Hand made by machine

It is sometimes difficult to decide if a particular device is a depositor or not. One man's depositor is another man's volumetric filler. Piston fillers, timed flow fillers, cup fillers and metered flow fillers are all used as depositors, so what makes a depositor different from a filler?

In filling, the objectives are accuracy of fill and a clean cut-off, with minimal damage to the product. These objectives are also important with a depositor, although sometimes subsidiary to the essential feature of a depositor which is to discharge the measured product in a particular shape or pattern.

With a filler, the shape of the fill is largely unimportant, but the vital feature of the depositor is in most cases controlling the shape or coverage of the discharged product.

Indeed, the ultimate challenge of the depositor manufacturer is to produce a product with all the appearance of being hand made, but with the precise quality and portion control that only a machine can achieve.

For example, Mono Equipment's Delta confectionery depositor, which won a PPMA Award of Excellence in 1999, is programmable and servo driven, to allow complex shapes to be created in both horizontal and vertical planes. Indeed, the Delta can build complex products in three dimensions that could normally only be created by skilled and experienced hands.

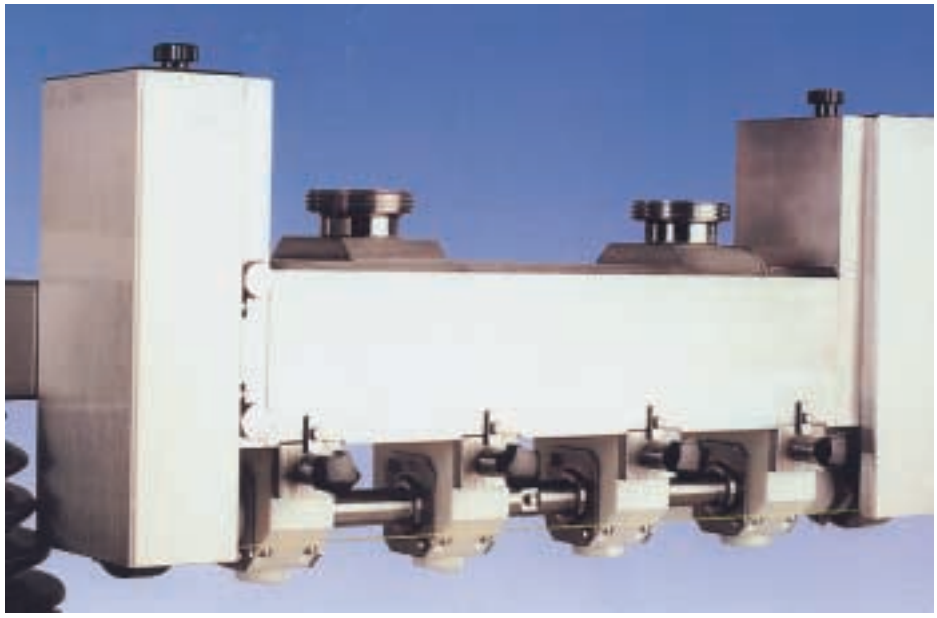
Most important, it gives users the capacity for mass customisation, with rapid changeover, and provides complete creative control with the ability to respond quickly to retailer and consumer demand. Santas, snowmen, and Christmas trees are just some examples of an almost limitless repertoire.

"The Delta replicates hand made products precisely, but at more than six times the speed," explains Mono Equipment. "One customer, for instance, has been able to produce over a million chocolate eclairs a week for distribution in supermarkets." Up to 99 product programmes can be stored in memory for immediate recall.

A further important attribute of the machine is economy. Mono points out that because it can place products very close to each other, some 40 per cent more deposits can be made on a tray, allowing maximum utilisation of the oven.

Mono has also just introduced additional equipment for its Alpha confectionery depositor in the form of a wire cut mechanism for biscuits and a rotary template for circular products, extending the machine's capabilities.

In the bakery industry, decoration has become particularly important yet, while many designs can be achieved on a one-shot basis via dedicated nozzle and die sets, or by positioning the depositor with a cam-based mechanism, each new design requires changeparts and, if movement of the depositor itself is mechanised, considerable engineering intervention.



