

Ready meals

CASE STUDY: GORDON JOPLING

Ingredient supplier lifts capacity with new sauce line

The complexity of sauce production, with its reliance on numerous, often fresh raw materials, means some ready meal packers have contracted out this part of the process to specialists.

After all, ready meals production, to a greater extent than almost any other food process, is an assembly operation. Manufacturers prepare sauces, rice, vegetables and proteins in distinct operations then combine them in trays on the filling line before lidding, sealing, cartoning and case-packing.

Gordon Jopling, based in Barnsley, is an ingredient supplier that has seen a shift in demand from basic powders, herbs, fruit, pulses and vegetables to part or fully-prepared ingredients. It now supplies secondary processors with a range of salsas, oven-roasted vegetables, pestos and, increasingly, sauces.

To meet this demand, the business has just completed a £350,000 investment that included the addition of two 500 litre batch cookers from Giusti, which supplied, installed and commissioned the new equipment to a tight timescale, integrating new and existing kit where necessary, to ensure the quickest possible return on investment.

Giusti was able to source two used Giustimix vessels from another client that had outgrown them. "Many clients operate their Giustimix cookers for over 25 years, so to Jopling an eight-year-old vessel seemed a sensible economy," explains Giusti managing director John Baldwin.

The Giustimix model offers horizontal scraped surface agitation, which is an effective but low-shear system. This was important, since some of Jopling's recipes call for soft particulates as large as 20mm that could be damaged by a more harsh system.

The vessels are fitted with Giusti's Vapinject direct steam injection unit which quickly raises the temperature to 95deg C and is useful in helping preventing 'burn on' – which was also



Extra sauce capacity: Jopling has installed two 500 litre cookers from Giusti

considered a major benefit by Jopling. But the injection system is supplemented by full jacket steam, supplied through a spiral to promote efficient heat transfer.

John Baldwin points out that Jopling also has the option to enhance the system in the future with the addition of a pressure cooking facility.

A new Giusti Impacton 11kW emulsifier was also supplied to carry out the high-shear mixing phase. The emulsifier is in-line rather than in-vessel, which saved expensive tank modifications and allowed it to be used with both cooking vessels.

In addition, a special feature of the Jopling installation is a new 5 bar steam supply, which allows an initial 'fry-off' phase prior to the cooking of the main batch. Giusti's sister company, Briggs Automation, installed water flow control using new Nixon flow metering systems. Two new bin hoists have also been installed to give efficient top loading of the cooking vessels.

After cooking, product is pumped through a new Cherry-Burrell Votator heat exchanger for cooling down to 4deg C at the rate of 500-700kg an hour and then pumped either to mobile bins or to a refurbished 1000 litre holding tank which has been equipped by Giusti with a new horizontal agitator.

Finally, when processing is over, the new sauce-making facility can be flushed through by a full clean-in-place system. This uses a 2000

litre water tank and 500 litre detergent tank, supplied by Giusti from reconditioned stock. Vessel line switching is manual, with a facility for detergent recovery based on caustic concentration sensors.

The new installation is now fully on stream, but there is scope for further improvements as business builds up – notably an enhanced recipe management option that could lead to greater production efficiencies.

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PROCESS EQUIPMENT

Cooling system reduces time for Authentic Foods

One frequent bottleneck experienced in sauce preparation is cooling – a particular problem, obviously, for those that cold-fill – since reducing the temperature of 500 litre-plus batches can add an hour or more to the total process time. As a result, some producers have focused investment on improving speed and efficiency in this area.

One example is Cheshire-based Authentic Foods, which has recently commissioned a new cooling facility using hardware supplied by Dutch firm Terlet, through UK representative

report

READY MEALS REMAINS ONE OF THE FASTEST GROWING SECTORS OF THE FOOD INDUSTRY. MICK WHITWORTH REPORTS ON MACHINERY DEVELOPMENTS, FROM PREPARATION THROUGH TO FINAL PACKAGING.

Grunwald UK, and installed by Qualtech Engineering Services.

Authentic specialises in ethnic curries and sauces and has been producing ready meals at its Stockport plant for some time. But the need to boost capacity has led to a second plant being built at nearby Sharston.

Along with the cooking and packing processes, great emphasis was placed on Authentic's sauce cooling system, which had to provide consistent, repeatable product quality as well as product safety. Two existing cooling vessels were used in the Sharston factory, but Authentic also purchased two 600 litre Terlet vessels, which use surface cooling technology.

Efficiency is maximised by the use of glycol jackets not only on the walls and base but also on the central column. Heat transfer through these surfaces is improved further by continual surface scraping throughout the cooling process.

Product transfer is achieved by vacuum filling and top pressure emptying, using filtered air. The avoidance of a pump at this stage is aimed at reducing the risk of product damage.

Brian Edwards, technical director of Authentic Foods, says good yields and cooling times have been achieved on this equipment without compromising flavour or aroma.

Meanwhile BPT (Skerman) is to build and supply all the cooking and cooling process equipment – complete with operator access gantry/platforms, transfer piping, and a full control system with data recording – for a new factory supplying premium quality Indian meals to one of the UK's major retail multiples.

Included are several cooking kettles from the

Hy-Mix series of hemispherical kettles with split jackets and inclined anchor agitators, and over ten high pressure steam brat pans which, says BPT, have proved particularly popular with producers of ethnic meals. In addition, a number of Bro-Cool rapid batch cooling systems are being supplied to handle sauces.

Mettler-Toledo has introduced FormWeigh, a Windows based software programme for recipe, formulation, dosing and simple weighing functions, and a database that stores formulae, batch numbers and customer information. The software can be installed on any PC and networked to host management systems to give easy transfer of data, orders and formulae.

FormWeigh records all methods and ingredients for every batch to ensure that traceability and validation standards are met and allows the weighing terminals to be connected to three individual scales as well as barcode scanners and label printers.

