bullet holes

More machines that provide fully enclosed shrink-wrap – and can handle taller transit packs with no 'bulls-eyes' or 'bullet holes' at the sides – are now coming on to the market. Report by Martin Keay.

Out of all the different types of disposable transit packaging available, shrink-wrap film will almost certainly come top of the list when the main criteria are evaluated: cost, weight per pack, volume in storage, display potential and ability to recycle.

But the benefits of shrink-wrapping don't just stop at the material and the pack. Shrink-wrapping machines are for the most part cheaper, more efficient, easier to size change, easier to operate, easier to maintain and more tolerant of product size variations than other transit packing alternatives.

However, one of the drawbacks with the classic shrink-wrap pack is the so called 'bulls-eyes' or 'bullet holes' at either end of the pack. These holes not only allow dirt and moisture to enter, but also influence the thickness of film that must be used. This is because experience has shown that the holes get used as handles and so, to avoid the film splitting, the film gauge must be sufficient to allow the pack to be picked up and swung by one of these holes.

In contrast, fully enclosed shrink-wrap packs protect the product completely and allow the packer to reduce the thickness of film quite significantly, because the opportunity to use the holes as handles has been removed.

Shrink-wrapping machines that can produce completely enclosed shrink-wrap packs are, of course, by no means new. L-sealers and further machines that use centre folded material, as well as the flow-wrapper style shrinkwrappers, are widely used to produce completely overwrapped packages.

Application restricted

Nevertheless, the application of these machine types is restricted to relatively low packs, usually less than 150mm high, and so they tend to be unsuitable for the typical transit pack, which can be up to 450mm high.

Several shrinkwrapper manufacturers have been working on the problem of totally enclosing tall packs and in recent months three companies have launched new machines to solve the problem. Each of these new machines has a different approach, but all three manufacturers have based their solutions on the same type of machine, the two reel sleeve wrapper.

The two reel sleeve wrapper was one of the first shrink-wrapping machines to be developed and is the machine used by almost all shrinkwrapper manufacturers to produce 'bullet hole' shrink-wrapped packs at low to medium speeds.

As its name suggests, this machine uses two reels of film, one mounted above the product conveying level and one below. A horizontal sealing bar is positioned between these two reel assemblies and at right angles to the direction of product flow.

Before operation starts, film is taken from both reels and sealed together by the horizontal sealing bar to form a curtain of film. Once this seal has been made the horizontal sealing bar rises to allow a pack to be pushed or conveyed under the sealing bar, taking the curtain of film with it and pulling film from both top and bottom reels. When the pack has passed under the sealing bar, the bar lowers to form the seal around the pack, re-create the film curtain and separate the pack from the film.

Different heights and widths

One of the great benefits of the two reel sleeve wrapper is that it can handle products that vary significantly in height and length, one after the other without adjustment and, within the limits of the rolls of film being used, can also accept products that vary in width.

Europack's machine to produce totally enclosed transit packs is the EPS4, which was

Enclosed packs: *Europack's new EPS4 twin reel machine also seals the film at the pack sides*

Folded at the side: *The Meurer approach to creating completely enclosed packs*

launched at the PPMA Show in September. Based on the company's proven range of two reel sleeve-wrapping machines, the EPS4 forms a loose sleeve around the product in the normal way, but using wider film than would be typical for a standard bullet hole pack. As the pack leaves the cross seal assembly, the loose film either side of the pack is picked up by two continuously moving heat sealing mechanisms, which form the side seals.

At this stage the shrink film fits loosely around the pack and can either be discharged in this form or passed through a shrink tunnel so that the film shrinks to the pack. Speed of the Europack EPS4 is up to 60 packs a minute.

Kallfass is also using a conventional two reel sleeve wrapper to produce totally enclosed transit packs. A sleeve is formed around the pack in the usual way and the end flaps are then sealed together using a specially designed shrink tunnel in which air is circulated at a much higher rate than in a conventional shrink tunnel. Carefully directed hot air heats and folds the film either side of the collation to form a fully enclosed transit pack.

Despatched via the post

This Kallfass system is capable of accepting packs of varying dimensions one after the other and is being used in Germany to wrap orders of CDs and cassettes so that they can be delivered to retailers by the German postal service. Kallfass is represented in the UK by Marden Edwards.

