

# 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.

**F**or decades tube filler design never changed. The indexing turntable, with its limitations on speed, was the basis of every design.

Then, at Interpack 1999 came fresh thinking from German manufacturer IWK-VPT – part of the Oystar group – in the form of the TFS 80 range of tube-fillers that leapfrogged the shortcomings of the turntable machine to create a radically new approach.

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 IWK Pac-Systems 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 filling, 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 100-510 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,

ported on an upper frame, which is simply raised or lowered via handwheel to cater for different 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.



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

four or six at a time depending on the model. Servo drive also allows on-the-run adjustment from the control 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 sup-

ported on twin lane machines – the TFS 80-4 and TFS 80-6 – the tubes are picked from their holders 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

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range to provide electronic adjustment via the touchscreen control panel for size changeover of 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 Derek Moore at IWK 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."

### High speed machine

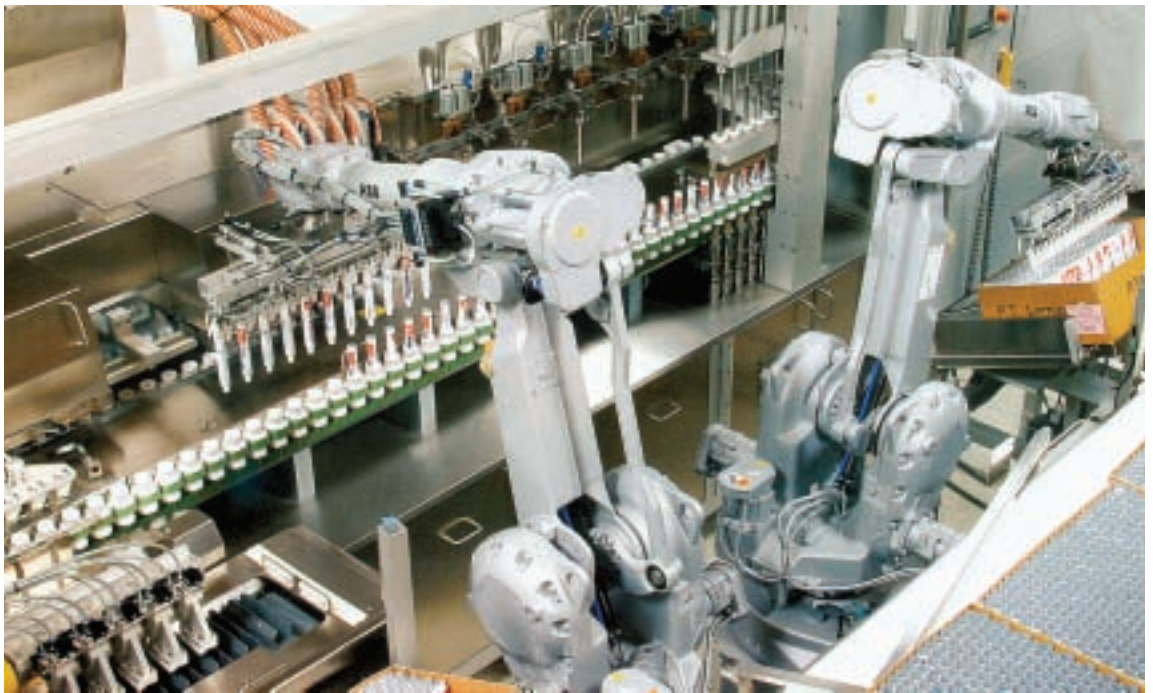
Oystar-IWK launched its high speed TFS 80-6 machine at Interpack 2002 and has since installed many lines world-wide. Capable of speeds up to 510 tubes a minute the machine is equipped with a total of six dosing pumps which have a total of 18 servo drives to allow each tube to be dosed with two additional colours or active ingredients, co-extruded into the tube with the main paste. This involves no reduction in speed.

The latest Oystar-IWK machine to be launched is the TFS 80-1 tube filler. 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.

Oystar-IWK also builds a range of traditional rotary tube fillers giving speeds from 40 to 200 tubes a minute upwards.

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 operates in single lane, with five filling heads, and can handle plastic and laminate tubes which are loaded from trays into the



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



**In-line approach:** The Millennium 120 from Tonazzi features a readily removable dosing unit

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's most recent machine is the 80-a-minute Nordenmatic 702 tube filler. Like other machines in the Norden range this can be equipped to produce Design-a-Seal shaped tube seals and with Norden's Store Magazine, increasing the tube infeed capacity and overall efficiency of the line.

Meanwhile, TMG Marchesini has announced the Millennium 120 tube-filling machine from Tonazzi, a single channel unit which abandons the traditional turntable in favour of a more linear approach using tube holders on a conveyor.

In particular, the machine's entire dosing



**Semi-automatic:** CO.MA.DI.S C630 model

unit can be removed in a single movement, making size and product changeovers much faster, while closing heads for plastic or aluminium tubes, including a hot air system, are kept in place on the machine as a further aid to reduced changeover times. Speed is up to 120 tubes a minute.

Adelphi Manufacturing represents TGM of Italy for automatic tube fillers but manufacture its own range of hand and semi-automatic machines that will handle both plastic/laminate and aluminium tubes.

### Small scale production

For small scale or laboratory production the Centrac hand operated or Response semi-automatic machines fill the tubes with liquids, gels or creams. Filled tubes are then transferred to either a bench top Vesta single or multi head tube sealing, cutting and coding unit or the bench top metal tube double fold and coding machine. The equipment is simple, cost effective and gives a professional finish, says Adelphi

TGM offers a range of machines to fill metal, plastic or laminate tubes at speeds from 1500 to 24,000 an hour, able to fill three full depth colours into one tube and handle products from liquids to the heavy pastes used in the building trade. A range of TGM horizontal cartoners integrates with the tube fillers, complete with leaflet insertion and embossed coding.

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 up to 250 a minute.

Among its latest machines is a medium range model, the C1090, capable of speeds up to 90 a minute for pharmaceuticals, cosmetics, food and chemical products. The machine can be equipped with a new type of ergonomic tube feeder – capacity up to 2000 tubes – and features a dosing pump that can be removed without tools. Hot air sealing is available for polyethylene, laminate or polyfoil tubes and the aluminium tube sealing unit is available in standard, double or saddle fold versions.

For semi-automatic operation at smaller cosmetics manufacturers and R&D work the CO.MA.DI.S. C630 is capable of 30 tubes a minute. Empty tubes are fed and orientated by hand with dosing, sealing and/or closing, coding and ejection of the filled tubes carried out automatically. The machine is compact and can be relocated on castors.

Finally, Excel Packaging Machinery, which represents Italian manufacturer Axomatic in the UK, has recently added a new budget priced modular eight-station machine to its range. The Axomatic Optima 780 is a semi automatic filler for handling metal, plastic, laminate and polyfoil tubes at speeds up to 20 a minute although it can be upgraded at a later stage into a fully automatic machine, with automatic tube loading and print registration, capable of handling 36 tubes a minute. ■

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