

READY MEALS REPORT

Ready meals remains one of the fastest growing sectors of the food industry. Mick Whitworth reports on machinery developments, from preparation through filling and tray sealing to end-of-line packaging.

CASE STUDY: OSCAR MAYER

Central recipe management helps spread automation

Automation is high up on the agenda at ready meals producer Oscar Mayer, Chard, where a networked recipe management system is now being installed.

Near-zero unemployment in the Somerset town of Chard has pushed automation high up the agenda at Oscar Mayer. The company, part of the Hygrade Foods group and a dedicated Sainsbury ready meals supplier, already employs around 900 people in the town. But additional staff are proving hard to find and, with the chilled ready meals market still growing at 15-20 per cent a year, servicing further growth could prove a challenge.

"It's all about low-cost automation," says technical director David Jeffries, "and finding ways to make more ready meals with the same number of people."

Some of this could be relatively simple, he says, like redesigning conveyors so fewer people are employed moving ingredients from A to B, and putting more cooling in-line. "The more work we can do in-line, the less work in progress we'll have, the slicker the operation will be, and the faster we can move product through the factory." And if more advanced technology is to be employed, it's a question of targeting investment where it will free up the most bodies.

For a company whose products range from simple stews to complex, multi-component, hand-finished products, it makes sense to focus labour on the higher value items. "I want to use low-cost automation to help with the beef stew



Recipe management: Recipe and production data will pass to and from the shop floor via Bizerba's system

and dumplings so we've got more people available to help with more exclusive products like Chicken Pizzaiola where you still need some hand-finishing," says David Jeffries.

Oscar Mayer comprises three distinct factory units stacked one above the other on the 12-acre site near the centre of Chard. Two are standalone ready meals plants, the third produces some meals but also acts as a service factory, carrying out preparation work for the other two units.

Incremental changes

With a seven-day operation producing around 120 chilled lines, it's not surprising that Oscar Mayer tends to make any changes incrementally. One example currently underway is a move towards a fully networked recipe management system. In due course, this will see all preparation and cooking operations pre-programmed from a central office, and data gathered on the factory floor being captured electronically by the same central system.

The move is being made in partnership with weighing equipment supplier Bizerba. As David

Jeffries points out, most parts of the ready meal production process involve weighing in some form, from arrival of raw materials, through bulk weighing of ingredients to assembly and finished pack weights.

"Those are hands-on, practical uses," he says. "But then you think: okay, how do we collect that information centrally and make use of it? What would we like to do, and how should we do it in each localised application?"

"For example, a simple software package would be able to measure the yield from proteins that we're cooking in our Stein oven. Obviously it's important that the yield is measured, both from a cost and a quality point of view. I want to make that measurement there and then. But I also want to be able to compare trends, so it becomes a virtual loop and you can start controlling those yields."

At the beginning it's just about having a set of scales on the infeed and another on the out-feed. "But you have to link the two," points out David Jeffries, "then start generating batch information, and it all snowballs from there. Once

you start looking at weighing applications it's all the stuff that comes with it that adds the value."

Oscar Mayer opted to work with Bizerba on the project because the company could handle all parts of the equation, from bulk scales to high-speed checkweighers, along with all the necessary software. Once fully operational, the recipe management system will link together shopfloor PCs, cookers, and weighing equipment such as the load cells beneath each cooking vessel, supplying and gathering production data in real-time.

To begin with, however, Oscar Mayer has concentrated on getting each piece of Bizerba weighing kit working accurately on its own, giving operators menus and accurate readings of tolerances and so on.

"The other important area of the Bizerba project is weighing proteins in the high-risk filling halls," says Mr Jeffries. "We've got about 30 different scales on three floors. Again, these are giving a menu of tolerances but we're not actually recording anything yet. The next phase is to put in a network of cables so, once you've told the scales what you are doing, everything will go back to the central PC: '300 batches of beef at 70g, giving a total of x, a yield of y, and z units per minute'.

"So it will be quite a useful tool in terms of measuring raw material usage and efficiencies, but also as a training tool: for example, is one person better at judging 70g than someone else?"

David Jeffries says the Bizerba system is "on the cusp" of being fully operational. The scales are already earning their keep – replacing kit from six different suppliers used in the past – and the networking should be in place by the spring.

"Most of the software is pretty much off the shelf," he points out. "It's how you tailor it that matters. We're now at the point where we need to assess all the recipes and costing methods. Making sure all the correct information goes in and telling the system what to do with it: that's the time consuming bit."

Two years down the road, he forecasts, some of the data from this system will start to be picked up by Oscar Mayer's GEAC System 21 enterprise resource planning system, which is used across the whole organisation to track materials. "But we would find it hard to cope with that amount of change in quite a short period. So we've said: let's do it in small, localised chunks, then we can get more sophisticated." ■

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PREPARATION

Improving the efficiency of mixing and cooking

Few factories more closely reflect their customers than ready meals plants. For good or ill, their configuration is generally dictated by the shape of their clients' ready meals portfolios. And the key word is usually compromise.

As supermarkets struggle to create a point of difference in an increasingly crowded market, the number of products handled by a typical ready meals plant has exploded. Most of the bigger players will be producing well over 100 recipe variants, and – even in the case of frozen meals, where there is more scope to manufacture in bulk for storage – most will be relatively short runs.

Nowhere in the operation are the realities of batch production more obvious than in preparation of ingredients, and particularly sauces which, whether they are exotic curries, traditional gravies or basic béchamel, are the backbone of most ready-prepared meals.

But much effort is now being focused on improving the efficiency of mixing and sauce-cooking, and on using automation to maximise consistency from one batch to the next.

One principal manufacturer of processing vessels for sauces, curries and pie fillings as well as general processing of fruit and vegetables is Auriol, represented in the UK by Multiplicity.

The Auriol range includes the unusual option of self-steam generation by gas or electricity, which avoids the need for steam boilers and attendant pipework, making it particularly suitable for start-up operations.

A selection of agitators is available to allow homogeneous distribution of whole fruit, vegetables or lumps of meat without degradation or, at the other end of the scale, preparation of smooth veloute sauces and dressings.

Each Auriol vessel is tailored to the needs of the user. It can include options for separation of solids from liquid, tilting into Eurobins, direct steam injection and recipe automation incorporating water metering, load cells, in-built emulsifiers and other processing aids.

Specific attention has been paid to ease of cleaning, with quickly removable scraper blades on all heated areas and the ability to incorporate clean-in-place procedures and fitments.

