

**R**ecent innovations in thermoform-fill-seal machinery have been very much concerned with addressing issues such as reclosability and resealability, providing choice of product in one pack, giving flexibility in terms of shape, quick size changeover and, naturally, bringing packaging costs down.

As John Hutchen, sales manager of machinery supplier Multivac UK puts it, "It's a matter of allowing your customers to be a step ahead."

And behind the race to keep one step ahead has been the tremendous take up of modified atmosphere packaging. A walk down the aisles of any major retailer will confirm the burgeoning market and consumer preference for MAP.

Market research company MSI Data is due to report on the figures up to 2000 later this year, when huge increases on its earlier findings are expected. But even its statistics from *Modified Atmosphere Packaging: UK*, published in 1999, are a clear indicator.

From under 2000 million packs in 1993 the UK volume for MAP packs shot up to 2809 million in 1998, with growth rates steadily increasing from five per cent a year to eight per cent by 1998 over 1997.

Clearly, this is no packaging fad. As MSI reports: "There are a number of sound commercial reasons why the use of MAP continues to grow. Apart from the obvious benefits for both retailers and consumers in significantly reducing the rate of deterioration of food, MAP retains both the original appearance and aroma of foods."

The report suggests that the fastest growth rates have occurred in the poultry, ready meals, bakery and dairy areas. Second in volume in 1998, next only to the carcass meat sector, was the number of MAP packs used for cooked meats and meat products. At 423 million units it represented 15 per cent of the total UK volume, says MSI.

Developed two to three years ago, a Multivac **thermoform-fill-seal pack** for cooked and sliced meats offers a peel-and-reclose profiled lid, thermoformed from the top web. The pack prevents the contents drying out in the fridge once the modified atmosphere has been released. "Performed on the Multivac R530, this pack required forming to extremely tight tolerances; the two webs had to be very accurately married together," explains John Hutchen.

More recent is a development in resealable packs for cheese. "We've sold five machines – 530 and R230 models – into this market in the last 12 months," says John Hutchen. Particularly

# Keeping one step ahead



**Resealable:** Cheese packs produced by Long Clawson Dairies on Multivac machinery

*Reclosable and resealable thermoform-fill-seal packs are among ideas to keep the machinery users and their food retailing customers one step ahead.*

interesting is a triangular 65mm deep pack used by Long Clawson Dairies for its speciality Stilton wedges.

A top web of PET/adhesive/PE is sealed to the thermoformed PE/PVC base. After opening, the adhesive will reseal the pack.

#### **Something new for the customer**

Again it is providing the customer with something new while giving packers and retailers the opportunity to lift the market with an alternative to flow-wrapped cheese packs. "There have also been high levels of leakers with horizontal form-fill-seal packs," observes John Hutchen.

He adds that being able to provide larger packs has been essential. "As the pack sizes go up the number of slices of product sold overall

increases, but you need to be able to reseal."

Retailers are forever looking to promote higher volumes. A recent initiative is the four-pack multipack of deli hams retailed by Sainsbury. Premium honey cured and premium smoked ham is filled into four adjacent formings, which are perforated. The 300g packs may be opened one or two at a time, preventing the remaining cooked meat drying out and so encouraging larger pack purchases.

Multivac has taken this idea a stage further, developing its equipment to offer a hinged lid multipack style. The base web is thermoformed two-up with the top web restricted to the middle of the base web, sealing down only over the filled thermoformings. The extended side edges of the base web are perforated, allowing them

## THERMOFORM-FILL-SEAL

to fold over, and are formed to provide a clip-over lid.

"The style allows excellent recloseability and is ideal for deli applications," explains John Hutchen. "We now have the technology to do it."

Another idea, shown recently for the first time, provides a cost effective positive reseal without extending the base web very far. The peel tab is slightly extended and a series of holes are punched in the top web that seals to this area and a label placed over the top. In use, the lid is peeled back as usual from the seal, but a positive reseal is provided by the label sticking through the holes to the bottom web.

