

# Separation and inspection aid Counting advances

PRINCIPAL DEVELOPMENTS IN COUNTING TECHNOLOGY INCLUDE NEW METHODS OF PRODUCT SEPARATION AND INSPECTION AT THE POINT OF PACKING.

**T**wo recent developments in counting machinery – both for the pharmaceutical industry – stand out for advancing the technology. One provides a new method of creating the product separation necessary for accurate counting, the other adds an extra inspection stage just before tablets or capsules are filled into bottles.

It may be stating the obvious, but the basic problem faced by a manufacturer in designing a counting machine is not so much counting the product, but rather separating individual pieces sufficiently to prevent the counting device registering more than one product as a single item.

Separating pieces so that they can be counted reliably requires completely different technologies, depending on the product and the speed required. Separating cards from a stack, for example, is a completely different proposition from counting out twist-wrapped sweets or hardware hooks, which have a tendency to cling together.

So it is not surprising that radically different designs of counters have been evolved to suit different industries and applications.

For example, in the pharmaceutical industry where the tablets and capsules being counted are invariably small and mobile, and often fragile, there may also be a tendency in some instances for the products to adhere to each other, a common problem with soft gel capsules.

Traditionally, the most common methods of counting solid dose drugs has been via mechanical slat counters, where the product is separated by being fed into channels on the slats, or electronic multi-channel vibratory counters which separate the product by vibration and then channel them in single file past an electronic scanner. However, in recent years alternatives have become available.

First to challenge these traditional methods in the UK was Bosspak, a member of the Romaco Group, with the launch of its RTC range of machines.



**Extra inspection:** Swiftpack SV2 uses an electrostatic field to check tablet and capsule quality

According to Romaco, the RTC combines the tablet counting speeds previously only achieved by slat counters with the flexibility and control of an electronic system. On difficult shaped products, such as caplets and soft gel capsules, the RTC can far exceed the speeds normally associated with mechanical slat counting machines, says the company.

The operational principle of the machine is based on rotating sorting disks, in which each tablet is positively located.

### Rotating disks and turret

The disks are situated around a central turret, which also rotates and which is mounted within the main hopper. The sorting disks are formatted for specific products and, as they rotate, they collect tablets or capsules in pockets around the rim of the disk on the upward stroke.

Products are then held in place until they reach the lowest point of the rotation, where

they are released into the counting head on demand. Changeover of format parts is via tool-free, quick-release connections.

Bosspak says positive control is also evident in the container handling technique employed on the machine. Containers are transferred from the infeed conveyor onto a central bottle starwheel set below the rotary counting turret. Each bottle is located beneath a count head, filling and counting while the bottles and turret are rotating to "maximise speed and stability". Once the correct count has been reached the filled container is transferred to the outfeed conveyor and an empty container then takes its place.

Another innovation claimed for the machine is in the counting system itself, a so-called "quad count" consisting of an optical matrix, which detects tablets or capsules around four sides of the counting head. This is said to increase the count zone by 100 per cent com-



**Positive separation:** Bosspak machines use rotary sorting disks to separate tablets and capsules.  
**Below:** The new Bosspak RTC 80 MB machine for medium speed duties

and weight, for comparison with pre-set values as they fall through the field.

Swiftpack points out that existing technology, such as operating an infra-red system to count each tablet, cannot offer such a wide range of quality checks. Infra-red systems can only check a product's shape, by calculating the 'dark time' as it passes the sensors, which also means that unfilled capsules will be accepted.

### Part-filled capsules detected

The intelligent inspection technology of the SV2 eliminates this problem, immediately identifying empty or partially filled products, as well as offering advances in recognising broken tablets. "Whereas infra-red systems are limited in their resolution, the SV2 is able to detect tablet imperfection," says Swiftpack. "This means that in addition to accuracy of count, the Swiftpack SV2 series offer an accurate measure of product quality in terms of physical variance, a vital issue where dosage is concerned."

In addition, downtime for changeovers is reduced, as the SV2 counter will accept products of various sizes. The filling funnel has also been positioned at the front of the machine, to allow clear supervision of the filling process.