Alongside its process vessel range, Auriol also offers a Betonniere tumbler/blender, with applications as diverse as mixing curry powders and coating potato with oil prior to roasting.

Sauce processing facilities

"The gentle tumbling action ensures thorough mixing without any degradation," says Multiplicity. Auriol Betonnières are available in sizes up to 1500 litres, all manufactured from stainless steel, with a variety of optional extras including vacuum, bin hoists and automated controls.

Fisher Foods recently undertook a major upgrade of sauce processing facilities at its Redditch plant and installed Hy-Mix cooking kettles from BPT (Skerman) in a package that also included operator access platforms, ingredients hoists, and a comprehensive control system.



Cooking and chilling: Vortex basket system combines the benefits of batch and continuous production



Sauce processing: Hy-Mix kettle installation similar to the new plant commissioned at Fisher Foods

The Hy-Mix kettles themselves are equipped with steam pressure jackets and live steam injectors and have inclined anchor agitators with PTFE scrapers, as well as high efficiency sprayballs for clean-in-place. Rotor-stator high speed mixers are also fitted and can be raised clear of the vessel, together with the lids, by hydraulic rams.

Fisher Foods is to use the new equipment for processing a wide variety of sauces and other ingredients for Marks and Spencer ranges of fish and seafood chilled recipe dish products.

Sauces are, of course, not the only ingredients that need preparation before they arrive at the filling line. Proteins, vegetables and pasta or rice may all need a degree of processing, such as blanching, before they are finally assembled in a meal tray.

First installation of new cooker

D2 Food Systems completed the first installation of its new Vortex cooker at a UK ready meal site in September last year and began installing two more elsewhere in November.

The Vortex is described as an extremely versatile cooking, cooling and chilling system for delivering evenly blanched and chilled product and consists of a series of vessels arranged one after the other, in which products are contained and transferred by the use of lifting and tilting baskets.

"The major benefit of lifting and tilting baskets is that you're combining the simplicity and flexibility of batch systems with the automatic operation and high output of a continuous

cooking and chilling line," says David Edwards of D2. The system can be made fully automatic by using optional automatic product pre-feeders linked to load cells and discharge conveying systems.

Product consistency is achieved through a system of water agitation through the baskets, combined with accurate temperature control and precise immersion times. Integrated water re-chill in the cooling station ensures products emerge at less than 5deg C.

The Vortex is designed as a modular system, with the option of two basket capacities and three or five stations. "This should cover the output requirements of most ready meals producers from small batch runs up to 2000kg an hour or more," says David Edwards.

D2's first Vortex installation was to a large producer of chilled ready meals. The line was supplied to cook, rinse, chill and then oil a variety of long and short dry pasta. With a typical cooking time of eight minutes, the equipment is delivering in excess of 1000kg an hour of free-flowing, lightly oiled, cooked pasta, chilled to less than 4deg C.

As well as the Vortex – which can handle anything from rice to seafood – D2 supplies continuous cookers expressly designed for short and long pasta as well as sheet pasta for lasagne and cannelloni production. ■

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LIQUID TRANSFER

Keeping the product intact and the cleaning simple

Products such as pasta and vegetables will typically be delivered from cook area to filling line by conveyor. But sauces, such as the rich onion gravy required by Pork Farms Bowyers (PFB) for a new ready meals production line at Trowbridge, making meat balls or sausages in gravy, are quite likely to be decanted into bins before being rolled across to the line.

So PFB concluded that safe handling and general 'good housekeeping' meant pumping was the best way of moving gravy from its Eurobins to the depositor.

Research inside parent group Northern Foods showed that Watson-Marlow Bredel SPX hose pumps were giving good service for food transfer duties at sister companies Riverside Bakeries and Manor Bakeries.

PFB's onion gravy is a delicate product. Onion content is 45 per cent by weight, and it is essential for finished product quality that the cooked onion pieces – roughly 10mm minimum length – remain undamaged by pumping.

Hence the choice of the SPX40 peristaltic pump. The gravy is totally contained within the bore of the hose, a fully-swept pumping chamber with no crevices or dead spots. Cleaning is achieved by flushing through with the aid of a pig ball and then finishing with sterilising fluid.

The pump is trolley mounted, for use on different production lines, and has a variable speed drive to provide throughputs of 1-5 gallons a minute.

Pump operation at PFB is continuous for five hours a day, seven days a week. "Improvements have been significant," says projects manager Steve Wain. "We've got far better all round housekeeping, no product wastage and we've freed up staff to perform other valuable tasks."

Maso Process-Pumpen offers a range of sine and paddle pumps able to handle products such as stews, soups, savoury sauces without damage, particularly liquids with suspended solids including diced and sliced meats, whole chicken breast, cauliflower florets, coleslaw and diced potato.

In addition, good suction capability is said to be especially useful in transferring products from closed bottom storage vessels to the filling line, while the pulse free flow is an advantage for installations that involve heat exchangers and flow meters. ■

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Handling difficult products: The MPF depositor from US manufacturer Multi-Fill

DEPOSITING

Flexibility high on the list of essential features

Depositor design has not changed radically in 20 years, but suppliers now seem to be stepping up the rate of innovation, with flexibility again high on the list of features. Indeed, Geest has recently ordered eight D150 depositors from Turbo Systems for its Mariner Foods ready meals operation, citing "flexibility and accuracy" as the chief attributes it was looking for.

"Firstly it's essential to achieve a good accurate deposit without any detriment to the quality of the product," says Phil McCaul, factory manager at the Mariner site. "Secondly, as we do a lot of changeovers during the course of the day, the equipment has to be flexible."

Geest has used Turbo depositors for a number of years and although it shopped around, it was apparently impressed that Turbo had upgraded and refined its equipment. Launched at last year's PPMA Show, the Turbo D150 is said to offer faster speeds, improved reliability, lower maintenance costs and improved design. It can handle liquids, creams, semi-solids and particulate products.

Standard features include tool-free cleaning and changeover, stainless steel construction, scraper seal design to maximise the cylinder



Peristaltic pumping: Watson-Marlow Bredel SPX40 handles onion gravy at Pork Farms Bowyers



Automatic weighing: Ready meals components weighed out and deposited on a Bilwinco system

life, minimal removable components, flexible product cylinder options, interlocking guarding and noise-reducing shock absorbers.

Another supplier that has been back to the drawing board is Avery Berkel, whose range of Neumo 58 single-acting volumetric pumps has been redesigned specifically to meet the needs of ready meals manufacturers and other food processors.