For further information:

BPT (Skerman)
Grunwald UK
Mettler-Toledo

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HANDLING INGREDIENTS

Transfer systems operate gently without waste

Efficiency and hygiene are both important when it comes to handling sauces and other liquid ingredients, and manufacturers such as Maso Process-Pumpen of Germany and Kecol of the UK each offer their own solutions.

Kecol maintains big savings can be made in ingredients such as purées and pastes by ensuring no material is left in the bottom of containers after pumping out. To achieve this, it has come up with its air-operated Twin Post Maxi and Miniprime pumping units for emptying storage or mixing drums.

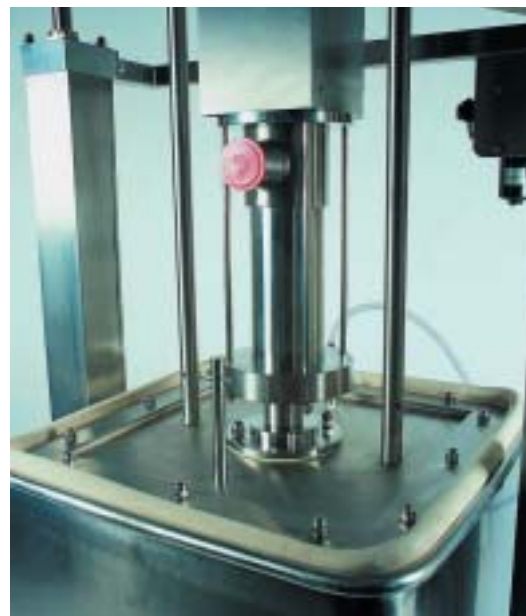
These feature a reciprocating pump mounted on top of a follower plate, which wipes down the insides of containers and eliminates waste. The plate is available for straight-sided vessels such as drums and mixing vessels up to 1 metre

diameter while there is also a new square follower system for Eurobin-type containers.

The plate sits on the product, and as this is pumped away the plate follows it down to the bottom of the container ensuring the pump is always primed.

Kecol claims its air motor is "extremely quiet" in operation and says the equipment can be tailored to the customers' cleaning requirements with the use of either tie-bolts for quick knockdown or quick-release flange clamps. Quick-release couplings between motor and pump are also standard.

Germany's Maso Process-Pumpen makes the Sine positive displacement pump, used widely in the food and beverage industry, says the company, as a result of the system's simplicity, gentle action and ease of strip-down.



No waste: Kecol pump and square follower system empties Eurobins completely

The pump uses a sinusoidal rotor turning in an outer housing. During operation, the rotor forms a series of chambers into which product is drawn gently in a continuous flow, making it suitable for shear-sensitive products and those containing particles or inclusions.

Powerful suction also means the pump can be used to remove high-viscosity products effectively from process vessels, storage tanks or mobile bins.

In ready meal plants, Sine pumps are typically used to handle sauces with vegetable or



Faster cooling: Two 600 litre Terlet vessels are now used by Authentic Foods

meat particulates, as well as stews, other savoury fillings and toppings. They can be deployed for raw materials handling in the preparation areas, moving finished sauces to coolers or chilled storage, or pumping to filling machinery for final dispensing, in both batch and continuous operations.

For further information:

Kecol Pumps

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Maso Process-Pumpen

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Vibratory feeding improves product delivery

Vibratory feeding has improved hygiene and product handling at one of the UK's principal ethnic ready meals producers, where a Flowright vibratory conveyor built by Wright Machinery has been installed to deliver difficult products, such as boiled rice and curries, to the multihead weigher.

This new unit replaces the belt conveyor design employed before, reducing cleaning times substantially and, via its vibratory action,

helping to de-agglomerate chilled boiled rice and give a steady flow to the weigher for optimum performance.

Product is loaded from bulk trays into the hopper of the conveyor by hand and then fed forward to the discharge, which is radial and encourages the product to flow evenly as it drops into the weigher.

Speed variations in the filling line are handled by feedback from the multihead to the Flowright conveyor, allowing automatic adjustment of vibration amplitude and hence flow rate.

The conveyor is set immediately to one side of the weigher, on a gantry, level with the infeed, and is mounted on a swivel that allows the entire unit to be swung away 45 degrees from the weigher for cleaning. This is now much simpler than before, as Mike Reed, sales manager at Wright Machinery explains.

"Belt conveyors are not ideal where sticky foods are involved and usually need to be stripped down and the belt removed for cleaning. However, the Flowright vibratory conveyor can be washed in situ and has no crevices or rotating parts that can harbour dirt."

The tray of the Flowright conveyor is double skinned, with the inner and outer stainless steel pressings welded together to provide a rigid structure, eliminating side braces or corner welds that could inhibit hygiene.

This construction also allows the inner skin to be made of dimpled material, for optimum product handling in this case, while the outer skin remains smooth.

Both the conveyor hopper and its covering grid can be removed for cleaning via quick-release toggles.

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FILLING

Depositor design turns to handling difficult products

Until quite recently the technology of depositing remained so basic that less than half the contents of a typical ready meal – often just a fairly runny sauce – could be delivered to the tray by machine.

This may have been good news for anyone seeking employment on a filling line, but brought no joy to manufacturers struggling to maintain 99p or £1.49 price points.

Inevitably, the relentless pressure to reduce costs has begun to see big improvements in equipment to deposit some of the more awkward meal components and reduce manual handling on the line.

A prime example is the MPF range of depositors from US manufacturer Multi-Fill, specifically designed to handle products that have previously proved almost impossible to fill by machine. Indeed, the MPF system features a volumetric filling head capable of depositing precise portions of cooked rice, pasta, vegetables and other tricky ingredients in trays, cartons or pouches.

Filling cooked pasta

Multi-Fill is represented in the UK and Ireland by F Jahn & Co where managing director Gerry Lupton agrees that, generally, the more free-flowing the product the better and more accurate the filling performance of depositors has been. But, he says, the MPF system has proved adept at handling cooked pastas such as noodles, spaghetti and tagliatelle as well as vegetable pieces such as broccoli and cauliflower florets, quick frozen carrots or beans.