Capsules and tablets apart, installation of counting machinery can often be to replace a manual process.

For example, Davenport and Burgess, manufacturers of key blanks and associated accessories, used to employ between six and ten outworkers to bag over one million key blanks a month, but has now automated the process and brought it in-house with the installation of an Autobag HS100 XL bagger with bowl feed, supplied by Automated Packaging Systems.

The company uses two sizes of pre-made bags on a reel, one perforated down the side, which replace the heavier self-seal bags previously filled by the outworkers.

The key blanks are automatically counted and bagged in quantities of five, ten or 100. Although the company still bags one million keys a month, the process now takes half the time and, as overprinting is carried out as part of the bagging process, there is an additional saving in eliminating the cost of labels.

There is also greater control as the operation is on site. Urgent requests can be met speedily with no need to move material to outworkers' houses.

Meanwhile, Comcount has recently supplied one of its Model BFW 650 counting and weighing systems to Daimler Chrysler in Stuttgart for

the RTC 80 MB. This works on the same principles as the 200, but is a monobloc design incorporating counting, filling and capping in one machine measuring 1400 x 1700mm, excluding the infeed and outfeed conveyors.

Two lower throughput models, the RTC 15 and 30, are also now available.

The RTC 15 single station standalone model, in semi or fully-automatic versions, gives speeds up to 15 bottles a minute and can be fitted with additional stations to increase output as

required. This model is described as ideal for small batch production, operator training and benchtop applications, such as in the laboratory.

It can also be employed to complement high throughput, in-line counters: for QC purposes it can be used off-line to verify count accuracy and for existing RTC 200 users it can improve productivity by allowing new formats to be optimised off-line.

The dual station RTC 30 has a throughput of 30 x 100-count bottles a minute.

The second principal innovation in tablet counting over recent years has been the Swiftpack SV2 Intellisense counter, which incorporates an electrostatic sensing system to assess tablet or capsule parameters such as size, shape

pared with conventional systems – which typically incorporate a dual array of scanners – and improve the capacity to detect broken tablets or capsules.

Bosspak explains that the method of collecting product from the hopper and feeding it into the container individually also makes the system particularly effective for handling products traditionally regarded as difficult, such as soft gelatine capsules and irregular-shaped tablets. Large products too – up to 22mm diameter – can also be readily handled.

The original 12 station RTC 200 offers an output of up to 200 x 100-count bottles a minute, but for mid-speed duties up to 80 x 100-count bottles a minute, Bosspak has now introduced





**Key count:** Davenport and Burgess has installed an Autobag system

packing spare parts for Mercedes Benz cars.

The machine was selected, says Comcount, because of its flexibility and accuracy derived from a combination of optical counting and weighing technologies on the same machine.

The optical counting mode is normally employed to produce packs of 1 to 25 pieces while larger packs up to 2kg are produced by weigh counting, so covering a wider range of applications than would otherwise be possible on conventional machines.

**Steady stream of product**

The BFW 650 machine is based on a vibratory bowl feeder, which supplies a steady stream of product that can either be pared down to a single file by the universal tooling suitable for the optical counting modes, or fed in bulk for the weigh counting modes.

There is also an option to use the optical count in the conventional manner and employ the weighing facility as an integral check-weigher. This means that the machine can be used to help ensure the quality of the product by detecting contamination or incomplete items where the weigh count does not match the optical count.

The machine for Mercedes also has an interchangeable quick release bowl with negative angle tooling, which can be fitted to the bowl feeder to enable flat products such as washers and seals to be handled accurately.

The BFW 650 machine was supplied in combination with an ABG Packmat automatic bag-maker equipped with a thermal transfer over-printer to produce a completely automatic weigh/counting, bagging and labelling system. This combination has already proved effective

in the German car industry, says Comcount, with two similar systems already installed at BMW.

In a further installation in Germany, hardware supplier KVT has just installed a complete counting and packing system from Swiss manufacturer Willi Maschinenbau, represented in the UK by WLT.

