

# PACK EXPO International 2002 Proves Worth the Trip

Hallie Forcinio

**The largest US packaging trade show widened the spotlight in 2002 to accommodate thousands of exhibitors and their innovations.**

**A**mong the 2007 exhibits spread out across 1.3 million ft<sup>2</sup> at McCormick Place in Chicago, Illinois, during PACK EXPO International 2002, exhibitors and vendors showcased numerous advancements for pharmaceutical packagers. The integration trend of the last several years continues, and more mechanical examples than ever crowded the show floor, ranging from pairs of machines to entire packaging lines.

One preintegrated turn-key filling line relies on a mix-and-match list of equipment, including a choice of five electronic slat fillers. Targeted at lower-volume applications such as contract packaging, nutritional supplements, and clinical trials, output may be specified at 50, 80, 100, or 120 bottles/min. Because the line is pre-engineered, delivery can be made in 8–12 weeks (Valu Line, DT Packaging Systems, Leominster, MA).

If desired, equipment can be delivered with validation documentation.

An integrated line designed for tube filling includes a robotic unloader, a filler–sealer, a cartoner, and a case packer (TZ unloader, IWK TFS 80-2 filler–sealer, and SC 4 cartoner, IWKA Pac-Systems Inc., Fairfield, NJ; Pester case packer, Pester USA, Allendale, NJ). The computer-controlled line is rated at 160 tubes/min.

A monoblock vial filler integrated with a laser coder demonstrated vial filling, plugging, capping, and marking (monoblock vial filler, plunger, capper, Cap Coder, Ltd., Oxford, England; All-print Smart 25 laser coder, Lasertechnics, Inc., Albuquerque, NM). The vector-writing laser coder offers a marking field of  $\leq 75$  lines of text and reproduces characters, graphics, and machine-readable codes in various sizes at speeds  $\leq 1250$  characters/s. Because the laser permanently marks the surface, vial markings are difficult to remove or change. Laser coding also eliminates expenses related to ink or ribbon consumables used by other marking systems.

A flow wrapper–robotic cartoner integration loads  $\leq 200$  cartons/min and includes a carton

former as well as a closer for a completely automated system. The system also can be integrated with a checkweigher to confirm cartons have been loaded properly (Pack 200 wrapper, Klöckner Tevopharm USA, Richmond, VA; LJ Series robotic top loader, Bradman-Lake, Inc., Charlotte, NC). The pick-and-place carton-loading function on many lines traditionally has been performed manually.

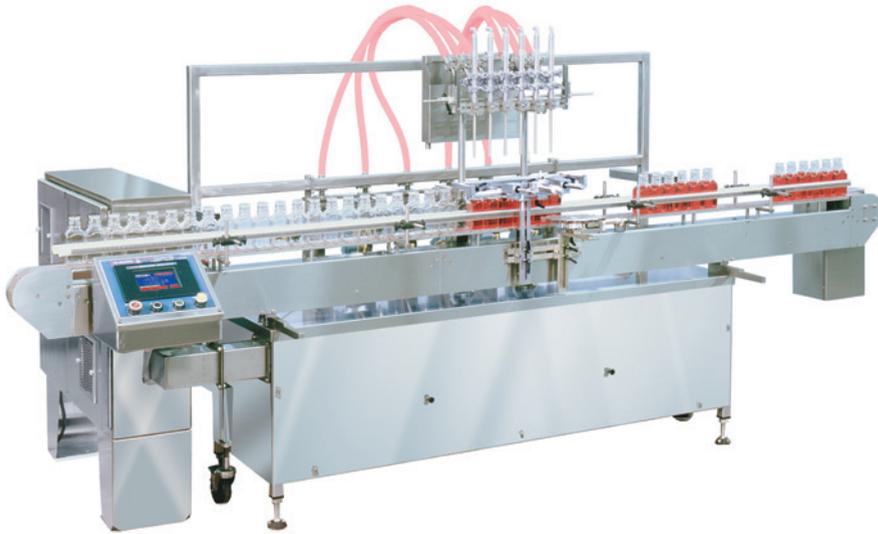
Automating the end of the line is a robotic palletizer–stretch wrapper combination. It not only accommodates multiple product types and sizes, but also can be programmed to manage various stacking patterns. Three standard robot models are rated for payload ranges  $\leq 880$  lb, while the stretch wrapper offers a 5000-lb load capacity. A film-saving powered prestretch feature can elongate film  $\leq 245\%$ , increasing yield and reducing material costs (Mini-System palletizer–stretch wrapper, Brenton Engineering Co., Alexandria, MN; Orion Packaging Systems, Inc., Collierville, TN).