Being able to provide different styles has also paid off on the dairy front. For example, Michael Henderson, director at Engelmann & Buckham, UK agent for Hassia, reports "a lot of success with dual cavity pots for desserts."

The company is currently in the process of installing a major new line which incorporates Ishida multihead weighers to handle the dry part of the product. Heart of the line is a THM 1842 Hassia thermoform-fill-seal machine cycling at 25 a minute to produce 150 packs a minute, using a jumbo unwind carrying a 1600mm diameter reel of high gloss, high impact polystyrene.

Thermoforming plugs are servo driven. "By being able to control the rate of descent of the plug you can control the distribution of material and therefore use the thinnest base web possible," explains Michael Henderson. One half of the pots is then filled six-up from a volumetric filler and at the dry products station two weigh units fill three-up each.

### Totally new market

Servo driven throughout its 17 metre length, the line is said to have been designed for efficiency on both materials and product. The top web comes into the machine from the side (positioned for ease of change), through tension rollers, over a turner bar, under an ink jet coder and is fed down to the containers where it is heatsealed. Pots are die cut and packed in open trays by pick and place equipment.

Hassia is also opening up a totally new market. "At the end of last year the company installed an aseptic line for baby foods," reports Michael Henderson. Not in a position to name the company producing the baby foods in dessert style pots, he explains that one of the reasons the equipment was chosen was that the TAS 8/48 uses saturated steam to sterilise bottom web and lidding material rather than



**Freshly packed image:** Expanded polypropylene barrier trays formed and sealed on a Multivac



**Medical products:** Wenz WM230 thermoform-fill-seal blister machine from Soudal

hydrogen peroxide. "There is no hydrogen peroxide in the container, the germ kill rate is ten times higher by steam and it is cheaper to use, as there are no disposal costs or chemical costs."

Meanwhile, Springvale Equipment, UK agent for SASIB Food & Beverage, reports that the Italian company has recently delivered a machine for packing tomato paste in plastic cups with a 12 month shelf life, rather than the traditional metal can.

Gorlex Spa supplies the special PVC which

allows the paste to be filled at 93deg C. The customer has been able to replace its entire range of tomato based products packaging, with the thermoformer able to produce containers ranging from 70 to 425g. In addition, by changing the colour of the cup stock and changing the lidding film, the equipment will be used to produce a range of containers for jams and spreads. Springfield also reports that it has supplied a six cavity portion line to Kirpac for its Patak range of Indian relishes.

Latest equipment from Robert Bosch is the



**Producing and filling dual cavity pots:** A Hassia THM 1842 line is being installed for a UK customer by agent Engelmann & Buckbam Machinery

aseptic TFA 4948 for coffee creamer portion packs. Hourly output is claimed to be 115,000 tubs with filling volumes of 5-18ml. Cycle frequency is a maximum of 40 a minute with up to 48 tubs produced on each cycle. Hydrogen peroxide is used to sterilise both the material and machine.

Film change can be performed on the run. However, if it is necessary to stop the equipment, the contact heater is raised from the web and automatic cooling initiated. This prevents the materials from overheating, avoids material loss on restart and is claimed to ensure uniform tub quality. Formings of uniform wall thickness are produced, says the company, from films of 500 micron initial thickness.

Lidding film presealing in a sterile area and the sterile excess air pressure are designed for a high level of aseptic security, with the machinery meeting FDA requirements.

As film advance is sinusoidal, a high cycle with minimum headroom is possible, says Bosch. The product does not overflow or contaminate the sealing zones.

Just how important is flexible production? "It is a critical issue," says Multivac's John Hutchen. "We have been known for reliability and longevity, but we have been trying to work slowly, but surely in the area of flexibility."

Multivac has three strings to its flexibility bow. First, forming depth may be changed by screwing the base of the die up and down via the drive system. Second is the tandem die system. "Here we put two die and sealing stations in line to allow quick change at the last moment," he explains. "We have supplied this type of line to fresh meat, cooked meat, cheese and sandwich producers. Of course it pushes up the cost of the equipment, but it cuts downtime: some users are able to change over in just five minutes."