For example, Kanes Foods of Evesham has recently installed an MPF depositor with a special six-position product distribution system, filling noodles into trays on a twin-lane thermoforming machine.

However, the MPF depositor is also designed to be entirely mobile, and can be switched easily between production lines as a result of changeover and clean-down times said to be "very short".

French dosing system maker PCM Dosys, represented in the UK by Jagenberg, has been designing equipment for food dosing, injecting, blending and filling for more than a decade.



Easier cleaning: Flowright conveyor is mounted on a swivel. Product is delivered radially (inset)



Pasta with two veg: Multi-Fill MPF is said to deliver difficult products accurately

Starting in the dairy industry, it has edged over into ready meals and now offers systems to handle a wide range of sauces with particulates including ingredients such as mussels, mushrooms and aubergine.

According to Jagenberg's Chris Robinson, the size of the pieces is mainly dependant on the ports and the pipework, which can range from 16-48mm. This can accommodate anything from 20mm strawberries to various sizes of cooked potatoes, although the main limitations are set by the homogeneity and the 'carrying' power of the sauce.

One PCM machine, an eight-head, servo-driven Dosyfill with eight single-passage nozzles feeding two different dosing points, can deliver 16 doses ranging from 90g to 115g at a speed of up to 13 strokes a minute. It can handle sauces with shrimps, squid, and various vegetables and herbs, as well as rice or pasta that has been pre-blended with the sauce.

Dealing with sticky components

Multipond is another machinery maker that has paid close attention to the problems of depositing 'sticky' components. Over the past year it has installed a number of systems to weigh and deposit ingredients such as cooked chilled marinated meats and cooked chilled rice. "These products, by their very nature, are difficult to handle and offer a challenge to the weighing industry," says Multipond's Geoff Tandy.

Recognising that many ready meal applications involve multi-component filling, Multipond has also developed a toppings/garnish unit suitable for weighing and depositing items such as shredded cheese, peppers or herbs. Not only is



Sticky products: Multipond multihead weighing marinated chicken



Mobile multihead: Bilwinco weigher can be moved easily from line to line

the product weighed, but it can also be targeted to a specific area of the tray or distributed evenly across the tray using the company's topping unit fluidising system.

Another name familiar throughout the ready meals industry is Turbo Systems, which has just sold a four-head monobloc depositor to Cavanaugh & Gray, a supplier of meals to Marks & Spencer and Virgin Atlantic. The equipment will be used to deposit mince and mashed potato.

Relative simplicity

Lindsay Thwaite, site engineering manager at C&G's Carlisle factory, says the investment will enhance the efficiency and flexibility of the production line, adding that the relative simplicity of the Turbo machine compared with rival units was important. "It was less complex, it was easier to fit and had only one piston. Others had four

pistons for four products," he explains.

The flexibility of the multi-lane system means that in addition to coping with hot, sticky, thick products such as mashed potato it can handle meat fillings or chunky mixes such as carrot and swede or cheddar and onion.

Ward Bekker Systems is among a number of established suppliers of both weigh fillers and integrated ready meals filling lines. The latter can include flighted product feed elevators,

tray denesters, tray indexing conveyors, check-weigher/metal detectors, and electronic control cabinets with PLC programming to provide sequential timing.

For example, one recent Ward Bekker installation for a major ready meals manufacturer included three separate lines each designed to fill three different components into trays at 50 trays a minute: a system that called for three multihead weighers over each line.

Another manufacturer that has supplied automated multihead weighers, feeding systems and filling lines to the likes of Birds Eye, Bluecrest and Findus is Denmark's Bilwinco, represented in the UK by Ancholme Machinery. One of its solutions to the tension between volume and flexibility has been to develop a mobile multihead weigher that – while still a substantial item of equipment – is capable of being manoeuvred easily from one production line to another.

The weigher, mounted on a support frame, can

be lifted or lowered to deposit components at the right height over the tray. It can be fed either by a mobile infeed system or by a product lift that raises and tips Eurobins into a storage hopper above the weigher.

Euroweigh is another company that has developed weighing and dosing equipment specifically for the ready meals sector.

Its established Speedweigh 661 is a compact, portable twin-head weigher which can handle a variety of dry, frozen and wet components in weights of up to 500g at speeds up to 40 packs a minute. A more recent development is the Speedweigh 301 four-headed weigher which, according to Euroweigh, is also easily moved on and off line. Both models have self-cleaning weighpans and quick-release contact parts for ease of strip-down.

The company's Series 500 range of timed vibratory dispensers is designed to add toppings such as grated cheese or mixed nuts into ready meals or salad bowls and can supply up to 80 doses a minute in a twin-lane format.

Twin lane conveyor

For larger-scale operations, the Euroweigh range includes a twin-lane indexing conveyor for use in conjunction with the weighing and dosing machines. Sixteen of these conveyors, complete with 32 Speedweigh 301 models, have been supplied to a single customer in south-east Asia in the past 18 months, where they are giving speeds up to 80 doses a minute.

For manufacturers facing a large number of changeovers, the option to wheel depositors in and out of line can be vital. According to Bob Lumb, sales manager at Riggs Autopack, the number of machines required can vary from just one – for example, for gravy or soy sauce depositing – to as many as five on a lasagne line where product is built up in alternating layers.

Mobility also helps once production is finished, as the machine can be whisked away to a separate washdown area. This in turn makes it important to have quick connections, particularly to the air supply and the start signal line.

“Product loading is very important too,” points out Bob Lumb. “Not many food factories these days would want to pump or hand-load product into a feed hopper that may be up to 2 metres from floor level.

“This sort of operation at best tends to be messy, with product running down the outside of the hopper, and at worst downright dangerous, with slippery, wet steps to contend with. So hoppers should be easy to load – which means low-



Handling three components: One of three triple component lines supplied recently by Ward Bekker



Low level mounting: Riggs Autopack has introduced its new Model 1000 depositor

mount – yet safe to the operators' fingers.”

