

A detailed close-up photograph of pharmaceutical packaging machinery, showing various metal components, springs, and rollers. The background is dark, highlighting the metallic parts.

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NEWS

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Filling Equipment

Stepping Up Filling Efficiency

Filling systems benefit from precise controls and setup repeatability.

By David Vaczek
Senior Editor

Vendors are advancing new solutions for solid tablet filling that boost output with no sacrifice to efficiency, all in more compact linear foot prints.

Deployed in the service of tablet bottling and liquid fills in microvials, servos are used to enhance machine speeds besides ensuring process precision.

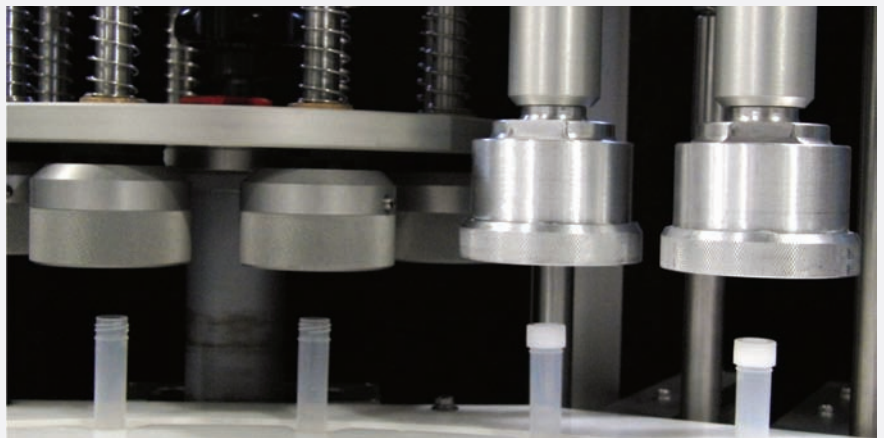
Tablet filling technology meets a spectrum of needs.

For every customer there is a different combination of tablet filling solutions that may be required.

“Many shorter runs of prescription drugs will use an electronic channel counting system for its changeover flexibility. You gain back the (higher) cost over time as there are no product specific parts that have to be switched out,” says Stewart Harvey, general manager, Nova Packaging Systems, Inc., (Leominster, PA), a division of IMA Safe.

“The slat counter is an ideal solution when you have longer runs with fewer changeovers. Many OTC products are packaged using slat counters,” Harvey adds.

Nova/IMA debuted its Uniline bottle filling line for the first time in North America at PackExpo. The mono-block system combines machines for tablet counting, filling, and capping, with options for desic-



A zero-play turret working with a unique infeed system promotes filling and capping precision in the Monoblock Filler/Capper for Micro-Tubes and Micro-Vials from ESS Technologies.

cant insertion and coding. The unit reaches a rate of 120 bottles per minute for a 100 count bottle.

Uniline features a container transport system that eliminates the need for bottle-specific change parts and manual adjustments for handling different size bottles. Bottles are held and positively controlled between two flights in the servo-adjusted, recipe-configured system.

“Uniline is a highly flexible system made for very quick change over between batches. It’s considerably simpler than a traditional bottling line in a compact foot print of under 14 feet,” says Harvey.

“The only change parts are related to cap size. We adjust for bottle dimensions with a push of a button,”

Harvey adds.

The line is managed by master shift register control with all bottles considered as rejects unless positively extracted from the system ensuring only good bottles continue down the line.

Nova’s Swiftpack electronic counters, Conta vision based counters, or its slat counters can be incorporated.

SPEEDING CHANGEOVER

Nova addressed the change over hurdles inherent in slat counters with the recently unveiled SL39 slat counter. The unit offers an interchangeable filling head, or cartridge, that houses the tablet-dedicated slats and related parts.

“Typically up to 72 slats have to be changed out for running a new product.”

(The cartridge system) drastically reduces change over time as both cleaning and the loading and removal of the slats is performed off line,” Harvey says.