The third way is to change the footprint: to bring in the walls where flexible film is being used. "Typical applications are the medical industry. You can't have preheat so therefore the flexible film has to have overhead heating. We have also sold lines like this for the smoked salmon industry," says John Hutchen.

#### **Easy die change**

Flexibility, ease of die change and cleanliness of the sealing heads is the philosophy behind a new range of thermoform-fill-seal equipment now available in the UK from Swissvac. Made by Meca Plastic, the machines feature innovative hinged top forming and sealing heads.

Meca Plastic chairman Patrick Robache explains: "We believe this is the first time that it

has been possible to lift what is a traditional 100kg die in this way. It is a total rethink in thermoforming machines." Die change times are claimed to have been cut in half with this equipment.

Available for base web film widths of 450 or 650 the machine cycles at 25 a minute and is built to IP65 standard in 304L stainless steel. "Completely modular, it is possible to add dual head operation later," says Tony Holman, of Swissvac. "Other innovations are the fact that the film grippers are advanced by a brushless motor, which is fast and extremely accurate, while the lifting mechanism for the thermoforming, sealing and cutting systems run in a sealed oil bath to provide permanent lubrication and long component life."

To thermoform, fill and seal trays or to buy and seal trays? That will always be the question. "To make foamed trays, for example, offers considerable benefits," claims John Hutchen. "Savings of between 25 and 50 per cent are possible when you take into account the warehousing space as well as the cost of the pre-made tray. It really makes sense in the larger operations.

"For example major retail packer ABP has gone for thermoforming foamed aPET or PVC trays with enormous savings on its minced beef

packs. They are producing 100 packs/min. The pack costs are lower, the labour costs are lower and pay back on the equipment will be within a couple of years," he argues.

In just the same way, an economically priced entry-level pot forming and filling machine, said to pay for itself in two years by materials and labour savings, compared with the use of pre-formed pots, is now available on the UK market from Sussex & Berkshire Machinery.

Built in Italy by BencoPack, the SL10 is able to produce typical 65ml pots of yoghurt, juice and desserts at 2500-4500 an hour. This, points out S&B is virtually the same output as many pre-made pot filling machines, yet for similar capital cost. Maximum pot size is 250ml.

"BencoPack has designed the SL10 on a modular basis, allowing it to be built more economically in batches," explains Graham Hughes at S&B. "As a result, we estimate that material and labour cost savings, compared with buying in and loading pre-made cups on a filler, will pay for the machine in around two years."

Single serve butter, jam and milk or cream portion packs of 10-50ml can also be produced on the SL10 at speeds up to 6000 an hour. Features include plug assist in the forming section to achieve even material distribution in containers up to 90mm deep and lift-in, lift-out, quick-change tooling.

For packing dressings and medical devices, the German-built WM 230 in-line thermoforming and sealing machine is now available from UK agent Soudal.

Capable of handling either PVC or PET up to 330mm wide in multi-lane formats, the WM 230 can work at speeds up to 25 cycles a minute, producing blisters up to 300 x 275 x 70mm. Lidding material such as aluminium foil or Tyvek is taken from the reel and sealed onto the blister form prior to the final blister shape being punched out. ■

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# Extra care for medical

*Similar equipment has been used by both food and medical device industries for some time. But machine specifications are now diverging, writes Alan Isaacs\**

**A**lthough virtually the same thermoform-fill-seal packaging concept has been used for both food and medical products over past years, the growing differences between the needs of the two industries are driving subtle, but important differences in the specifications of machinery used.

While the objectives of the two may appear the same – getting the product to market – the true position is quite different. This means that increasing care is now being exercised by the medical industry when specifying machines originally aimed clearly at food packaging.

Part of the dilemma in specifying machines for the respective industries is their apparent similarities in consideration of pack stability, appearance, post packing processes such as sterilisation, and cost. But there are some major differences.

In the medical industry, the pack has to be considered as part of the product. Not only does the pack tell you how to use the product, but also ensures the product is sterile. Access to the product is also different, with the use of courtesy flaps to enable the pack to be opened and the product retrieved without corrupting product sterility.