Cleanliness of the deposit itself is also important. Various types of cut-off valve are in use, says Mr Lumb, such as plunger valves from around 10-35mm diameter to allow for solids in suspension, rise-and-fall heads for decorating patterns such as mashed potato, and others offering regular distribution of product across the tray. Most of these depositing heads are of standard design, but it is becoming more common for users to require special adaptations.

Riggs has borne these parameters in mind in the development of its Autopack Model 1000 low-mount depositor. Recent buyers of this model include a producer of airline meals, which bought a machine with a 75 litre feed hopper

and easy-to-use hand jacks for adjusting the height of the machine on the line. The customer also specified a snap-on connection for hand-gun nozzles. To minimise the risk of injuries the Model 1000 also has an easily-loaded hopper and a safety bar lid.

The safety issue has also been picked up by Adelphi Manufacturing, where director Laurie Perry points out that the Health and Safety Executive has recently expressed concern over the number of accidents involving depositors.

Adelphi has set out to address these worries in its new Response semi-automatic depositor by eliminating finger traps and providing an emergency stop and isolator valve as standard. “The machine can also be stripped down for cleaning entirely from the front, with no need to remove covers or bend and stretch to reach awkward corners,” explains Laurie Perry.

The Adelphi Response also features a head design said to be capable of handling every type of liquid and cream common in ready meals, including sauces with large particulates. It can deposit components in volumes of 5-1000ml with a claimed accuracy of ±0.25 per cent.

For further information:

- Adelphi Manufacturing **enter 125**
- Ancholme Machinery **enter 126**
- Euroweigh **enter 127**
- Jagenberg **enter 128**
- F Jahn & Co **enter 129**
- Multipond **enter 130**
- Riggs Autopack **enter 131**
- Turbo Systems **enter 132**
- Ward Bekker Systems **enter 133**

TRAY SEALING

Integrated lines present a balancing act

A client list that includes Kraft Foods, HJ Heinz, Hazlewood and Nestlé has helped Florida-based Osgood Industries form a clear picture of what ready meal manufacturers want from filling and sealing lines.

Its conclusions won't surprise anyone: high flexibility, low maintenance costs, minimal downtime, ease of cleaning and ease of operation. But since high volumes are also the order of the day, these demands require something of a balancing act. So how do you build flexibility and ease of use into a large, integrated, high-throughput machine?

For Osgood, represented in the UK by Nupol Machinery, the solution begins with the denesting operation.

Preformed trays are separated by mechanical fingers or jaws, depending on the particular stacking characteristics of the trays, and transferred into pockets on the carrier plates. When many tray sizes have to be run, pusher bars are sometimes used, and these are adjustable in pitch to keep changeover times down.

The heart of Osgood's machines is the meal assembly process. The company describes its system as 'plug and play'. In other words, a combination of different filling systems can be incorporated into any given machine length, but all controlled by the main PLC.

A typical Osgood ready meals line will combine multihead weighers, auger powder fillers, volumetric fillers and robotic placers. Sometimes there may also be a manual loading section for components that remain difficult to fill automatically.

The user has the option of specifying a fixed configuration or, for greater flexibility, a wheel-in, wheel-out modular system.

On pumpable filling stations, Osgood frequently opts for servo drives. These have the advantage, it says, that the filling parameters for any give product or volume can be preset. The settings are entered into the PLC, given a recipe number and can be recalled on demand via a touchscreen.

After filling, trays are closed either by heat-sealing or edge-crimping of foil trays over card lids. The heat-sealing station can handle pre-diecut aluminium foils by pick-and-place or,

when film from rollstock is used, membranes are heat-sealed and cut in a combined station and the scrap material rewound onto a reel.

Heat-sealing is controlled mechanically, with air cylinders mounted above to retract the head if no tray is presented. The heat-sealing station is operated by the PLC through a PDI loop, which keeps the temperature within ± 2 deg C.

A bottom support tray with vulcanised rubber or silicone profiles, tailored to each tray format, locates the tray through the sealing process, and products are then discharged in the direction of the machine flow.

Combination of standalone units

Despite the flexible nature of the filling stations, machines of this type may not appeal to manufacturers producing a large number of varied, short-run products – not least because of the high capital cost of an integrated machine with multiple filling stations.

Many prefer to use a combination of denesters for pre-made trays, plus standalone weigh-filling units, dosers and separate tray-sealers. Alternatively they may build their lines around thermo-form-fill-seal machinery. It's also true that, except in the case of new start-ups or major expansion, many manufacturers will wish to incorporate as much existing machinery as possible in a mix-and-match operation.

The Reepack range of Italian-built manual, semi-automatic and in-line tray-sealing equipment covers a wide range of throughputs, from 10 up to 120 packs a minute although, as UK agent Union Food Machinery & Equipment points out, larger, in-line machines can be supplied with denesters, depositors, single or multi-lane infeed, divergers, accumulating stations and convergers. The tray sealers also include

the option of gas-flushing where extra shelf life is required.

Tray-sealing and handling systems from another Italian firm, Tecnovac, are now available in the UK through a partnership with Planet Flowline.

Tecnovac has been in business for more than a decade, and has particular experience in frozen and chilled ready meals. Planet Flowline says the tie-up will extend its ability to offer turnkey installations based on equipment from a number of suppliers.

Another range of Continental machines – this time from Sealpac – is now available to the UK through Ultraseal Pac which is particularly enthusiastic about the Sealpac 800 tray-sealer, which it describes as the flagship of the German-built range. All Sealpac machines can seal flexible or rigid top web materials to a preformed tray, and also handle vacuum-only, gas-flushing or a combination of the two where modified atmosphere is required.