The new model can deposit food in liquid, semi-solid or solid-in-suspension form, in quantities from 3ml to 5 litres per shot, depending on the cylinder size. Various types of filling heads can be fitted, including a new range of special decorating heads, while the quick-strip pumps can be taken to pieces and cleaned "in a matter of minutes, without the need for tools," says Avery Berkel.

Unlimited volume range

The new version also features a more cost-effective flywheel assembly, providing an unlimited volume range for each size of cylinder, and a simplified rotary valve for quicker, easier cleaning. An interlocked hopper and pipework assembly is designed to improve safety.

A range of depositors for products which have previously proved difficult to fill by machine has been developed by US manufacturer Multi-Fill, which is represented in the UK by F Jahn & Co.

The MPF system features a volumetric filling head which is said to be capable of depositing precise portions of products such as cooked rice, pasta and vegetables, into trays, cartons or pouches. In particular, says F Jahn, the MPF sys-

tem has proved adept at handling cooked pastas such as noodles, spaghetti and tagliatelli as well as vegetable pieces such as broccoli and cauliflower florets, IQF carrots and beans.

The MPF depositor, which is mobile and can be switched easily between ready meals production lines, is PLC controlled via an Allen Bradley SLC503, connected to a Panelview graphics panel. In addition to providing information clearly for rapid operator training, this graphics panel also allows the user to add features in the future with only a software change.

Integration is also the name of the game for Bilwinco, the Danish supplier of weighing and packaging lines represented in the UK by Ancholme Machinery. Over the years its UK customers have included Cavaghan & Gray, McVitie's/Heinz, Bluecrest and Birds Eye. With automated multihead weighers, feeding systems and filling and distribution lines in its catalogue, it aims to deliver "complete, customised solutions".

Automated production and packing is the single best answer to offering higher capacity at lower cost, says Bilwinco spokeswoman Margit Simonsen. "The biggest advantages are higher levels of accuracy during portioning and filling,

and products untouched by human hands during production and packing. And automation also tends to mean fewer bottlenecks than manual handling."

The evidence on the ground is that not all manufacturers can see how to justify the cost of automation when flexibility is so important. But Bilwinco has recognised the need for versatility with the development of a mobile weighing system that can be moved from one line to another, or removed completely for cleaning.

Lower risk of bacteria

"These design features are important," says Ms Simonsen. "By limiting the use of water in the packing room [for washing down] there is a much lower risk of bacterial growth."

Meanwhile Multipond has launched the new FF control system for its range of multihead weighers, helping the machines handle difficult products that were once considered impossible to weigh out automatically. Typically these include components for ethnic ready meals, meats, cooked rice, pasta, pasta salads and pizza toppings.



Vibratory feed: Multipond system is variable to handle difficult products

The control system now allows the frequency of the radial vibrators to be individually altered and pre-programmed, so providing the best setting to suit different products and ensure they flow at the optimum rate. ■

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FILLING AND SEALING

Impressive speeds on offer from integrated lines

As manufacturers work to automate longer stretches of the ready meals process, the divisions between preparation, filling and sealing become increasingly blurred. Some components, such as sticky, irregularly-shaped proteins, are still most easily filled by hand, while the sauces that accompany them may be deposited by hand-held hoses or automatic depositors.

Tray denesting may still be a manual process and filled trays may require some manual alignment where suitable automatic marshalling systems have proved too expensive or difficult to design. But for manufacturers with the luxury of producing large volumes of a limited range of products, integrated filling and sealing lines can now offer impressive speeds.

For example, at last November's PMMI Show in Las Vegas Autoprod showed off a newly redesigned continuous-motion filling and sealing system which, configured in a 4 x 2 tray format, could run at speeds up to 240 trays a minute. But Autoprod said larger configurations could offer as much as 500 trays a minute.

The revamped system can be supplied with servo-controlled CIP piston depositors, gas flushing or any other type of filler, including scales, volumetric pocket or vibratory units. And, according to Karen Cobbett of Springvale Equipment, Autoprod's UK representative, the system is suitable for all types of food products, especially ready meals.

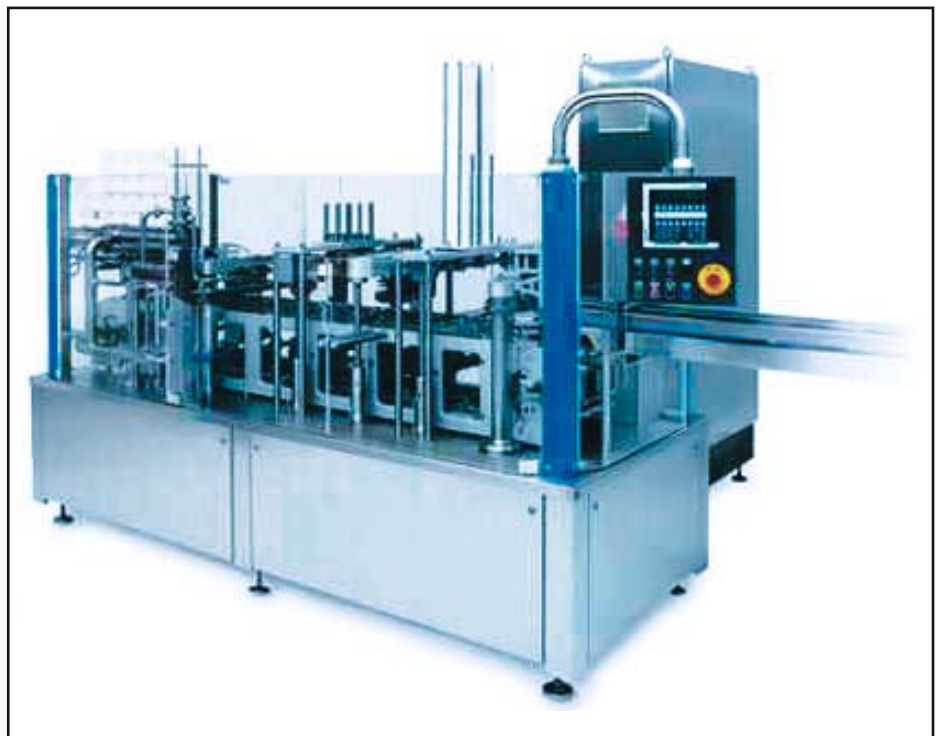
The continuous motion feature allows processors to fill lower-viscosity products at high speeds, also allowing smaller headspace in the container. "Both these benefits are achieved by eliminating the product movement inherent in indexing systems," says Ms Cobbett.