Faster changeover is also supported by a new balcony style design for easy for cleaning.

The SL39 achieves speeds of up to 400 bottles per minute. Mechanical counting is supplemented by Nova’s TruCount 100% count verification system for electronically confirming the count after the tablets are discharged from the slat cavities and before they fall into the bottle. The sensor’s field is flexibly divided into zones corresponding to the number of slat cavity divisions set up for filling.

“This ensures that we can maximize the configuration of the machine with any number of zones,” Harvey says.

IMA/Nova doubled throughput in a small foot print electronic tablet counter with the Swiftpack SwiftPharm unit rolled out last year. The machine supports speeds reaching over 100 bottles per minute on a 100 count fill for a single machine system and over 200 bottles per minute for a dual machine system.

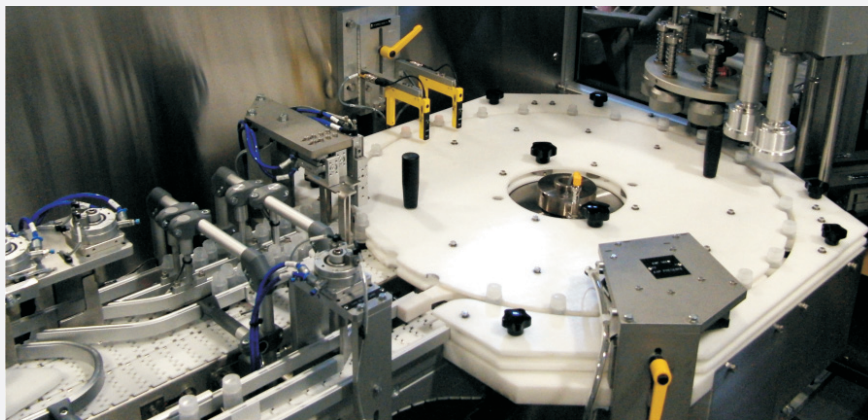
A stepper-motor-driven rotary pre-count gate replaces an air-driven system, for closing the gates after bottle filling and managing product accumulation before the next bottle is indexed. The precise control supports throughput by allowing the vibrators to run for the maximum amount of time possible, Harvey says.

Also enhanced is the linear vibratory feeding. Vibrators are the same width as the trays for better vibrating distribution. “Instead of a 12-track-wide tray with one vibrator, we have four sets of three-track trays with a vibrator under each. With the same number of tracks on the table, we can deliver twice the throughput as on the older systems,” Harvey says.

Servo control on all machine motions supports high output in the Cremer CF-425 linear tablet counter from NJM/CLI Packaging Systems Int’l.

VIBE CONTROL

A modular design that accommo-



Servo controlled diving nozzles and pre-torque/torque stations on the ESS Technologies, Inc. Monoblock Filler/Capper support filling up to 120 bottles per minute.

dates up to ten counting heads further advances the machine’s efficiency. Customers can add modules depending on their required line output, says Mark LaRoche, vice president, sales, NJM/CLI.

“Rather than buying one counter for filling 50 bottles a minute and another for 100 a minute, the user adds the counting head modules to a standard frame,” says LaRoche.

The CF-425, manufactured by Cremer (Lisse, Netherlands) supports throughput of up to 300 bottles per minute depending on product shape, size, and count, in a foot print 40 percent less than previous models.

Servos replace magnetic vibrators, pneumatic systems, and the feed screw bottle transport system.

The servo-driven vibrators support higher channel speeds and consistent product flow.

“In earlier models, for filling 200 bottles per minute, we would use 4×12 counting channels and that would require up to 22 feet of line space,” LaRoche says.

“Now we can use six counting heads (to achieve that fill rate), with six counting channels per bottle, in under 13 feet of line space,” he says.

The unit enables easier setup for achieving top performance.

“Electromechanical vibrators on the market today are subject to a lot of variability because they are magnetic. As they heat up, the vibration changes. So you get variances from the settings, and the performance is off when the settings are recalled,” says La Roche.