Completely reworked design

But the 800 model, launched a couple of years ago, is said to offer "a completely reworked design which takes advantage of all the latest technologies". These include intelligent tool recognition, a more efficient gas/vacuum operation, guaranteed orientation of trays with flanged ears such as snack bowls, higher speeds, and simple integration with ancillary equipment such as sauce depositors and weighers.

Indeed, according to Ultraseal Pac, demand for hermetically sealed packs is becoming more and more evident in the UK as consumers looks for tamper evidence and leak-proof packaging.

Finally, not every package needs the conventional board sleeve. FP Packaging Machinery



Top of range: Sealpac 800 features include intelligent tool recognition



Turnkey opportunities: Tecnovac tray sealers are now available in the UK from Planet Flowline

has recently installed snap-on lid applicators on two lines at a ready meals plant where they are providing "significant savings in labour".

Each of the FP Reciprocating Placer machines applies snap-on lids to heat-sealed multi-cavity ready meal trays, which arrive on a single lane conveyor at speeds up to 45 trays a minute. The lidders were supplied as completely self-contained units, complete with conveyor work and motor-driven roller tamping stations.

FP says the high degree of flexibility required by the customer led to the inclusion of special, easy and quick size change features, allowing the machine to run up to nine variations of shape and height for both lid and tray.

Manual size changes reduced

Firstly, the number of manual size changes was reduced by fitting the single lane placer with three lid magazines, each dedicated to one of three basic lid outlines. This eliminated the need to size-change the magazine side guides. The lid pick-off suckers were then fixed to a sliding mount, which could be quickly and easily moved to each magazine position using a quick-release level arrangement.

In addition, the gating system of the placer conveyor, which is needed to stop the trays ready for lid placement, also had to be size-changed to accommodate different base tray profiles. So gates were fixed to a sliding mount. This meant they could be easily and quickly moved to a pre-set position without the use of tools.

To allow changes to lid and tray height, FP used its servo motor drive system. It included a program for each size combination, enabling the pick-and-place movement to be size-changed at the push of a button.

FP says the servo drive system can achieve

production speeds up to 80 cycles a minute. The lid itself can be picked and moved at high speed, giving more dwell time above the tray or tub to achieve accurate positioning and placement.

For further information:

- FP Packaging Machinery **enter 135**
- Nupol Machinery **enter 136**
- Planet Flowline **enter 137**
- Ultraseal Pac **enter 138**
- Union Food Machinery **enter 139**

CASE STUDY: KWOKS FOODS

Niche markets dictate selective automation

Despite the continued boom in chilled ready meal sales and the ever-present pressure to strip out labour costs, not every producer feels the urge to automate. Depending on the nature of the product, and the number of variants to be produced in a week, some manufacturers – even those producing for the major supermarkets – are highly selective about which processes they will switch from manual to automatic.

Take Kwoks Foods, for example, a Grimsby-based manufacturer selling authentic-tasting Chinese meals to retail multiples including Asda and Safeway as well as the BP Connect chain of forecourt stores.

Tricky for mass production

The company takes its name from co-founder and head chef Paul Kwok, but is now majority-owned by the £200m-a-year Wm Jackson group, owner of a regional store chain as well as bakeries and the Aunt Bessie's ready-made

Yorkshire puddings producer, Tryton Foods.

Chinese cuisine, with its emphasis on quick cooking and subtle flavours, has always proved tricky to translate into mass-production. By comparison, Indian curries, with their powerful tastes, are more forgiving when it comes to scaling up, since consumers are less likely to notice small variations.

But one of the mainstay ingredients of Chinese restaurant and take-away food, the controversial flavour enhancer monosodium glutamate, is nowadays frowned upon by supermarkets. This pushes producers to find other ways to reproduce the tastes consumers expect, which can mean longer cooking times and a wider range of ingredients.

Despite producing up to 6 tonnes a day of chilled meals, only two of Kwoks' packing operations – lidding and sealing of cPET trays and heat-sealing of takeaway 'grab bags' – use automatic equipment. And according to logistics manager Gavin Milligan – who, despite the job title, is also responsible for major equipment purchases at Kwoks – the company will remain cautious about swapping manual labour for machinery.

Many ready meal producers fall into two broad categories, says Gavin Milligan. There are makers of mainstream, high-volume meals such as chicken tikka masala and lasagne, churning out dishes by the tonne in 'white box' factories which benefit from automation. Then there are niche producers like Kwoks, aiming to produce near-restaurant quality dishes in relatively short runs that call for frequent changeovers.

Kwoks makes authentic-style dishes such as chicken in black bean sauce and Thai vegetable curry in batches as small as 50kg. "All the cleaning out and setting-up [of automated filling lines] would not be worth the bother," says Mr Milligan.

Most of Kwoks' range, including rice dishes, are prepared in electrically-heated brat pans – 200kg capacity, heavy-duty versions of catering cooking pans. There are also a couple of steam-jacketed vessels with built-in agitators, with two new 500kg versions currently on order, but brat pans currently rule the roost. After cooking, product is decanted into trays using a tilt mechanism, and these are then racked up for blast chilling to below 4deg C.

All dishes are then cold-filled in cPET trays, with the weighing-out and depositing of components – whether sauce, rice, or proteins such as chicken or duck – carried out by either hand-weighing or volumetrically.



Automation: Tray sealing on one of the two Packaging Automation Vision 182 machines

Lidding of filled trays is one function that Kwoks has automated, and it has now installed the second of two Vision 182 tray-sealers from Packaging Automation. Currently, neither machine is gas flushing the packs, but one unit was bought ready-equipped with MAP facilities and the other is capable of being converted without difficulty.

Gavin Milligan says: "Gas-flushing would give us more flexibility, particularly when we're doing a lot of regular small orders. The extra shelf life means you can do longer runs and hold some of the product for despatch the next day always, of course with the agreement of the customer."

The company is also "in discussions" with possible export customers, which would almost certainly demand the extra shelf life of MAP.

Mr Milligan says there were three main considerations when choosing a second PA machine.