Operation of the sealing and filling system is run from a single, touch-screen control panel, which enables the operator or engineer to keep tabs on all maintenance, production, diagnostic and CIP operations.

With durability and reliability in mind, Autoprod has developed a new frame design which incorporates a larger, tubular stainless



High speed: Autoprod filling and sealing line in 4 x 2 configuration gives 240 trays a minute



Faster changeover: Buhmann Servofill avoids the use of a carrier chain to support the tools

steel frame aimed at giving the machine "a more robust disposition". The new design also integrates the drive components into the main body of the machine, thereby reducing floorspace requirements.

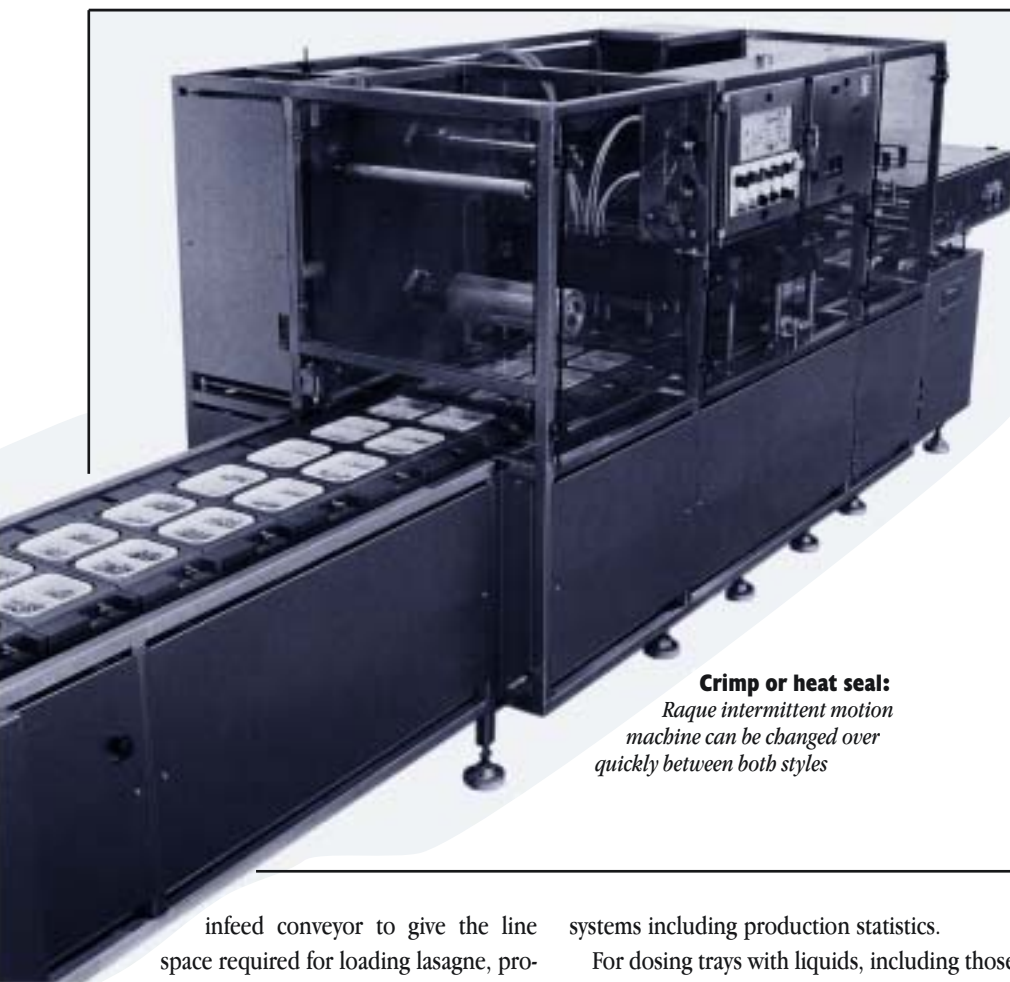
Ready meals lines from Raque Food Systems, custom built for the specific application, include both intermittent motion systems for speeds up to 70 trays a minute and continuous motion machines giving up to 240 trays a

minute, usually needing no more than two lanes.

Plastic or aluminium trays

For example, an intermittent motion tray lidding machine built recently for a major European food manufacturer was designed particularly for flexibility, being capable of both heat sealing and crimping.

This twin-lane unit, equipped with a 30ft



Crimp or heat seal:
Raque intermittent motion machine can be changed over quickly between both styles

infeed conveyor to give the line space required for loading lasagne, provides speed up to 60 trays a minute with quick size change and the capacity to be switched easily between plastic and aluminium foil trays.

To accommodate different tray sizes, carrier pockets on the conveyor clip in and out via a single lever in a matter of seconds for each, while working parts of the two-stage foil crimping system can be exchanged quickly for heat-sealing components.

At the first crimping station, where the flange is partially laid over, the tooling is replaced by a heat seal head with plug-in connections, and at the second crimping station where the operation is completed, a die cutting tool is installed instead. Depending on lidding style, a lid dispenser or film unwind and rewind unit is brought into action.

Avoids risk of tool distortion

Apart from providing the ability to change rapidly between foil and plastic trays as demand dictates, Raque points out that the two-stage seal and cut approach also avoids any risk of heat from the sealing tool distorting the trimming tool and affecting the cut. In addition, it makes a much less complex assembly possible, with lower maintenance costs.

The machine has touchscreen controls, with password protected security levels, giving access to diagnostics and machine management

systems including production statistics.

For dosing trays with liquids, including those that are shear sensitive or contain particulates up to 40mm cube, Raque's piston fillers employ a straight-through rotary valve beneath the product hopper, and metering cylinders set at 45deg to give a gentle 135deg product path.

All contact components can be removed for cleaning without the use of tools and there is a range of metering cylinders from 1in to 5in diameter for doses of 25g to 1.5kg. The piston and cylinder are usually the only change parts required, although occasionally dispensing valves are also changed.

Positive cut-off provided

A series of dispensing valves is also available, such as cone, rectangular valve, rosette head and spreader types, with the standard valve being a piston type that provides positive cut-off and clean push-out of any stringy material, as well as blow-off, avoiding risk of contaminating the seal area.

Product hoppers with blenders are supplied to keep particulates in circulation while viscous materials and those susceptible to bridging are handled in an auger based unit. Free-flowing products are held in a conventional gravity hopper and split hoppers are available to allow multiple products to be filled simultaneously.