German manufacturer Meurer, represented in the UK by Fords Packaging Systems, has taken yet another approach with the machines it has supplied to wrap collations of cartons in the tea and coffee industries. The machine used is a stretch-banding machine, which is a variant of the two reel sleeve wrapper. On this machine the film is pulled tightly around the pack before being sealed, which ensures that the collation of cartons is held tightly together throughout the wrapping process.

Folded like a parcel

When the pack leaves the cross seal mechanism, the film at the sides of the pack is folded like a parcel or an envelope before being heat-sealed. This produces very neat end seals which allow the contents of the pack to be seen from all sides and also allows the pack ends to be used for carrying labels. The use of stretch-banding allows the customer to minimise the amount of film used to produce these transit packs and eliminates the shrink tunnel.

Indeed, eliminating the shrink tunnel minimises the energy usage and makes this system particularly suitable for frozen foods.

Meanwhile, Meurer and Fords have also developed a high speed system to turn and collate cartons of frozen pizzas and burgers on edge prior to shrink-wrapping. This means they can be palletised with the glued flaps vertical, which increases strength and, for some customers, has allowed 3 metre pallet heights to be achieved with unsupported shrink-wrapped collations. The carton turning systems are capable of speeds up to 300 a minute.

Low profile products

For low profile products of uniform cross section, flow-wrap style wrappers continue to be popular to produce completely enclosed packs.

Sitma, which is represented by Integra International, part of the AH Buckham Group, offers a wide range of both single copy wrapping lines, and shrink wrapping machines, two of which are particularly suited to general packaging operations.

The Sitma C35 is a manually fed, semi-automatic bottom reel flow-wrapper style machine capable of handling a variety of product sizes and shapes, up to a height of 150mm. Maximum speed is 35 items a minute. It makes the longitudinal overlap seal at the top of the pack via a heat sealer or Sitma's ionising system, prior to shrinking.

The Sitma C790 makes the seal underneath the product and can cope with products up to 130mm high at speeds up to 120 a minute.

Another trend in recent years has been the increased use of single reel sleeve wrapping machines. These were developed initially for high speed operations up to 100 packs a minute, which is achieved by eliminating the horizontal sealing bar used in the two reel sleeve wrapper.

On these machines, film is drawn from a single reel mounted below the product conveying level. This film is cut to length and then wrapped around the pack with the ends simply overlapped underneath the pack as it moves to the shrink tunnel. Here, the overlap of film fuses to form a seal while the loose film either side of the pack shrinks to create the classic bulls-eyes or bullet holes.

In recent years, the price of single reel sleeve wrappers has come down, allowing them to be used for applications at, say, 30 packs a minute, which in the past would have been achieved by a two reel sleeve wrapper working at the top of its speed capability.

However, price was not the only limit on the application of single reel sleeve wrapping

machines in the past. On most machines of this type the mechanism that takes the cut film and wraps it over the moving collation, is specific for a particular pack. A higher or longer pack requires a longer length of film and this in turn requires a different arc of movement from the film wrapping mechanism.

On most single reel sleeve wrapping machines therefore, a change in pack meant an exchange of size parts, making pack size changes relatively lengthy tasks. However, Italian manufacturer Dimac, part of the Aetna Group, has developed an answer, which has been applied on its new Star series, launched in the UK at September's PPMA Show.

Upgradable in the future: *Kisters' new generation of modular construction shrinkwrappers*

Upgraded in the field

Indeed, the Star single reel shrinkwrappers are built to a modular design that allows the machines to be upgraded in the field to meet increased demand or changes in pack specification. Wrappers supplied initially for 20 collations a minute can be modified to run at 30 or 45 collations a minute and a wraparound tray or base-board insertion station added.

"This gives lower volume users in particular the advantages of a single reel machine from the outset, without the commercial risk of installing equipment that may eventually be unable to keep pace with demand," points out Aetna UK managing director Mark Tucker.