**Shelf life up to five years**

Peel capability of the seal is critical since rupture of the pack, or cutting the pack open are not acceptable alternatives to peeling off the lid. Shelf life is also long, at up to five years. This makes the pack a fundamental part of the product: the product simply cannot be used without the presence of the pack, and the pack must be present at point of use.

*\*Alan Isaacs is chairman of the Doyen Group*

In the food industry, however, the pack is a vehicle to get the product to market. The pack does perform an important hygiene function, but in most cases is not essential to the proper use of the goods.

**Function of consumer convenience**

Just to emphasise this point, you can still go to your local butcher or delicatessen and buy foods that are processed and wrapped separately, and the pack is often discarded well before the food is prepared. Food is also not always supplied in a sealed pack and, while hygiene plays a large part, the pack remains a function of consumer convenience to be discarded at the earliest opportunity, rather than an essential part of the product.

In the medical industry, the consequences of using a non-sterile medical product are potentially life threatening, and this is why there is so much emphasis on validation. The medical industry guarantees sterility and this puts the acceptable quality level (AQL) way beyond normal sample inspection systems. Instead, a medical thermoformer has to control pressure, temperature and seal dwell time in such a manner that seal integrity is always ensured.

A major part of the validation process is proving that this seal integrity is ensured in all circumstances. The regulatory bodies now play a big part in how thermoforming machinery is specified, and medical manufacturers have to prove, through documentation and control, that machines have been properly validated to produce zero defects.

Seal integrity in the food industry is also important, and although poorly sealed products are unacceptable, the customer is unlikely to use food that has spoiled. Normal AQL levels

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Kent TN1 1LE  
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## THERMOFORM-FILL-SEAL



**Fast changeover:** Doyen Tool-less Changeover Thermoforming machine (above) is equipped (right) with an independently driven cross-sealing bar

and sample inspection can be used in such cases.

Validation requirements have placed significant pressure on machine suppliers. Also manufacturers take machine validation to different extremes.

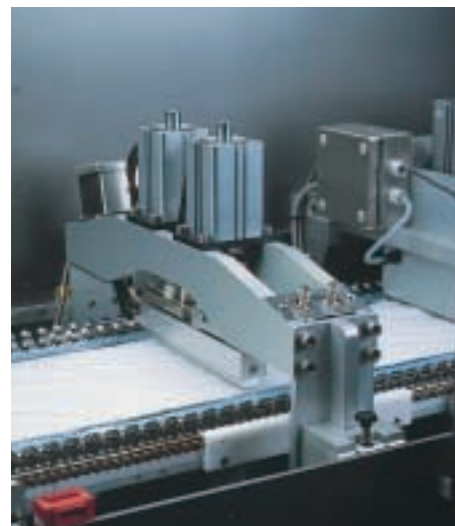
Doyen for example, applies a clear policy that no single event on a machine — such as a component failure or spurious software — can lead to a defective product. This adds expense, but ensures the machine is very unlikely to run if anything is wrong. Such system defect protection is not required with a food machine. Another example is independent pressure transducers to ensure the correct sealing pressure is applied for every pack, in addition to the normal regulators.

Typical running and production conditions highlight another difference between the two industries.

### Quick changeover needed

The food industry typically has mainly dedicated lines to cope with large production runs without the need for regular changeover. The food industry requires machinery which is design proven, robust, can be washed down, dedicated to a product and comes usually without frills.

As margins are extremely tight, emphasis is placed on standard machines which are naturally less expensive than machines designed and manufactured in lower volumes.



In addition to the same requirement of robust design, most medical manufacturers are faced with a large product range and are completing very short runs. It is perfectly common to have up to ten different products packed on one machine, and this means the equipment has to be far more versatile.

In particular, the machine design needs to reflect the need for quick changeover and the ability to vary the web width easily to suit the differing product sizes would be a major advantage as product ranges continue to proliferate.

The new Doyen Tool-less Changeover Thermoform Packaging Machine does just this, and is a good example of how thermoforming technology has been adapted to meet this need. Pack size on the new system can be changed in less than ten minutes without the need to change the seal head tooling. ■

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