A number of companies are developing software designed to simplify integrating equipment such as label printer–applicators, continuous and digital inkjet printers, and thermal-transfer overprinters with other machines and packaging-line systems. Operating hardware typically requires Ethernet connections to link the machines to networks and other equipment (iQ Applied Software, Willett America, Inc., Grapevine, TX).

## Blending

For challenging blending applications, a digital system makes product preparation and packaging seamless by combining fluid ingredients on demand in real time with a series of pre-engineered dosing modules, each equipped with a digital pump and mass meter. A short 3–5 s on/1-s off blending cycle helps maintain a high degree of precision and delivers a continuous, consistently blended stream with an accuracy of 0.15–0.25%. Compared to traditional proportional-integrating-derivative blending, the digital pump–mass meter system offers greater compounding flexibility, faster product turnarounds, shorter practical run capabilities, superior prod-

**Hallie Forcinio**  
is *Pharmaceutical Technology's* Packaging Forum editor, 4708 Morningside Drive, Cleveland, OH 44109, tel. 216.351.5824, fax 216.351.5684, (editorhal@cs.com).



**The Filamatic Digifil offers 5-min, no-tool filler changeover, made possible by swapping the quick-disconnect, dockable trolley that holds fluid contact parts and the metering system.**

uct quality and consistency, faster cleaning, reduced waste, and consistent blending, despite fluctuations in demand from the filler or changes in ambient conditions. Each system includes a choice of software programs and statistical process-control packages as well as validation measurement methods governed by a programmable logic controller (PLC) and PC-based operator interface with a color touch screen (mass/blend continuous stream liquid blending system, Oden Corp., Tonawanda, NY).

### Filling

A 5-min, no-tool filler changeover is possible with a dockable trolley system containing all fluid contact parts and metering systems. A product change is accomplished simply by disconnecting the system and replacing it with a second trolley. As the new run begins, the first trolley system can be rolled away to be connected to a cleaning unit and cleaned in place in preparation for the next changeover. A wide range of machine configurations are available, including three frame sizes—four-, eight- and 12-head—and various metering sizes and systems, including piston, lobe, gear, peristaltic, ceramic piston, flow meter, and time pressure (Filamatic Digifil in-line filling

systems, National Instrument Co. Inc., Baltimore, MD).

Another modular design that mounts the filling pump on wheels for quick changeover requires no tools or mechanical alignments to swap systems. PLC synchronizes pump, filler, and container handling operations and stores setup parameters for future reference. A servo-driven filler manages a wide range of products with varying degrees of viscosity, temperatures  $\leq 130$  °F, and pH levels ranging from 2 to 13. A filler processes containers 5 mL–5 L at speeds  $\leq 150$ /min. Pump options include piston, gear, or peristaltic (FLX 1200, NJM/CLI Packaging Systems International, Lebanon, NH).

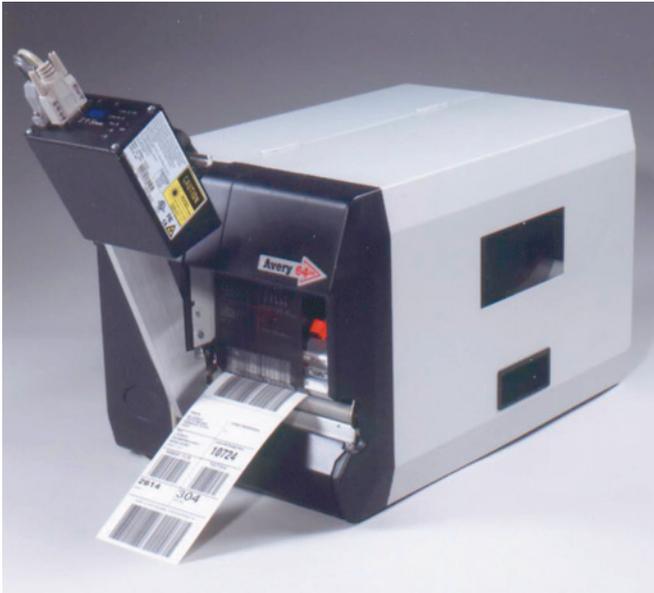
Engineers on both sides of the Atlantic have collaborated to create a parenteral liquid filler with the first “world-product design.” Manufacturing occurs in a two-stage process: base units are produced in Europe and shipped to the company operation nearest the customer, then the system is completed to customer specifications with the appropriate controls, infeed–outfeed configuration, pumping systems, and change parts. The goals of the collaboration are to accelerate delivery, shorten the time for change orders or modifications, and increase the convenience of factory and on-site acceptance testing for the customer. The machine also incorporates customers’ most-wanted features, including a small footprint, speed, easily changed vial sizes, better checkweigh capability, balcony design, improved airflow to reduce the risk of contamination, and simplified machine validation. An

intelligent time–pressure system fills vials from 0.25 to 500 mL with programmable bottom-up filling. An in-process checkweigh system checks a full nozzle set of vials that are picked up while in motion. Vials are weighed before and after filling on the same scale, improving accuracy and reducing handling instances to just one. The unit may be specified with a barrier–isolator or as a stand-alone unit for cleanroom installation (FLM 4080, Bosch Packaging Technology, Minneapolis, MN).