All modules are built in separate frames that bolt together and have their own individual servo motor drives. This means, for example, that a tray or base-board feed module can be readily added within the base of the collation module, delivering up through a modified deadplate. Shrink tunnels, too, are built to accept extra heating modules to cope with higher speeds.

Instead of the conventional vacuum belt film feed system, the new Star series employs a rotary cutting knife and servo controlled drive rollers set immediately beneath the transport level. This means that the cut sheet of film is driven positively on to the product conveyor and accelerated to the speed of the flight bar, providing optimum print register accuracy. In addition, the mechanism is simpler than vacuum belts, and can simply be slid out from the machine for maintenance.

Dimac is also using a new single wrapping bar arrangement in place of the more usual multiple bars, carried on a chain, so providing quick single point adjustment by handwheel for different product heights. A simple slide and variable length lever arrangement for the drive allows the bar to describe a fixed length ellipse, so maintaining pitch, but at whatever height is required to lay the film securely onto the collation concerned.

Film drive: *Dimac's new system, shown open*

The collation system for the 20 and 30 a minute machines relies on mechanical gating and handwheel adjusted lane guides. For speeds of 45 a minute, the mechanical gating is replaced by Dimac's twin conveyor system, which uses acceleration of the second conveyor relative to the first to provide the space between collations. Dimac also builds machines capable of handling up to 70 packs a minute.

Kisters introduced its new 'Modularity' approach to high speed shrinkwrapper design at Pakex earlier this year, demonstrating some of the modules that allow the machines to be simply uprated in the future to take on additional tasks.

Six basic modules

The six basic modules cover infeed duties, collation, blank feeding (for pads or tray blanks), tray folding, film sleeving and a shrink tunnel. In addition there are two option modules for stacking and pack turning. Each is completely self-contained, with its own drives, and simply bolts into place with control exercised by the machine's Siemens or Allen Bradley PLC. Wing doors which fold up and over provide virtually unrestricted access to the working parts.

All of this means that users no longer need to decide at the outset what tasks the machine should be capable of carrying out in the future, as Kisters explains:

"If, for example, the customer originally planned to shrink-wrap six plastic bottles but later wanted to pack ten smaller bottles – which would be unstable without a tray – then he would have to include this function in the original machine. This was a clear disadvantage. In our new concept, if the customer's requirements change, an extension to the machine is also possible."

For example, the four basic modules of infeed, collator, film sleever and shrink tunnel required to produce an unsupported shrink wrap can be extended for supported collations with the addition of a blank feeder for pads. The addition of a folding station then allows the machine also to produce trays, while a stacker can also be added for tiered packs.

Wrapid Packaging's single reel machine is the BVM Speedmaster which runs at speeds of 30-

Pick-and-place: *Polypack Rokh system places unstable product directly on to the film*

High speed: *BVM Speedmaster machines from Wrapid Packaging can reach 100 trays a minute*

100 trays a minute on plain or printed film. Principal applications are in the bottling, canning and food industries.

Cermex launched its new Evolution 3 single reel shrinkwrapper at Drinktec Interbrau in September. Capable of speeds up to 70 cycles a minute, the machine incorporates a new film handling system that allows lower gauge materials to be employed, down to 30 micron, and also has a new continuous motion film changeover system. This requires no splicing or jointing and allows the machine to continue running during a film reel changeover.

The Evolution 3 is controlled via an industrial PC which, combined with the CESAM software, drives the machine and also provides production data. A field bus system controls the main parts of the machine and the shrink tunnel while customer support can be provided via a modem link that gives Cermex engineers remote access for trouble shooting.

Novopac's high speed single reel machines, the Lancio series, are available to give speeds up to 60 a minute, with collations running unsupported, on base boards or in trays. The machines can also be equipped with a VF wrap-around case packing section, to provide an alternative style of packaging when required, such as for exports.

Most shrink-wrap film is intended solely to get the product from the manufacturer to the retailer and so protection rather than presentation is the main criterion. However, increasingly, full colour printed film is being used to create multipacks and to protect products for the consumer to take home. This type of shrink-wrapping is now familiar for soft drinks, beer and canned pet food.

Registered film on the top

Up to now though, the use of print registered film has been restricted to single reel sleeve wrapping machines, generally used only for high speed applications. However, Ivan Reeve, sales director at Europack, reports that his company can now supply two reel sleeve wrapping machines able to handle print registered film on the top reel.