“This creates a lot of confusion among operators. Often a senior operator is

called in to get the machine running to its optimal performance,” he says.

“The current electronic counting technology on the market requires a lot of variable settings. Our older models required 38 different parameters for set up,” he says.

The CF-425 needs just six parameter settings. “Our approach to the design of the CF-425 was to make sure that the machine is resettable and repeatable, so that any operator could consistently achieve optimum speeds. We are able to achieve this by eliminating variability in the feeding and by replacing electro mechanical vibrators with a (servo-controlled) camshaft-based mechanical vibrator that is 100% repeatable. We can stop on a dime and recall the exact settings.”

For a planned release next year, Cremer is upgrading the CF-425 to a new Model CF-622. The unit will occupy 13 feet, five feet less than the CF-425, and feature six counting channels per bottle.

POSITIVE HANDLING

A new high-speed filling and capping machine from ESS Technologies, Inc. (Blacksburg, VA) emphasizes precision in the filling and capping of micro-containers.

The Monoblock Filler/Capper for Micro-Tubes and Micro-Vials features a unique infeed system, and a zero-play turret for controlling vials through filling, capping, and torquing.

Featuring optional servo control at the filling and capping stations, the unit was designed by ESS in response to requests from several clients for a high-performance micro-container

filling system, says Walter Langosch, director of sales and marketing.

“Control of the container in micro-vial filling is of the up most importance regardless of what you are filling. Precise feeding, filling, and cap placement is a key consideration when working with container diameters this small. (The Monoblock Filler/Capper) is designed as a precision container handling system that improves efficiency, while reducing waste and rework,” Langosch says.

The intermittent motion unit indexes up to 60 vials per minute. Typical applications include lab testing environments with containers of 7 mm to 10 mm diameter, and typical fills of 0.2 ml to 1.2 ml.

The infeed design eliminates the need for a standard container in feed using a conveyor or feed screw.

After orientation in a bowl feeder, vials are fed directly through a tube into a precision-driven turret. The

zero-backlash turret secures the vials for downstream processing. The infeed system supports faster change over and reduces floor space requirements.

Optional servo controls at the filling station include drives for the pumps and for diving nozzles.

In an ESS-designed servo-driven capping station, bowl-fed and oriented caps are fed to a capping turret. “The system provides very precise control of the caps with close tolerances that allow us to place the caps on the vial with extreme accuracy, so cocked or skewed cap placement is minimized,” Langosch says.

Caps receive a quarter or half turn for securing to the vial.

Electronic sensors on the Monoblock unit verify that a vial has been filled, and check for missing caps, tagging product for downstream



The ESS Technologies Monoblock with intrinsically safe controls is ideal for filling flammable liquids.

ejection.

Optional servo-controlled torquing provides more consistency and accuracy for closing plastic caps and vials with slight tolerance variations.

“Torque becomes critical in some lab environments where technicians want to have one-hand-vial-opening. The torquing stops when it reaches a certain level of resistance,” he says.

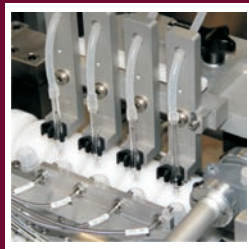
Torque values are tracked and recorded with immediate torque feed back on each container. Skewed caps with torque values outside parameters can be identified and rejected. ■

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Model MB 120 Monoblock Filler/Capper



Infeeds designed for exceptional handling of vials, bottles, micro-tubes, etc.



Servo-driven filling nozzles provide accuracy to $\pm 0.5\%$ of fill volume for precise filling.



Automatic feeding and placement of plugs, wipers, etc.



Servo pre-torque and final torque capping stations allow precise torque to be applied.



- Compact Monoblock Features Balcony Design
- Very Small Footprint
- Speeds Up to 120 Bottles Per Minute
- Quick, Tool-free Changeover
- Liquid or Powder Filling
- Intrinsically Safe Controls Available



Handles a wide variety of pharmaceutical and cosmetic container and closure types.

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