The company, which stocks 16,000 items and carries 4000 spare parts for tool makers, previously relied on manual weighing and counting, also hand packing rivets, nuts and bolts into cardboard boxes. Now it has a tabletop weigh-counter and a Willi W22 bag form-fill-seal machine, with specially modified software that allows the new system to create labels from an existing database.

Operation of the machinery is controlled via a barcode on the works documentation, which is scanned using a hand-operated device to tell the system the item number, quantities and so forth to be packed into each container. The operator places the parts onto the weigh-counting table by hand and the required quantity per pack is automatically determined using pre-stored weight data for each component.

An integrated conveyor then transfers the parts to the bagging machine, which then prints and loads Minigrp bags.

**Handling pipe fittings**

Still in the hardware sector, Gainsborough Engineering has recently installed fully automatic high speed counting lines at two major pipe fittings manufacturers. This has allowed both companies to reduce their costs by replacing pre-made bags with film on the reel, along with on-line printing instead of preprinted



**Car parts:** Comcount BFW 650 machine



**Count by weight:** The latest G227 unit from Avery Weigh-Tronix

labels. Both lines have also removed the need for any manual lifting, counting, bag sealing or labelling of product and bags.

The fittings range from 10mm metal flanges up to large elbow and multi jointed plastic connectors and are delivered to a storage hopper and then transferred by a vibratory cross conveyor which spreads them out to provide a semi-separated flow onto an inclined elevator. This feeds the multilane counter, from Counting Technology Systems, which supplies the bagger with counts from 5 to 100 items.

The preprinted film has a clear area to allow a unique identification code to be printed on the bags by thermal transfer, along with a barcode and assembly instructions.

The system is controlled from the PLC on the bagger via touch screen controls and, as a result of the large product memory available, it is possible to store all the parameters for each product or job to be run. This, says Gainsborough Engineering, is reflected in fast set up times.

Riley Automation's range of multi-station counting and bagging systems incorporate vibratory bowl feeders capable of feeding,



**Multi-station:** Triple counter and bagging line from Riley Automation

counting and dispensing a broad range of products. Fully modular, the systems can incorporate any number of counting modules with an accumulation conveyor, bagging machine, controller and integrated printer.

Each bowl feeder counting module comprises a bulk storage supply hopper which meters the product into a vibratory bowl feeder, through a counting ring into a collection area. On completion of the count, the product in the collection area is released into a drop pan and any over count is contained in the collection area to become part of the next count.

A counter controller provides a completed count signal to an auxiliary controller. When this second controller has received this 'count complete' signal from all active bowl feeders it initiates all the drop pans to open and discharge their contents into the pockets of the accumulation conveyor.

### Sorting small components

This accumulation conveyor then runs into a pre-programmed number of pockets and discharges the contents into the bagging machine. The conveyor then signals the bagging machine to seal the open bag and present another one.

Systems of this type are ideal for sorting millions of small, sharp-sided or difficult shaped components into a specific package.

The latest weighing and counting scale from Avery Weigh-Tronix, the G227, links to bar code readers, label printers, alpha-numeric keyboards and PCs to create a complete counting system. It is available in capacities of 5kg, 25kg and 50kg, accurate to 250,000 divisions, but can interface with two higher capacity platforms to cater for a wide product range.

Detailed records of 1000 products can be stored in its internal memory for instant recall or the scale can power a barcode reader for fast, error-free data entry. Soft function keys, which can be adapted to the needs of the application, and alphanumeric operator prompts, are said to ensure easy operation, even for infrequent users.

Labels can be produced with bar codes and in human readable format with part number, description, quantities, weight, date and time. The scale will also provide full totalising of weight, count and transactions for management control and information.

Finally, the Smart Count is the latest scale to be added to the Mettler-Toledo Viper series. It has memory for 1500 records, bar code reading and writing capabilities, a graphic display and programmable function keys. Three RS232 ports and a PS2 keyboard interface come as standard although the third RS232 interface can be exchanged for a second scale input. ■

### For further information:

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