For its high speed continuous motion machines, Raque uses a travelling carriage to move the dispensing valves in time with the

trays, giving more time for filling and avoiding splashes onto the seal area. Advance or retard adjustment can be made on the run.

"Raque has considerable experience of manufacturing ready meals lines running in excess of 100 packs a minute," explains Barry Gunton, managing director of Raque Food Systems Sales. "The key to efficient operation at these speeds is accurate depositing of the product, which today can often include quite large particulates. This ensures that the tray flanges are free from contamination and so all seals are of a high quality."

Multihead combination weigher

To minimise product give-away, high value items such as meat or fish can be dispensed using a multihead combination weigher. Film lidding on the high output lines is usually via Raque's high-speed in-line heat-sealer which, in twin-lane format, can typically handle 12 trays at a time.

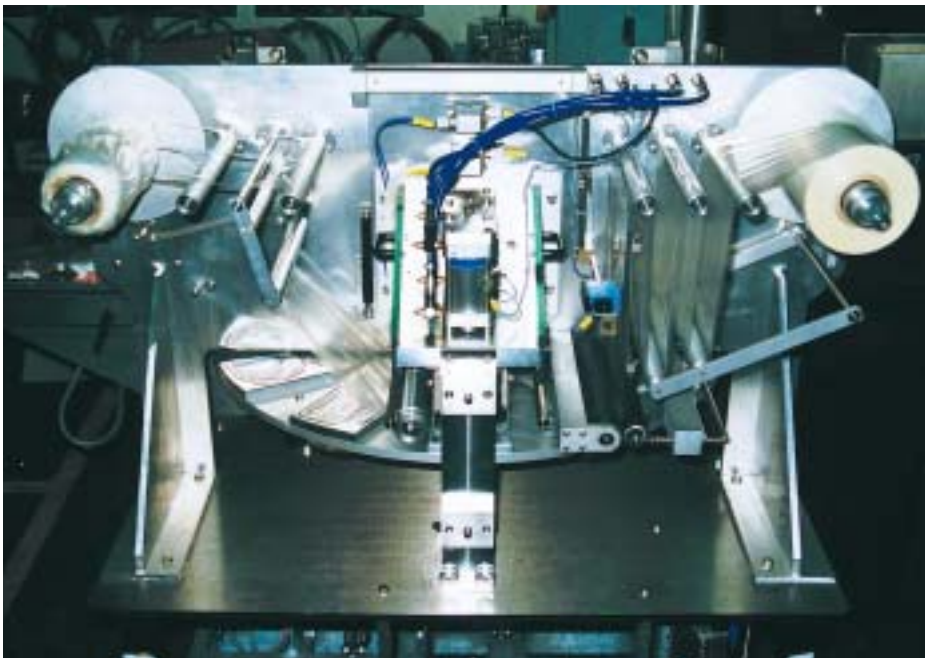
An in-line tray and tub filler-sealer which does away with the usual chain to carry the tools supporting the containers, reducing size changeover and cleaning time substantially, is now available on the UK market from Qualitech, agent for German manufacturer Buhmann Systeme.

Applications for the Buhmann Servofill extend from filling prepared salads and ready meals, though to pate, spreads and dips. Speed is up to 60 cycles a minute and the machine can be built with up to six lanes.

Instead of the usual carrier chains which, Qualitech points out, require periodic re-tensioning and may gather debris, the machine uses low friction tracks to support the anodised aluminium tools, which are fitted with a number of hardened stainless steel pegs at either end.

There is no connection between one tool and the next. Rather, each pushes the next around the track, with the drive gear from the servo motor engaging with the pegs of each tool as it passes. This servo drive also allows indexing speed to be ramped up and down to suit the product viscosity, in particular avoiding risk of slopping.

As its name suggests, the Servofill also uses up to six servo driven volumetric dosing pistons, which provide press-button programmable volume change, and can handle liquids with particulates up to 50mm diameter. A clean-in-place system is also available for the fillers. Lidding is via a heat seal membrane, cut from the reel, while press-fit overcaps can also be applied.



Reduced space: Waldner rotary filler and closer for trays requires less space than in-line systems

Qualitech has also recently announced a new tray sealer from German manufacturer Sealpac. The SP800 is equipped for vacuum or modified atmosphere packing and incorporates a larger sealing chamber than previous machines in the series, measuring 800 x 360 x 200mm deep. Speed is up to 15 cycles a minute and the machine features vertically opening doors for space-saving.

FP Packaging recently installed a turnkey ready meals line involving automatic dispensing of pots, product dosing, lidding, labelling and best-before date coding for a leading UK ready meals producer. The line operates at 60 containers a minute and was built and installed within two months to meet a tight product launch schedule.

Pots are denested using a multi-lane Pneufeed air jet denesting machine. This delivers the containers on to a conveyor which is gated beneath each product dose. Filled pots are then conveyed to a two-lane electronic reciprocating placer (ERP), which applies plastic lids. After leaving the placing machine, containers are compressed through an overhead belt that snap-closes the lid prior to labelling and ink jet coding.

FP Packaging says ERPs have superseded pneumatic machines which, it says, cannot be set up as rapidly or accurately as pre-programmable electronic units.

One German engineering firm, Hermann Waldner, represented by Ultracpac in the UK and Ireland, offers the option of linear or rotary filling lines for the ready meals industry. Rotary machines are seen as a useful alternative where space is a major constraint, giving multi-stage filling within a relatively small footprint

although linear machines can be supplied to any length, with either automatic dosing or manual feeding.

Whichever format is chosen, the machinery can handle aluminium, PET, polystyrene or board trays, with lidding material taken either from roll-stock or supplied pre-cut.

Major expansion at Saxon Valley

Saxon Valley, a Geest-owned ready meals supplier, has just completed a major expansion of its production plant at Biggleswade, which majors on pasta-based meals. New facilities included two single-lane Compact heat-sealers with 700 x 200mm tool area from Italian manufacturer Mondini, each capable of handling 72

trays a minute, and one twin-line Compact, which offers a 700 x 500mm tool area and double that capacity.