"This will allow our customers to use full colour printed and registered materials on products which are wrapped at relatively low speeds," he points out. "Previously, this would have been impossible because of the high cost of single reel sleeve wrapping machines."

Confirming the importance of the two reel shrink-wrapping machine, manufacturers continue to launch new models.

Among those from Cermex is the CP18 which can handle products at random and the CP18/ALC which was developed to handle unstable products such as aerosol cans, and also to accept a degree of random length or height to suit contract packers in particular.

This machine employs a single conveyor, on to which the bottom film web unwinds, to carry collations through both sleeving and shrinking operations, providing a smooth passage and avoiding risk of toppling as products pass over the bottom sealing bar of traditional machines.

Instead, bottom sealing anvils are carried on the conveyor itself, set at a choice of pitch to suit the mix of products to be wrapped, along with rubber reference bars against which collations are placed by hand. The top sealing bar then descends and moves in box motion with the conveyor and bottom web, pulling down the required amount of film from the top unwind to suit collation height and length, which are sensed by photocells.

Trayed or unsupported: *Wraps UK range includes machines to handle both styles*

Box motion sealing provides pressureless handling of the collation, for stability, and also contributes to higher speed, which is up to 45 packs a minute depending on dimensions.

Kliklok has introduced the Quicksilver twin-reel machine in two versions: intermittent motion for speeds up to 25 packs a minute and continuous motion for speeds up to 50 packs a minute. In-line and side-feed arrangements are available for both. The machines feature an on-board diagnostics system and there is an optional low-level side-mounting film roll unwind to make film replenishment easier.

Polypack's answer to handling difficult or unstable products is the Rokh pick-and-place system which allows products to be collated and transferred in a large radius to suit the limited space available on existing shrink-wrapping lines.

Film dispensed on top

Unstable products are handled by dispensing the film on top of the wrapper's bucket infeed conveyor, which is used to locate and maintain the bundle. The Rokh places the collation on top of the film, the conveyor moves forward and the film is draped over the collation and sealed before the wrapped pack is passed through the shrink tunnel. These machines can be supplied in single or dual lane and run at 40 to 50 cycles a minute.

The latest development announced by Polypack is an all-in-one system that can collate the product, load into plastic or board trays for point of sale display, shrink-wrap and then form a wraparound case or drop the products into an RSC case.

Positive placement

"The key to this system is the positive placement, positioning and accurate loading of the trays," says Polypack. "This is achieved by a lug conveyor used to transfer and position the trays and our Rokh system to load the products. These machines have proved particularly popular with the toiletries, cosmetics and pharmaceutical industries."

BVM machines from Wrapid Packaging now cover a particularly wide size range, with machines from 400mm to 1600mm jaw width and jaw openings up to 600mm. Side seal units also allow the machines to produce totally sealed packs for applications such as pharmaceuticals that require a dust-free environment.

Wraps UK is now getting close to supplying its 200th machine in the UK. The company's range includes machines employed on both trayed product and unsupported collations, using film gauges of 25 micron up to 100 micron in some cases. There is a standard range of in-line and side-feed systems although Wraps UK is able to supply special features.

For the Orkney Herring Co in Stromness this involved changing the position of the controls

and providing a means of transferring the packs at 90deg immediately after the shrink tunnel.