Common spares makes sense

"If you're choosing a strategic partner it makes sense to have some commonality in spares and consumables. Flexibility is also important to us. PA were willing to make amendments to the machine to suit our rather cramped geography. And the equipment itself is very sturdy."

After lidding, most Kwoks products are either manually sleeved for individual sale from



Closing 'grab bags': Kwoks uses two of these SIG Dobby BD sealers

supermarket shelves or assembled as complete meals for one or two in take-away style 'grab bags', the format favoured by forecourt shop operator BP Connect.

Grab bags are heat-sealed on two SIG Dobby BD bag-sealers – the only other significant pieces of automation in Kwoks' filling and packing halls since even case-erecting and case-packing are manual operations. "Again, we do such short runs that if we had case-packers we'd spend all our time resetting the machinery," says Mr Milligan. "So there is no attraction when we've got people who can erect 30 cases a minute by hand. People are just wonderfully flexible."

The BD bag-sealers used by Kwoks include a lengthened throat which allows bags with flexi-

loop handle to be processed as well as cheaper, punched handle carriers. The machines also have an extended infeed to help with product handling. Currently, these units are sealing seven bags a minute, although SIG Dobby says that the rate could be increased if necessary.

The BD series uses the rotary band principle and delivers speeds of anything up to 12 metres a minute, sealing all thermoplastic materials including polyethylene, polypropylene, PVC and coated laminates. The bags to be sealed can be presented vertically or horizontally and are carried through heating and cooling sections to ensure an hermetic closure.

Factory to be extended

Limited space is another constraint on mechanisation at Kwoks' site, as the current production area is just 6500sq ft. But the factory, based on Grimsby's Europarc Business Park, is shortly to be extended to 35,000sq ft. Whether this will automatically lead to more mechanisation depends on how much growth is achieved, and from how varied a range of products.

"There are always elements that could do with more automation," says Gavin Milligan. "Depositing of sauces, for example, is always cleaner and more accurate with a doser than a scoop. But we will only automate as far as makes sense within the constraints of authenticity and product quality."

Meanwhile, he feels there are quality benefits to hand-depositing. "It helps preserve the physical form of the product," he says. Ingredients delivered to the line through pumps and pipes run the risk of product getting "beaten up" along the way, he feels. And hand-filling also gets round the problem of uneven distribution, as line operators can better ensure every pack gets the same share of proteins and other larger components.

"We definitely don't want to become yet another anonymous white building churning out standard ready meals," adds Mr Milligan.

For further information:

Packaging Automation **enter 141**
 SIG Dobby **enter 142**

SLEEVING

Tray sleeves cater for a variety of shapes and sizes

Schwan's Europe is already one of the Continent's biggest pizza manufacturers. Now it has taken its Chicago Town brand into ready meals – an area dominated by supermarket own label. The striking sleeve design chosen for the new range has tapered sides and is cut away on two corners to follow the shape of the 'deep dish' style bowl. The carry handles of the bowl are then located in the remaining corners of the sleeve.

The pack format is unusual, but is assembled on a standard automatic cartoner from T Freemantle on which Schwan's is able to run both the special deep dish pack and standard end-load skillets. PLC-controlled via a touchscreen, the sleeve features Freemantle's slimline autoloader, which is said to save up to 25 per cent of floor space. Size changes are carried out using a quick-change pinlock system.

Kliklok Woodman has developed a high-speed product transfer and loading system especially suited to handling frozen ready meals, where trays can sometimes become distorted.

In the latest generation of its IPTU (Intelligent Product Transfer Unit) trays are received end-on from upstream equipment and aligned using the company's 'smartbelt' system. They then enter a rotary turret, which provides mechanical control, locating the tray while a rotary motion sweeps the pack smoothly into the infeed conveyor of the cartoner, making a 90deg change of direction at the same time.

This equipment has recently been installed as part of a high-speed line handling ready meals trays at 250 a minute. The rotary transfer system is complemented by a Concorde HSR cartoner which feeds and erects the cartons. According to Kliklok Woodman, this fully integrated system overcomes the need to turn ready meals trays from narrow-end loading to broad-side leading for presentation to the cartoner.

German manufacturer Vepatec has recently supplied a machine for sleeving a range of

chilled products including round bowls of soup as well as rectangular lasagne and cannelloni packs.

The machine applies sleeves at speeds up to 60 trays a minute and also glues the sleeves to the packs using a low-melt adhesive to avoid damage. This ensures the pack/sleeve combination stays in one piece if it gets tipped or stood on edge on the supermarket shelf.

The sleeve – part of a range made by Vepatec with speeds up to 120 minute – has a magazine capacity of around 700 sleeves, and is operator-adjustable via the use of handwheels. In the UK Vepatec is represented by Partners in Packaging.

Adco Manufacturing launched its CS-80 ready meals sleeve in 2001 and says that several of the machines are now in operation in the UK.

product. Squareness in the pack is ensured by means of flexible rubber grippers, which hold the sleeve securely in place while it is closed.

At 2.4 metres long the stainless steel and aluminium CS-80 is compact, but can nonetheless run at up to 80 sleeves a minute, applying full or part sleeves or watchstrap bands. Size changes can be achieved in less than five minutes without change parts while servo-assisted changeover is available for users that want a more automated procedure. A new 120-a-minute version of the CS model is due to be launched this spring.



Left: Schwan's deep dish style bowl is sleeved on an automatic cartoner (above) from T Freemantle

Below: Vepatec has supplied a machine to sleeve soup bowls



One feature of the CS-80 is that it does not require infeed timing. Products – typically rectangular, oval or round ready meal trays or tubs – can arrive at the infeed back-to-back or at random. A servo-operated feeder places the blank onto an overhead rail and from there it is transferred to the closing section along with the

Another supplier whose range can accommodate a range of sleeve types is Bradman-Lake. Units are available for handling fully enclosed, rectangular cartons or open-ended wraparound sleeves at a variety of speeds.