Programmable patterns: *Three axis MA100 servo depositor from Turbo Systems*

The ultimate challenge for the depositor manufacturer is to produce a product with all the appearance of being hand made, but with the precise quality and portion control that only a machine can achieve.

This is where Turbo Systems' new three-axis servo depositor breaks new ground, allowing complex designs to be achieved, and varied quickly, for biscuit production as well as intricate decoration on cakes and pastries. The system employs a servo controlled arm carrying a stainless steel manifold, which can be fitted with any configuration of nozzles up to a maximum width of 600mm.

Decoration and lettering

The manifold can be moved 100mm from side to side, backwards and forwards in line direction by 150mm, as well as up and down by 100mm allowing, for example, even lettering and graphic-style decoration such as faces or other images to be piped on automatically, together with more conventional decorations such as rosettes or stripes.

Depending on product and complexity of decoration, the machine is able to run at 60 cycles a minute, operating with intermittent or continuous product feed, again depending on application. However, where the servo control really scores is flexibility. New designs can be created off-line and held in memory for press-button changeovers, while a CIP system is also

Mass customisation: *Mono Equipment's Delta confectionery depositor takes on the work of skilled hands*

available to reduce downtime further.

Outside the bakery industry, Turbo Systems is able to offer equipment also to give a range of decorative finishes to potato and other toppings for products such as cottage pies, Cumberland pies and fisherman's pies. Decorating heads produce effects such as waves, whirls, horseshoes or rosettes while the company's CAD/CAM facilities allow further designs to be explored as well, all of which lay the pattern down in a single action.

Turbo Systems has also just introduced a new twin-feed outlet nozzle to open up new design ideas when two dissimilar products such as jam and cream are dosed into the same container. The TX100 can also be used for injecting, decorating and spreading and has been designed to be compatible with the company's range of depositing machinery. Deserts, bakery products and ready meals are particular applications.

Weight ratio of the two products can be set by centralised controls at the rear of the depositing machine, while design changes can also be achieved by varying the speed of the depositor.

Record Pelkman has just announced a new manifold depositor for cake and biscuit batters, made in Italy by Food Processing Systems. It is designed either to be incorporated within an automated production line or operate as a stand-alone unit with existing lines.

The system allows the shape, length and weight of products to be to be adjusted on the run, while the number of batter deposits can be varied by running with just one depositing head and one row of nozzles, or up to three heads with two rows of nozzles.

Pneumatically operated valves

A chain conveyor carries the baking trays through the depositor station, where the two manifolds are mounted on a common frame and their driving action linked directly to the speed of the trays. Pneumatically operated valves control the batter deposit, ensuring accurate weight control, and there are no tray/no deposit sensors installed between the manifolds.

In the ready meals industry, presentation is all important and a wide range of depositing devices are used to handle many different types of food and sauces. For instance, Italian ready meals lines manufacturer Mondini, represented in the UK by Planet Flowline makes a range of depositors including two basic types of liquid filler.

The Mondini VF/SPM doser is a volumetric piston filler which uses an electro-mechanical drive that ensures the piston moves at constant velocity during the depositing stroke. This model is available with a range of valve and piston sizes which allow it to handle particulate cubes up to 40mm. However, there is also now a new servo driven version, the VF/SPE, which can provide greater control over more difficult products, via programmable and infinitely variable speed for the piston's induction and dosing stroke.

Stripped in a minute

The model VSB/L is a timed flow filler incorporating a lobe pump which can be stripped down for cleaning for a product change in less than a minute. This type of doser is ideal for either positioned dosing, or the evenly distributed dosing required for lasagne sauces, and can also handle soft particulate cubes up to 15mm. Both the VSB/L and the VF/SPM can be supplied with a remote valve mounted on a travelling head for distributed deposits.

For difficult products, such as cool cheese which has a tendency to string, the piston filler is available with a head which draws back over the container after the valve has closed, ensuring that the drips or strings fall into the container rather than over the container side.

