

In-line approach means Raising the limit on tube filler performance

MOVING AWAY FROM THE RESTRICTIONS OF AN INDEXING TURNTABLE HAS SEEN TUBE FILLER SPEEDS INCREASE DRAMATICALLY FOR HIGH VOLUME PRODUCTS.

Now and again in the evolution of a category of packaging machine fresh thinking arrives to leapfrog the limitations of existing designs, creating a radically new approach.

So when German manufacturer IWKA launched the first of its TFS 80 range of tube-fillers at Interpack 1999, the fresh thinking was immediately apparent. Gone was the conventional turntable, with diameter and indexing speed limitations imposed by its mass, to be replaced by an orbital track which accepts empty tubes horizontally, raises them to vertical for filling and closing, and returns completed tubes to horizontal for cartoning.

In effect, this means an in-line layout which, as UK representative IWKA PacSystems points out, allows the new machines to be built on a cantilevered basis for ease of cleaning to GMP standards, and gives the operator clear access to all parts. Also, closing systems to handle plastic and aluminium tubes can be readily mounted side by side, for immediate changeover.

That original design, in which a single track indexed two tubes at a time for fill-

ing, has now been extended with the addition of twin track models, creating a range of TFS 80 machines that fill one, two, four or six tubes on each cycle to give speeds of 100-500 a minute.

The orbital track, in single or duplex versions, carries quick-release, magnetically secured holders for the tubes, which are fed in horizontally and rotated to bring print into register. Following

this, there is a tube-cleaning station employing a vacuum suck-blow system.

As the track passes round the end of the loop, the tube holders are carried diagonally through 90deg to upright, presenting the tubes ready for filling.

Servo drives are employed for the dosing system, providing programmable changeover in the volume range 2-350ml, and to elevate the tube holders up to the filling nozzles, one, two, four or six at a time depending on the model. Servo drive also allows on-the-run adjustment from the con-

length tubes. Below the filling and sealing stations, the machine surface is inclined for ease of cleaning.

Filled and sealed tubes then pass along the track, down the other diagonal, and in the case of single lane machines are discharged horizontally for cartoning via drop gates directly into the cartoner's product buckets. No chutes or conveyors are required, eliminating size dependent adjustments and providing gentle transfer.

On twin lane machines – the TFS80-4 and TFS 80-6 – the tubes are picked from their hold-



Twin track: IWKA TFS 80-6 tube filler showing robot loading and unloading of the containers

trol panel should humidity, temperature, viscosity or other variables cause changes in product flow.

The dosing system, together with a hot air sealing station for plastic or laminate tubes and/or folding tools for aluminium tubes, is supported on an upper frame, which is simply raised or lowered via handwheel to cater for different

ers and placed automatically in the infeed buckets of the cartoner. This pick-and-place arrangement prevents risk of scuffing and ensures that the tubes lie in the correct orientation for the side-load cartoner.

Servo drives are used throughout the TFS 80 range to provide electronic adjustment via the touchscreen control panel for size changeover of

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most machine functions via the PC control system within 15 minutes.

This consistent use of servo drives makes virtually all cams in conventional tube fillers obsolete, points out IWKA PacSystems. "Product dependent cam adjustments such as stroke settings, timing adjustments or even filling cam settings now lie in the past, since movement characteristics can be set and adjusted by programming the servo motors. Movement profiles can now be optimised, which could not previously be achieved by cams."

IWKA launched its high speed TFS 80-6 machine at Interpack 2002 and has since installed 30 lines world-wide. Two of these are in the UK, one of them at GlaxoSmithKline, Maidenhead, where the machine is equipped with IWKA's dosing system for monopaste and deep stripe toothpastes.

This uses a total of six dosing pumps which have a total of 18 servo drives to allow each tube to be dosed with two additional colours or active ingredients, co-extruded into the tube with the main paste.

The latest IWKA machine to be launched is the TFS 80-1 tube filler, shown for the first time at Interpack 2005. Capable of 100 tubes a minute and based on the same operating principles as its larger stablemates, the TFS 80-1 is similarly servo driven.

This servo drive allows the TFS 80-1 to be programmable for settings such as transport speed, diving nozzle movement and closure dwell time, which means that optimum settings established during R&D or short runs can be employed immediately when production is scaled up to much higher speed TFS 80 models.

IWKA also builds a range of traditional rotary tube fillers giving speeds from 40 tubes a minute upwards. These include the entry level TFS 10, said to cost 40 per cent less than comparable machinery as a result of extensive value engineering, the use of parts common to other IWKA machines, and production in much larger batches than usual.

Norden's high speed tube filling machine is the NM 5002S-HA capable of running 1-200ml tubes at speeds up to 500 a minute. The machine



Top of range: Norden's high speed tube filling machine is the NM 5002S-HA capable of speeds up to 500 a minute

operates in single lane, with five filling heads, and can handle plastic and laminate tubes which are loaded from trays into the transport system by two robots synchronised with each other.

Several functions in the tube filler are servo driven including the main drive, the tube transport system, the filling pumps and the tube lift, while two or three colour co-extrusion filling is possible. Filled tubes are transferred from the pockets of the transport system into the infeed of the Norden 5002S cartoner by a servo driven pick-and-place unit that lifts five tubes at a time.