The SW701 sleeve-wrapper, for example, is aimed at entry level users. It is a fully automatic, continuous motion machine, capable of handling pack sizes 50-265mm long, 76-215mm wide and 20-76mm high. Digital readouts help the user achieve quick size changes. Various infeed systems can be supplied and the latest SW701s have been updated to run at 80 packs a minute.

The servo-driven SW702, for throughputs up to 150 a minute, has angled side guides that can be adjusted to ensure tight closure of packs with sloping sides.

Another system which, like Bradman-Lake's SW701, is aimed at the smaller user is the SmartSleeve CT60 from Delford-Sortaweigh. This easily-manoeuvred mobile unit is intended



Wraparound sleeve: Bradman-Lake SW701 can now reach speeds of 80 a minute

to make automated sleeving a practical, cost-effective option for food companies upgrading from hand-sleeving. Its magazine hopper can accommodate up to 600 sleeves, and size adjustments are menu-driven.

Delford is keen to promote the benefits of the CT60 over hand-sleeving. Flat-cut blanks are cheaper than pre-glued sleeves, it says; coding and date-stamping can be carried out in-line; sleeves will be consistently tight – and, of course, labour requirements will be reduced.

Pre-glued sleeves installed

Hand-sleeving is not only confined to small and medium-sized producers. The sheer variety of products now expected by the major supermarkets means even top-end manufacturers sometimes employ manual lines to handle low-volume products when the needs of customer service require it.

One of Northern Foods' recipe dish businesses has installed three of Freemantle's newly-launched pre-glued sleeves. These are semi-automatic machines running on three different lines at up to 80 packs a minute. All three run a separate range of products, including single and twin compartment meals.

The operation of the pre-glued sleeves means the machines could be installed to run with the standard hand-applied sleeves currently in use. As Richard Kitchen of Freemantle points out, this has the advantage that sleeves can still be hand-applied in the event of a machine stoppage. But under the normal cir-

cumstances the machine can apply up to 80 sleeves a minute with a single operator.

Since the sleeves are pre-glued, the machine can also handle a much wider range of pack size and designs, including ovals and round bowls. Changeovers have apparently been achieved in as little as four minutes.

"Recent calculations show the waste from these machines is less than 1 per cent," says Richard Kitchen. "If the operator fails to fill a sleeve it is ejected and can be reused."

This reduction in waste has encouraged some users to revert from wraparound systems to pre-glued sleeves, he says.

"It has long been assumed that flat blanks work out as a more cost effective solution than pre-glued sleeves. But a recent study concluded that the cost of wasted sleeves and long changeover time on wraparounds, along with the cost of the adhesive and the warm-up times, made pre-glued sleeves the more cost-effective and flexible option."

For further information:

- Adco Manufacturing **enter 144**
- Bradman-Lake **enter 145**
- Delford Sortaweigh **enter 146**
- T Freemantle **enter 147**
- Kliklok Woodman **enter 148**
- Partners in Packaging **enter 149**

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CODING AND LABELLING

Take-away bags labelled in the flat on both sides

Just like Kwoks Foods, Noon Products is now supplying tray-packed ethnic meals grouped in take-away plastic carrier bags.

It is a format that would be almost impossible to label by machine once the bags were filled. So, to get round this, the carriers are pre-labelled in flat form by a Graham Commander top and underside labeller. This uses two heads for simultaneous application of labels up to 220mm x 220mm on both sides of the bag.

A specially designed infeed fitted with a stainless steel dimpled surface plate helps reduce the static electricity produced by the bags, which come in sizes up to 560mm wide x 360mm long. A hot foil coder is also fitted for printing 'display until' and 'use by' dates on the top label.



Bag labelling: Noon Products has installed a Commander applicator from Graham Labelling

Meanwhile Sovereign Labelling has introduced a high speed system to apply pressure-sensitive labels to ready meals containers – both patch and full wrap (overlap) styles – at speeds up to 200 a minute. A variety of optional coding devices are available.

Rotech Machines has two coding systems suited to ready meals applications: one for retail packs and the other for cases.

The Rotech Feeder 150 is aimed at users that want to centralise the overprinting of sleeves or cartons using a single high speed printer and can print up to 150 items a minute with typical changeover times of one to five minutes. Fitted

READY MEALS REPORT

with Rotech's Coder 60 hot foil coder, the system is able to print up to 60mm of data on one line, including any combination of date codes, including 'display until' and 'best before', as well as price.

The company's latest product, the Eurojet 204, is designed for printing ITF-14 bar codes on outer cases. It offers a resolution as high as 600dpi and a print height of 50mm.

Digi Europe recently launched the HI-3600 Ecoflex high-speed weigh-price labeller, designed to apply Ecoflex labels, developed by Burrells of Wisbech. These labels are mainly used in the ready meals sector, and can even replace board outers if the label is wrapped



Wraparound: Digi Europe's new HC-3600 high speed Ecoflex labelling machine

round the pack with a suitable folding unit. The labeller can be retrofitted to existing 3600 series weigh-price labellers so customers can switch between conventional and Ecoflex labels at the touch of a button.

An additional option from Digi is the HC-3600 Ecoflex, which provides labelling only rather than full weigh price labelling. Like the HI-3600, it can achieve speeds of around 50 packs a minute.

For further information:

Digi Europe
Graham Labelling
Rotech Machines
Sovereign Labelling

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Hand packing station: Ergonomic system from Endoline feeds into automatic case-taping machines

END-OF-LINE MACHINERY

Flexibility and speed join issues of labour savings

Many ready meal processors are still tussling with the question of how best to handle end-of-line operations. The issue is chiefly one of capital cost versus labour cost but speed and flexibility are also in the mix.

According to Tony Hacker, a director of Endoline Machinery: "The specific problem appears to be a large gap between basic case taping machines and fully automatic case packers. Many customers are concerned that case tapers alone are too labour intensive, and that case packers are too expensive and often inflexible.