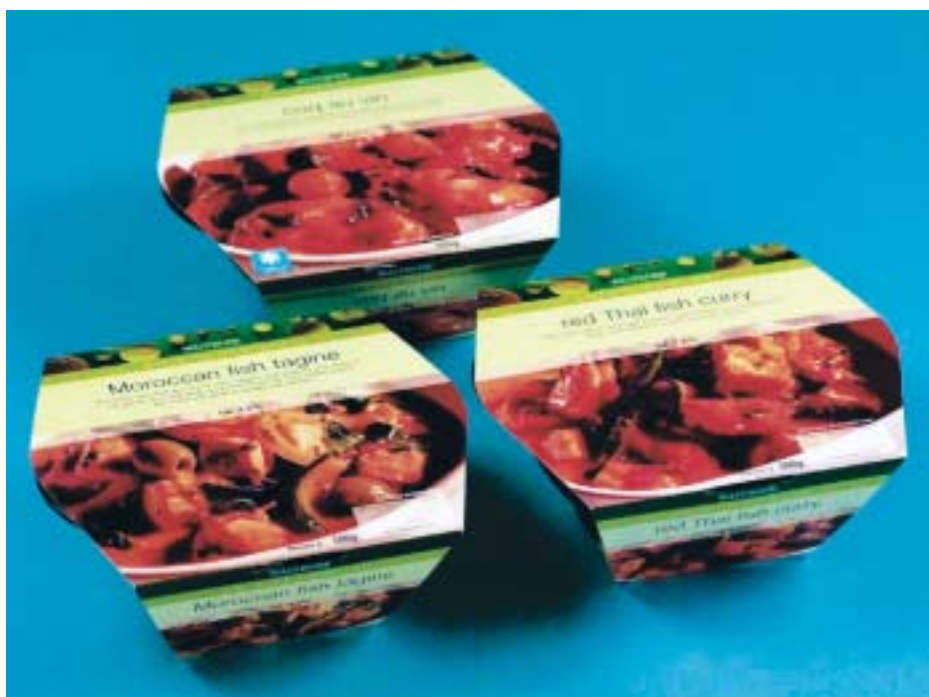
The three units were installed by Peterborough-based Planet Flowline, and came complete with conveyors and tray denesters.

Changeover in 10 minutes

Versatility was apparently an important factor in the choice of the Mondini machines which can handle aluminium foil trays with pre-cut board lids yet change over to PET trays with film lid application in 10 minutes. Pre-heaters are fitted to the tooling racks to decrease this downtime while there is also a quick-release tool system and a versatile tool trolley which can turn the top tool through 180deg, giving access to the knife assembly for cleaning and maintenance. To maximise line efficiency, all three units have a fully-automatic film reel changing system.

Geest, of course, is one of the biggest names in chilled ready meals. A lesser known, but specialist player is Bighams Global Gastronomy, which produces chilled meals "for the connoisseur" from its base at Park Royal, west London.

Bighams has recently upgraded from shrink-wrapping to heat-sealed packaging for some of its lines after securing a contract to produce nine ready-to-cook products, including red Thai fish curry and Moroccan fish tagine, for Waitrose. These all call for cPET bowls with heat sealed film lids. So the firm has installed a semi-automatic PA182 MAP-F heat-sealer from Packaging Automation, with the option of



Upgraded packaging: Bighams has installed a Packaging Automation PA182 heat sealer for Waitrose trays



Helping expansion: One of two new single lane Mondini Compact tray sealers at Saxon Valley

upgrading to the fully automatic Vision 182 in the future.

Price, availability and the option of trading up were all important in the buying decision. "Lead time was a critical factor, with some suppliers on the Continent needing up to 16 weeks to deliver, which was not acceptable," says Bighams' sales and marketing manager Nick Parker.

The PA182, which has recently been redesigned and upgraded, can heat seal all types of material, and is available – like the Bighams machine – for modified atmosphere packaging applications. It is part of a family of semi-automatic, hand-turned, rotary table machines that can handle up to 15 cycles a minute and, according to PA, have proved popular with small to medium-sized producers. ■

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SLEEVING, CARTONING, LABELLING

Higher speed and more product information

Just as higher speeds are available for dedicated ready meals filling and tray sealing lines, so the board sleeving process has needed to keep pace. For example a board sleeving machine able to handle the output from multi-lane ready meals lines – typically up to 300 trays a minute – was announced last year by Sussex & Berkshire Machinery, agent for the French manufacturer Paker.

It operates in wraparound style from flat blanks which, points out S & B, saves the cost of pre-made five-crease sleeves and also allows a choice of lock style or glue closure. In particular, the Paker design is said to provide positive handling of board and product at all stages, ensuring that squareness is maintained in the finished pack, even at elevated speeds.

"For example, rather than glue the final overlap seal at the same time as the board is turned, the Paker approach is to make the overlap first, and then re-open it to apply the adhesive," explains Russell Gardner at S & B. "In this way there is no risk of creasing by attempting to fold over board that is already secured at one end of the pack."

Built in stainless steel to meet food industry

requirements, the Paker machine can be hosed down and, for complete hygiene, incorporates an internal drainage system, directing all wash-down fluid to a single outlet. Servo drive allows a full size change to be made within 2 minutes.

However, whether sleeves or, increasingly, labels are employed there is also the fact that manufacturers must contend with a range of regulatory issues, as well as satisfying the marketing and food safety demands of supermarket customers, often a moving target.

Graham Labelling Systems claims its Commander range can provide solutions in all these areas, providing a variety of labels and shrink sleeves, complete with tamper evidence, without compromising on decoration and brand image. Single-head label applicators or multi-head fully automatic systems can apply labels on to any position of the pack: top, side, base, front, round the corner or a combination of these. Special product handling systems also allow labels to be positioned in register with particular aspects of the pack if necessary.

Larger labelling heads

As label sizes increase to accommodate the amount of information now required by consumers and by the law, from ingredients declarations to nut allergy warnings, Graham has developed machines with larger labelling heads and more substantial bracketry to handle wider web sizes and full spools.

Tamper-evident packaging is now almost a standard requirement by major supermarkets, and again Graham offers a range of solutions. Application of the label to the top of the pack



Board sleeving: A variety of trays can be sleeved by the Paker machine at speeds up to 300 a minute

and wiped down either one side (lollipop style) or both sides (watchstrap style) is a common format.

The Commander is able to apply labels up to 425mm long and can handle the longer lengths recently introduced to allow labels to be wrapped under the base of the product. "This method is also now being used as an alternative to board sleeves on ready meals packs," says Graham Labelling. "This is because it's cheaper in terms of materials and application machinery, gives better pack security and allows more of the product to be viewed in the pack."

ADCO Manufacturing has launched a new wraparound board sleeving machine, the CS-80 Flightless Sleever, which requires no infeed timing. Products such as rectangular, oval or round ready meal trays or tubs, can arrive at the machine's infeed at random, or back to back. A servo-operated feeder places the blank on to an overhead rail, after which it is transferred into the closing section together with the product.