For solids, Mondini can supply its DDT/LC80 filler, which was developed specifically for the trayed meal market and is able to handle a wide range of delicate products. A special feature of the machine is that the volumetric pocket table retracts underneath the product hopper to allow the product to fall into the pocket without damage.

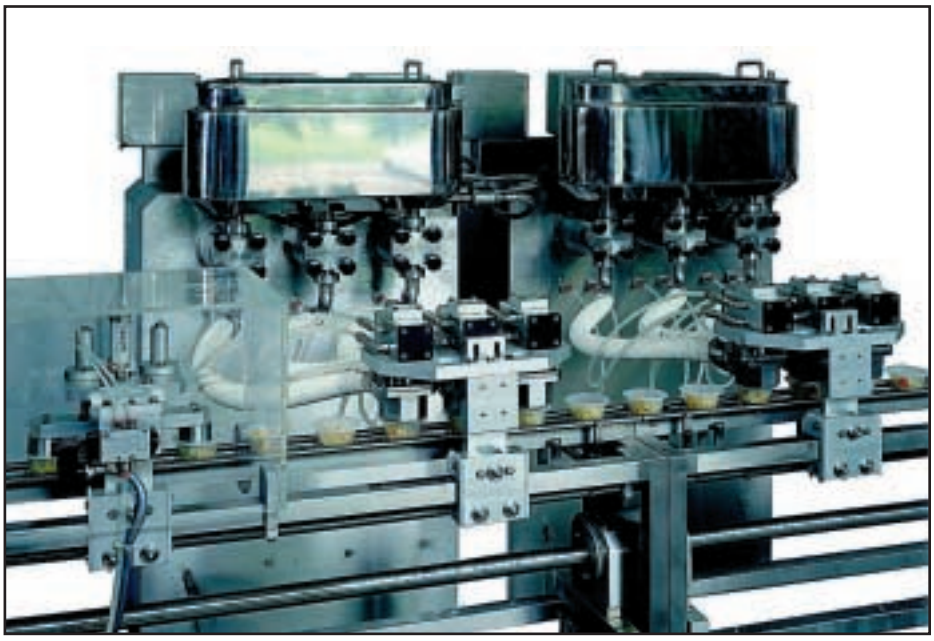
The table then moves forward over the filling line and, when a container is sensed, the product is released. This filler is suitable for products such as short pasta and diced or frozen vegetables and, on 100 to 300g fills, accuracies of ± 3g can be achieved.

Extremely difficult products such as full fat cheese, or crumble mix for desserts, can be handled using Mondini's Model DF/GS toppings doser. This consists of a hopper positioned over a conveyor belt which delivers product to a second belt controlled by a level

probe and depth wheel. When a container is sensed, the second belt runs for a predetermined time to deliver the required amount of product. For products such as lasagne, the container feed is arranged so that it moves as the cheese is discharged, to give an evenly distributed topping.

One problem facing many ready meals manufacturers is, of course, the task of economically filling quite small quantities of a variety of foods. This prompted American machinery manufacturer Multi-Fill, represented in the UK by F Jahn, to develop its MPF multi-purpose filler, which uses vacuum assisted gravity flow and volumetric cups to provide an answer to depositing small quantities, particularly of delicate products.

"In the past, traditional filling methods did not provide handling for these difficult-to-fill products without damage, or the ability to fill small quantities with reasonable accuracy," explains the company. "Therefore those filling requirements were met by either hand filling or semi-automatic equipment, making the filling process costly in an every growing and highly competitive marketplace."



Multiple filling: *Mondini VSB/L system set up for high speed dosing in ready meals production. Particulate cubes up to 15mm can be handled*

All kinds of vegetables

The MPF fillers are able to handle virtually all kinds of vegetables, in any shape, in either cooked, blanched, precooked or IQF stages, potatoes and root vegetables in sliced, diced or other cut shapes, rice and pasta, sectioned fruit, meat, poultry and seafood.

To maintain product integrity the machine creates a vacuum assisted gravity flow through feeding tubes into an adjustable volumetric pocket, and then into an oversized transfer pocket from which product is discharged to the container. Deposits of 55 -1330g can be made in a single dose at speeds up to 120 cycles a minute and the machine is available in single or multi-head configurations. A compact, mobile version is also available for use between a number of different production lines.