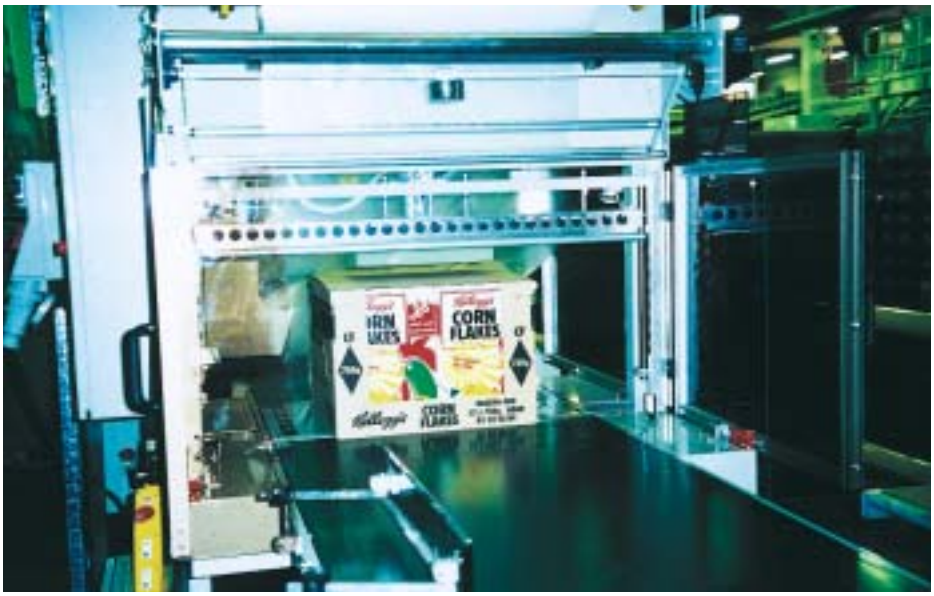
Getting started in shrink-wrapping

The two reel sleeve wrapper continues to be the first choice for companies as they expand their production, with huge materials and labour savings to be made by switching from hand packing into corrugated board cases. In other applications, shrinkwrap is adopted to improve pack integrity.

For example, Bragan Water of Co Monaghan, Ireland, has recently switched from placing bottles of mineral water into corrugated cases by hand to using unsupported shrinkwraps, created with a new Adpak B700 Swift fully automatic wrapper. This is able to handle the entire output of the filling and labelling line, typically operating at 150 x 1 litre bottles a minute.

Other bottle sizes filled by Bragan range from 250ml to 3 litres which are packed in various collations from 3 x 2 up to 6 x 4. Size change, which requires no tools, takes less than 30 minutes, says Adpak.

Unsupported: *Shrinkwrap film has replaced corrugated cases at Bragan Water*



Improved integrity: *Kellogg's has installed two Rochman machines from Yorkshire Packaging*

Meanwhile, Yorkshire Packaging Supplies has recently installed a second Rochman fully automatic sleeve sealer at Kellogg's in Trafford Park, Manchester. The Rochman equipment is a fully automatic inline sleeve wrapper, complete with a large double chamber shrink tunnel, designed to shrink-wrap full cases of a variety of Kellogg's breakfast cereals.

"Shrink-wrapping has been a successful venture for us in terms of providing the best method of increasing production speeds, keeping costs under control and improving pack integrity," explains Paul Bailey, Kellogg's Trafford Park warehousing manager. "Successful results with the first piece of shrink-wrapping equipment encouraged us to commit to a second machine." ■

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For full details of all PPMA members able to supply shrink-wrap equipment for transit, enter **402** on the free reader service card in this issue, or visit the PPMA web site: www.ppma.co.uk

Roll wrapper selects best film width

An automatic wrapping line able to handle rolls of polyurethane foam up to 2.1 metres wide and 400-2400mm diameter at random, selecting from three film widths to reduce waste, has been commissioned at German foam manufacturer Otto Bock by Optima Filling and Packaging Machines, also of Germany.

Based on the Optima XL wrapping module for large items such as white goods, paper on pallets and building materials, the line is able to operate at speeds up to 130 rolls an hour and, points out UK agent Sussex & Berkshire Machinery, works on what is a virtually unmanned basis.

The rolls, which are used in the automotive and furniture industries, weigh anything from 10 to 350kg. They arrive at the Optima line on a conveyor, with their long edge leading.

Once their width and diameter have been sensed by photocells, each roll is allowed to progress to the most appropriate of the three wrapping stations, each of which uses different width film.

At the wrapping station, the reel is carried into the film curtain created by webs from top and bottom film reels and the wrap completed by sealing bars that are controlled to meet halfway up the reel. This allows the seal to be made on the periphery, right next to the material, creating a tight wrap that requires no subsequent shrinking.

The ends of the wrap can then also be heat sealed if required.

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Foam roll wrapping: *Rolls of foam are fed into the Optima XL line at Otto Bock*