The squareness of the pack is ensured by means of a vacuum belt system and flexible rubber grippers which hold the sleeve securely in place during closing. The CS-80 is a relatively compact machine – only 2.4 metres long – and is built from stainless steel and aluminium.

ADCO claims that size changing, without the need for change parts, can be carried out in less than 5 minutes and the carton hopper is fully adjustable to handle all sleeve sizes within the machine's range. Speed is up to 80 packs a minute and the machine can run either full or part sleeves or watchstraps, although further units in the company's range can provide speeds up to 300 a minute.

Wider banding systems

Another novel, cost-cutting solution to labelling and sleeving is being suggested by Erapa (UK). The company is perhaps best known for its shrink-wrapping and steel and non-metallic banding systems, but has now redesigned its standard 29mm banding system to work with 50mm, 75mm and 100mm widths.

As a result, bands that were once purely functional can now be expanded to include both branding and product information, as an alternative to full sleeving.

"This gives us an opportunity to target the ready meals market, which traditionally uses expensive cardboard sleeves," says Rodger Portass of Erapa. "Inexpensive full-colour bands are accurately banded round products and by use of print registration and an onboard printer we can print best-before dates, bar codes, and so forth."

The CT60 automatic sleeving system from Smartsleeve is now available with an integral weighing system designed by sister company Delford, the weighing and labelling specialist.

A compact alternative to hand sleeving for a wide range of prepared and ready meals appli-



Wraparound sleever: The new CS-80 Flightless machine from ADCO

cations, the Smartsleeve is mobile, allowing the machine to be employed on different production lines, and is said to be quick to change over as a result of a menu-driven control system.

Using its integral weighing system, the CT60 can undertake random weight as well as fixed weight operation, with the facility to print fixed or variable weight information directly on the sleeve, at speeds up to 60 packs a minute.

Finally, Dutch company Langenpac, represented in the UK by Springvale Equipment, offers a range of "super-flexible" cartoners specially designed to collate multiple components, including those with unusual shapes, and feed them into pre-glued cartons at speed. One user collates three ready meals ingredients packed in irregular-shaped bags and cartons them at speeds up to 80 cartons a minute. ■

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END-OF-LINE

Easy-open cases match primary pack innovation

Efforts by food processors to break the mould of standard trays and provide something more eye-catching for the consumer have created new challenges for equipment suppliers, and this extends to end-of-line operations.

Cermex, for example, aims to ensure its case packers can handle pouches and other types of inner pack by providing different collators tailored to each product type. "The style of outers is changing rapidly," says Cermex, "and supermarkets are demanding the type of outers that can be easily and quickly split down for the product to be loaded onto the shelf.

"Ready-joined cases and wraparounds may already have an 'easy-open' facility, of course. But there are also various types of tray and lid, or tray with support fitting, and these can split open very quickly, leaving the base tray ready with the product to be loaded into the fridge."

Cermex says it can meet the demand of all these styles using either the side load packer or wraparound machines or, alternatively, a combined machine that provides a tray packing and lidding facility.

The machines can be designed so that either the lid or support unit is glued to the base tray, or the support fitting is just loaded into the tray and remains unglued. "Either way," says Cermex, "when the pack needs to be opened up it takes just a few seconds to make the pack ready for loading onto the shelf."

The need to reduce outer packaging means that some inners are now leaving the factory in shrink-wrap alone. For this reason, there is also scope on Cermex shrinkwrappers to put an easy-open facility on the film.

Italian manufacturer CAM was best known initially for pharmaceutical packaging machinery, but has now developed its range for the food industry, including board sleeves and cartoning machines for speeds up to 250 a minute. In Britain it supplies through Campak.

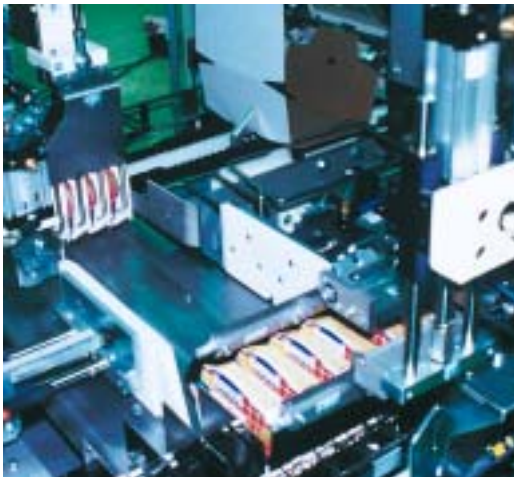
For end of line operations the company offers the ASB38 stretch-banding machine which, unlike conventional systems, uses a

single roll of ldp film leaving only a single seal on the pack. After stretching the film tightly around the girth of collations, the machine relies only on hot air guns to shrink the film on the side of the pack

CAM also builds top load and side load case packing machines, all fitted with the 'mechanical memory' system, a series of colour coded datum points fitted on a revolving turret to allow a quick and simple size change to be carried out by skilled operators. Speeds go up to 20 cases a minute.

Finally, Endoline has recently supplied a leading ready meals producer with two new case packing lines on which, although cases are still filled by hand, operating efficiencies are expected to produce annual savings of £90,000

The first line employs an automatic case erector feeding into an ergonomically designed



Easy-open: Cermex wraparound case-packer handling a case with an easy open feature

packing station where the two incoming conveyors, one with cases, the other with ready meals, deliver at convenient handling heights for the operators. There is then an automatic top and bottom case taper and a flexible gravity roller conveyor to take cases to a central point for palletising by hand.

The second line includes a two-tier packing station that stores case blanks above the product conveyor and a case former that helps an operator erect a case and then load it by hand. The operator then folds over the top flaps and pushes the case through a top and bottom taper. A gravity roller conveyor takes the cases to a central point for palletising by hand. ■

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CASE STUDY: HEADLAND FOODS

Selective automation provides key to flexibility

Headland Foods in North Wales produces 400 tonnes of ready meals a week and has found that 'selective automation' provides the key to flexibility.

Headland Foods is one of the unsung heroes of the UK ready meals sector. Its products are almost entirely for supermarket private label – sleeves for Iceland, Sainsbury, Safeway, Asda, the Co-op and Morrison's are stuck to its boardroom wall – so the company inevitably keeps its head down.

But despite this relative anonymity it is category leader in retail frozen meals, turning out up to 400 tonnes a week – including a small percentage of chilled meals, solely for Morrison's – across eight production lines. This year, sales are forecast to hit £51 million.