Apple Engineering has recently introduced a servo controlled multi-head depositing unit with 4-20 heads as static or travelling systems. There is a choice of three volumetric depositor configurations from the company's standard range: the MR150 (5-150ml) MR300 (10-300ml) and the MR900 (20-900ml).

Apple also provides injection systems with up to 100 static or travelling heads, supplies product transfer systems, and has also just announced a new top and side cake enrobing system. This employs a servo controlled MR300 series depositing unit and a cake rotation platform to provide 100 per cent cover of cream onto circular cakes.

Meanwhile, Palethorpes of Market Drayton has recently improved the solids to fluids ratio and cut production costs for its range of pies following the installation of a new three-head PF-2.5-3 filler from Raque Food Systems.

A wide range of fillings is handled, including recipes such as potato cheese and onion, chicken and mushroom, chicken and sweetcorn, steak, steak and kidney, minced beef and onion. And, as Raque points out, a common problem encountered by many producers of chilled savoury bakery products is that of securing consistent and accurate deposit weights, particularly where a wide variety of viscosities is involved.

The Raque PF 2.5, three-head 135deg piston filler now installed incorporates a blender hopper equipped with a hoist to lift and tilt tote bins of filling, so avoiding risk of material break down by the use of lift pumps. The final result is a solids rich deposit of 70 per cent solid to 30 per cent liquid.

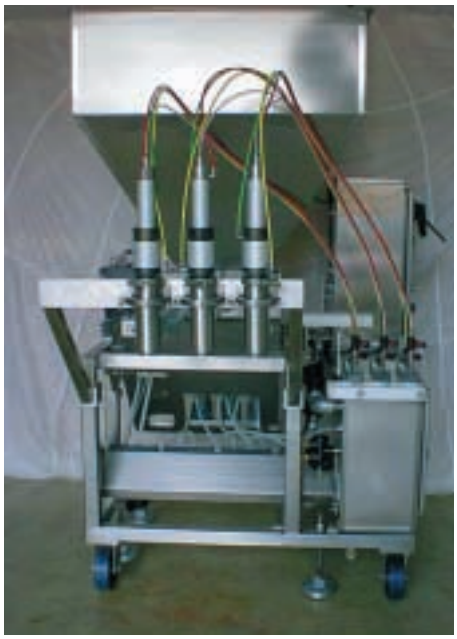
Before installing the Raque machine, Palethorpes had relied on the use of depositors which performed well but were less accurate and slower. The new PF-2.5-3 filler not only provides considerably faster and more accurate performance but, says Raque, is also virtually maintenance free and can be quickly stripped for cleaning without use of tools.

Phil Joslin, technical controller at Palethorpes says: "Our pie line is working flat out for 96 hours a week and the PF-2.5-3 has been up to the task and highly accurate, with a good consistency of solids to fluids ratio, the main area where we were seeking to make a significant improvement."

Multi-head: *Apple Engineering eight-across electronic depositor*

The three across pie line used by Palethorpes for this particular application dictated the use of a three-head filling machine, although Raque is able to supply units with one to 12 heads as required.

Finally, in the confectionery industry where, up to now, die forming has been the most pop-



Three heads: *Palethorpes is using a new Raque PF-2.5-3 filler for pie fillings*

ular method of lollipop manufacture, many manufacturers are switching to depositing says APV Baker, because of greater flexibility in production and product formulation.

Lollipop shapes and colours

A wide choice of lollipop shapes can be made using its depositors, says APV Baker, with dual and triple deposits employed to produce multi-colour products with stripes or whirls, each having more than one flavour. Shapes can be built up from different colours or flavours to create products that include seasonal decorations and cartoon characters.

"To add even more eye-catching features, the lollipop can also be printed with a wide choice of images," explains the company. "Inclusions such as nut pieces and encapsulated flavours are also possible."

The depositing process allows the stick to be placed automatically while accuracy of dimensions and weight, in the range 10-28g, is claimed to be extremely high. ■

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