At the other end of the scale, Norden builds machinery for speeds down to 25 tubes a minute. Indeed, the company recently introduced the 80-a-minute Nordenmatic 702 tube filler and has sold the first in the UK to Universal Products, Preston, equipped to produce Design-a-Seal shaped tube seals. The machine will help Universal raise its production to 20 million tubes per annum and is fitted with Norden's Store Magazine, increasing the tube infeed capacity and overall efficiency of the line.

Reduced changeover time

Meanwhile, Romaco's Unipac division has introduced equipment to reduce tube filler changeover time, using a triple set of dosing contact parts which, it is claimed, can save up to 700 hours production time a year by eliminating downtime for cleaning.

The three sets of contact parts are mounted on a rotating turret, so that while one set is in use, a second set is available for immediate use when the current dosing hopper is empty or when a changeover is required, and a third set is under preparation. This allows continuous production

to be achieved, with the prepared dosing set ready to swing into place the instant it is required.

The potential financial benefits of this new system are significant, says Romaco. "Based on an output of 70 tubes a minute and two changeovers a day, the estimated production time saved annually is 700 hours, equivalent to the time required to produce at least 2,500,000 additional tubes."

This system is available as an option on Romaco's new Unipac U20100 tube filler – a 12 station turntable machine capable of 100 tubes a minute – which is to be launched during February at the Ipac-ima exhibition in Milan.

The machine incorporates all the key features of its predecessor, the U2080, combined with the latest servo drives to control the dosing pistons and diving injectors.

This is said to offer several advantages. Ease of operation is improved since the appropriate filling profile for the product can be set up and controlled completely via the touchscreen panel, while feedback from a downstream checkweigher allows automatic adjustment of the fill volumes.

Servo control also means that the filling profile can be optimised to suit the flow properties of the product, with parameters including speed, acceleration, deceleration and diving depth of the feeding nozzles all variable. This, points out Romaco, improves fill characteristics and, in the case of high-viscosity products, eliminates entrainment of air.

Adelphi Manufacturing now offers a wide range of equipment for filling and sealing tubes, from bench-top, hand-operated machines through to automatic systems.



Handling thick paste: Adapted TGM machine

For laboratory or small-scale production, aluminium, plastic and laminate tubes can be filled on the Adelphi Centrac hand-operated filler or the Adelphi Response semi-automatic filling machine. Separate bench-top tube-sealing machines are also available from the company, allowing users to employ the filling machines on other types of container.

Italian built range

For integrated tube filling and sealing, Adelphi offers the Italian built TGM range which includes a machine developed last year for speeds up to 300 tubes a minute. At the opposite end of the spectrum, TGM also last year introduced its new E150 semi-automatic machine for customers with modest output requirements – up to 25 a minute – and a limited budget.

The E150 is available equipped for metal closing or sealing with hot air which, says Adelphi, reflects an increasing trend for users to choose hot-air sealing for plastic and laminate tubes rather than hot-jaw sealing because of the higher seal quality achieved.

TGM's standard range of machines includes models for filling three-colour products while specially adapted versions have been supplied to cope with the most demanding applications, including filling thick DIY pastes.

Italian manufacturer CO.MA.DI.S, part of the IMA group, builds tube filling and closing machines to pack cosmetics, pharmaceuticals, chemicals and food into aluminium, polyethylene or laminate tubes at speeds of 17 to 250 a minute and has just introduced a new medium range model, the C1090, capable of 90 a tubes a minute.

The machine closes aluminium tubes via normal, double and saddle fold while plastic, laminate and polyfoil tubes are sealed by hot air. IMA says that size change has been simplified and can be carried out without tools, while there is also a colour touch screen control monitor.

Tube feeding is from outside the base frame of the machine and there is clear access from all four sides to the drives and other parts below the machine table. A new dosing pump is also used, designed for quick disassembly without tools.

Finally, Excel Packaging Machinery, which represents Italian manufacturer Axomatic in the UK, has recently added two new machines to its range. Aimed at contract packers, the Axomatic Optima 700 is a semi automatic filler for handling metal, plastic, laminate and polyfoil tubes at speeds up to 20 a minute and, says Excel, has limited need for change parts.

The Axomatic Optima 800R is an entry level automatic tube filler giving speeds up to 40 a minute. Available to handle plastic and laminate tubes with either hot jaw or hot air sealing, as well as metal tubes, the machine has an automatic magazine feeding system or can be fed by means of an inclined chute. Print registration is also available.

Further machines in the Axomatic Optima range include models capable of speeds up to 260 tubes a minute. ■

For further information:

Adelphi Manufacturing
T: 01444 472300
E: sales@adelphi.uk.com

Excel Packaging Machinery
T: 01865 400489
E: info@excel-packagingmachinery.com

IMA UK
T: 01189 772323
E: hotdesk@imauk.co.uk

IWKA PacSystems
T: 0870 011 3794
E: info@iwkapacsystems.co.uk

Norden (UK)
T: 01462 895245
E: enquiries@norden.co.uk

Romaco
T: 01480 435050
E: uk@romaco.com

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