At any one time its portfolio includes around 140 different product, with 50 or 60 of those changing each year as new ideas come in and tired lines are discarded. "We're not in a position to cherry pick," says operations director David Hogg. "We recognise that every supermarket has its stars, its average products and its dogs. If we say we're not interested we know there are competitors who are waiting to jump in.

"So flexibility is important, and we're trying to position ourselves so we can do as many different things as possible."

Output at the bigger of Headland's ready meals plants, located in Flint, North Wales – it also has a 16,000 sq metre pasta-based meal factory in Grimsby – has doubled during David Hogg's five and a half year tenure. He reckons the current configuration is more or less ideal to achieve the required flexibility without blowing efficiency out of the water. Of the eight lines, five handle trayed meals, the remaining three are for pouched, boil-in-the-bag products.

"One of the clever things about this business," he says, "is that in some respects it's an assembly plant. If someone said they wanted a sausage wrapped in bacon with an olive on top, I don't have to worry about how we are going to make them: we just go out and source them. We buy components from all over the world."

Own label platter

The Flint factory makes anything from chicken tikka masala to a beef platter: an upgraded version of the old TV dinner that is one of its biggest sellers. "We're the own label platter king," jokes Mr Hogg. A platter might include beef, vegetables, Yorkshire pudding and gravy. The gravy alone is a multi-component product, which will be manufactured in the cook area on site. But the batter puddings will be bought in, as will cooked and prepared beef.

"In the main, we're producing sauces and combining them with proteins and vegetables or rice. For a product that specifies diced beef, like beef stew and dumplings, we'll source cooked, IQF beef, then deposit the beef, the sauce and the dumplings."

The process starts with a series of cooking vessels, mostly BCH, with capacities up to 1.2 tonnes, with automatic transfer to BCH vacuum coolers capable of handling up to 2 tonnes of sauce an hour.



Final packaging: Finished frozen ready meals are stretchwrapped and palletised at Headland

From here, sauces are transferred to the line. With trayed ready meals, Mr Hogg says, Headland has not set out its stall to be the fastest producer, preferring to concentrate on flexibility. So the tray lines feature a variable combination of Ward Bekker indexing conveyors and multihead weighers, Turbo sauce depositors and hand filling stations, followed by Mondini tray sealers and, finally, spiral freezers.

"That combination is giving us between 36 and 50 trays a minute, and we've pretty much rolled it out across the whole business," explains David Hogg.

Lowest cost production

The exception to this rule is boil-in-the-bag, where Headland claims to have lowest-cost producer status. There are three Tiromat lines, of which one is devoted solely to curries. "We'll have proteins delivered by a multihead weigher, dropping four at a time, then deposit four lots of sauce, and the next station will deliver cooked rice. We're getting 44 a minute from the Tiromats. No-one can touch us on that."

Mr Hogg believes Headland is unusual in its use of multihead weighers on ready meals lines. "The platter line does 20-odd different products, but the commonality is that they always deliver some kind of potato and two veg. We were the first to use multihead weighers together with indexed conveyors to create a 'picture' on the platter, with just a little bit of hand-finishing to tidy them up."

The combination of multihead weighers and IQF meats makes it much easier to deliver a set weight to each tray, whether it be 40g, 50g or 60g, rather than leaving it down to what David Hogg calls "the vagaries of dispersion".

When talking to clients, he will stress this use of "selective automation" to reduce costs where possible while still giving a hand-finished look. "We want to use machines for what they're good at, but we don't want to be dominated by them," says Mr Hogg.

"The machines should not dictate the look of the meal. So if we're making a hotpot, for example, we like the idea of using a machine to deposit the potatoes, but we'll still want to ensure we've got 90 per cent plate coverage as well." ■

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CASE STUDY: TWIN CHEF FOODS

Boil-in-bag line proves to be a winner

It might sound like a throwback to the 1970s, but boil-in-the-bag is becoming big business for Twin Chef Foods, the manufacturing arm of catering wholesaler Brake Bros.

Nine months after the company installed a Tiromat pouch line from Convenience Food Systems at one of its two ready meal factories – a 60,000 sq ft site at Flint, North Wales – the format has more or less kicked cPET trays into touch.

But then, these are not retail products, so practicality takes precedence over consumer appeal. Twin Chef manufactures for supermarket coffee shops, staff restaurants and other caterers, from pubs to healthcare. Buyers in organisations that employ relatively skilled chefs seem to favour the pouch format, to the extent that it has already grown to represent 15 per cent of Flint's output – and there's talk of needing more space. Virtually all Twin Chef's cPET business has now been taken out of the factory and given to contract packers.

Flint general manager Paul Milton and Twin Chef's divisional engineering manager Keith Mulley put the boil-in-the-bag line together in partnership with Convenience Food Systems, which supplied the main pouch forming line.

In the filling hall at Flint, where up to 100 tonnes of frozen ready meals are produced each week, the pouches created on the Tiromat are machine or hand-filled with products such as chicken tikka or steak and ale pie filling, at a series of stations.

Where most systems would pull a vacuum in the pouch as they seal it, this one injects a small amount of steam, effectively blowing out the air.

The object is to fill any potential air pockets with steam, since any air left in the bag will make it float when it is cooked by the end user.

"It's literally 'squirt-seal', with no chance for air to get built up in there," says Keith Mulley. "It's unique. They had to develop it especially for us, because of the difference between vac-filling for hot or cold fill."

Paul Milton points out that Twin Chef prefers to fill its sauces and gravies hot, direct from the nine vessels in its segregated cookhouse, for quality reasons. "Seventy per cent of what we do is hot fill. In cold fill, you end up taking out some of the colour and flavour in the cooling process, and you have to overcompensate for that in the original recipe."

The pouches are filled in a 2 x 2 configuration on an indexed conveyor. Once they have been sealed they are cut into individual pouches, then run through a channeliser to take them into a single lane for metal detection before being transferred to the company's twin tower freezer, believed to be the biggest of its kind in Europe.



Main line: Lasagne in foil trays remains Twin Chef's single biggest product

Unfortunately, boil-in-the-bag is not a suitable format for the Flint factory's single biggest product, lasagne, which is packaged in foil. The lasagne line can be running for up to 12 hours and keeps the giant freezer busy.

But Twin Chef produces between 28 and 38 products a week, out of a total portfolio of 214, so most lines will only be running for about four hours at a time. "Our niche is quick changeovers," says Paul Milton, and the pouch line suits this perfectly, as well as offering substantial packaging cost savings over cPET.

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