"This problem is becoming increasingly common as primary packing machine speeds increase, as do the number of potential RSI [repetitive strain injury] cases."

Endoline has set out to crack this problem expressly for ready meals by introducing a range of hand packing stations that incorporate what it views as the fundamental design requirements for the industry.

These include: no more than two operators packing trays at up to 100 a minute; packs to be either vac-formed trays with sleeves, or cartons; outer containers to contain between four and 12 packs; outer formats to include cases, trays and returnable crates; coding to be required on the

carton, sleeve and outer; and the possible need for layer cards.

The company has developed two styles of system in an attempt to meet these needs. Both, says Tony Hacker, are centred on a hand-packing station designed to ensure products, people and packaging are all in the right place at the right time.

This has been achieved by using different types of powered conveyor to deliver packs efficiently and undamaged to the packing area. Once packs have arrived, adjustable packing tables ensure operators never actually carry the weight of the packs as they load them into the outers.

Speed of operation

The main difference between the two solutions is the speed of operation. For higher speed applications, the station is fed by one of Endoline's compact case erectors. Lower speed systems have in-built case forming aids to reduce case erecting time.

According to Tony Hacker, this has given customers the opportunity to reduce overheads where this had previously not seemed feasible. "Returns on investment of less than six months are quite common with these systems," he says.

One obvious solution to the problem of RSI which has still to catch on fully in the food industry is robotics – a term which covers anything from simple pick-and-place systems to a free-arm robot such as Soco System's Robokid.

The Robokid's function is chiefly to fill cases with product arriving by conveyor from the

production area. However, depending on the mode, it is also able to handle completed cartons, trays or boxes weighing up to 36kg and operate at a pallet height up to 1600mm. A number of different gripper hands are available, capable of working in up to six different axes depending on the model, and these can be supplied with quick release couplings.

Soco says the robot is easy to programme. Two pieces of optimisation software create the necessary co-ordinates and the operator can then run the system and follow the process via a touch screen interface.

Robokid forms part of Soco's range of case and pallet conveyors, case erectors, closing/sealing machines, pick-and-place case packers, robot palletisers and pallet magazines.

Another end-of-line specialist, BluePrint Automation, also highlights the growing importance of robots. This fast-developing technology is "putting intelligence into handling systems, creating performance at lowest cost", it says.

BluePrint can supply end-of-line solutions to handle a range of pack types from frozen block-bottom bags to sleeved trays. For ready meals, it has developed three solutions allowing both vertical and horizontal packing.

Gravity case-packer

HOP is a robotic pick-and-place system for high speed horizontal packing, with a modular design that allows a degree of tailoring for each client. Next up is the modular gravity case packer, MGC. This includes an auto-adjust system that permits product changeovers within two minutes, 'minimal' product drop, and a turning belt system to give length-wise and cross-wise packing.

And finally BluePrint offers its Integrated XYZ Scara robots, which work in both the vertical and horizontal plane and can also "operate dynamically".

French machinery manufacturer Cermex also offers a range of machines from conventional case-packers to packing robots. It points out that the sheer variety of packs now used for ready meals – including pots, flow-wraps, cartons and bags – presents challenges, especially as these may then be bundled in conventional cases, wraparound packs, trays or shrinkwraps.

While trays and lids can answer the supermarkets' demand for ease and speed of use, at least for meals in cartons, the cost of the outer and the machinery to pack it can be quite high.

Shrink-wrapping can be the cheapest solution in terms of raw material but does rely on



Handling flexible packs: Cermex racetrack collator presents bags on edge for side-loading into cases

the strength of the carton to ensure packs reach their destination in good order.

Cermex machines can use print-registered film if required and the cartons themselves can be kept flat or packed on edge to give an end display on the supermarket shelf. Cermex units can also handle corrugated for bases with highly printed cartonboard for the lids.

Another style of single item packaging is the corrugated ledge tray, and Cermex says it has supplied many wraparound tray packers for cartons of pizzas.

Flexible packs, such as stir-fry meals-in-bags, provide the greatest challenge, mainly due to the size variation of the products and the lack of stacking strength. Flow-wraps present two problems: variations in the product and in the amount of air in the bag, especially if the outer is then over-filled.

Racetrack collator

Flexible packs are also more difficult to orientate if they are required to stand on edge. However, for one client, Cermex's solution was to supply a conventional side-load machine and then use a racetrack collator to stand the product on edge prior to loading. In some instances, Cermex also recommends its ER30 and ER 60 packing robots although it says "everything is possible on conventional machines".

Meanwhile, one of the UK's leading UK frozen ready meals manufacturers has installed two automatic Tightwrappers from Europack, chosen, says the company, for speed, flexibility and a compact footprint.

Capable of handling up to 300 cartons and 25 collations a minute, the right angle

machines incorporate an electronically controlled, built in heat tunnel and a star wheel collator which takes flat-laying single file cartons, turns them onto their edge and counts them into the required pack format, prior to wrapping,

The machines are fitted with touch screen controls and the latest electronic diagnostics for fault finding, and employ some 15 different cartridges for quick size change.

CAM, based in Bologna, Italy, is able to supply stretchbanding and case-packing machinery as part of a complete, turnkey production line that includes primary horizontal sleeving or cartoning.

Its ASB38 stretchbanders use only a single roll of Idpe and so need only create a single seal on the pack. Instead of using shrink tunnels, this system relies on hot air guns to shrink the film on the side of the pack which is more efficient, CAM says, and also allows operators to see the products down the line.

Alternatively, it can supply top load or side load case-packers for speeds up to 20 cases a minute. Like all CAM machines, points out UK representative Campak, these are fitted with the company's Mechanical Memory arrangement - a series of colour-coded datum points fitted on a revolving turret to allow quick, easy changeovers by operators. ■

For further information:

- Blueprint Automation **enter 156**
- Campak **enter 157**
- Cermex **enter 158**
- Endoline Machinery **enter 159**
- Europack **enter 160**
- Soco System **enter 161**