Another machine designed for cleanroom or isolator use is a compact, 60 vials/min monoblock capable of filling liquids or powders and applying stoppers or caps. The unit features PLC; a sanitary, wipe-down design; no-tool changeover; and bottom-up fill capability. A positive displacement system is standard, but other filling systems can be specified, and more than one can be installed to increase the machine’s flexibility. A missing-vial detector confirms vial presence before product is dispensed (Mini Monoblock, Cozzoli Machine Co., Plainfield, NJ).

Yet another monoblock eliminates belts and starwheel container transport with a “comb” system designed to minimize particulate generation. The flexible in-line machine can process glass or plastic bottles and vials  $< 120$  pieces/min as well as various styles of droppers, rubber stoppers, and screw-cap or aluminum-crimp closures. An optional checkweighing system can provide 100% inspection of the filled containers (M53 in-line intermittent motion filling and capping monoblock, MAR USA Inc., Fairfield, NJ).

An aseptic blow–fill–seal machine produces 15 multidose low-density polyethylene containers/cycle for an output of  $\sim 700$ /min. The unit blows containers, aseptically fills an ophthalmic solution, and hermetically seals the containers while simultaneously forming threads and a KME closure. The machine can accommodate 5-, 10-, or 15-mL container volumes. An integrated punch tool performs deflashing and separates the 15 containers from each other, which simplifies subsequent production steps such as capping, labeling, and packaging (Model 321M Bottlepack aseptic machine, rommeLag USA Inc., Edison, NJ). An electronic system documents equipment, operation,



**The on-line verifier from Avery Dennison enables 100% inspection of labels to ensure correct and consistently readable codes.**

spare parts, and maintenance, including error analysis and other functions. This information can be displayed on the color screen of the operator interface, stored in memory, and printed (Rovis Electronic Documentation System, rommeLag).

For solid dosage forms, a dual-lane slat counter delivers speeds in excess of 200 bottles/min. Servo-driven feed screws adjust easily via position gauges and a slide plate to change filling between front and back conveyors, while a power lift feature quickly makes a height adjustment for a different sized container. A bottle diverter ensures an even flow of containers to both conveyors, and electronic sensors provide smooth handling. An integral hopper and removable parts simplify cleaning and reduce changeover time (72-42 DL Pro-count slat counter, Integrated Packaging Systems, Inc., Parsippany, NJ).

A new digitally controlled slat washer offers a cleaning cycle of <1 h and consumes a minimum amount of detergent. The unit, equipped with a turntable, can be loaded with  $\leq 72$  42-in. slats or  $\leq 144$  15- or 19-in. slats and is fully programmable, enabling rinse- and dry-time modification. A circular, sliding access door conserves space. Spray jets rinse the inside of the tank after each cycle to eliminate any chance of cross contamination (CE-3000 slat washer, Integrated Packaging Systems, Inc.).

Machines targeted to lower volume applications were abundant. A tube filler designed especially for contract packagers

and short product runs automatically fills metal, plastic, or laminate tubes with viscous or semiviscous product at speeds  $\leq 60$ /min (TFS 10 tube filler, IWKA PacSystems).

### Capping

A high-speed capper capable of applying threaded closures at a rate of  $\leq 800$ /min can process containers ranging from 30 mL to 5 L. Color-coded click-in-place change parts reduce changeover time to <30 min and require minimal use of tools. The equipment features a raised-bed sanitary stainless steel conveyor that meets GMP standards and can be delivered with full validation documentation (RotaCap, NJM/CLI Packaging Systems).

### Blister packaging

A compact blister packaging machine measures 57 in. wide  $\times$  33 in. deep  $\times$  68 in. high, making it ideal for short runs and clinical trials. The flexible machine can form webs of poly(vinyl chloride) (PVC), poly(vinylidene chloride)-coated PVC, polypropylene (PP), cyclo olefin copolymer, polystyrene, and aluminum foil and lidding constructions incorporating foil, paper, PP, and polyester. The balcony design separates mechanical and electronic components from the packaging area and is easily integrated with a cartoner. Output is rated <150 blisters/min (blister packaging machine, Blipack S.A., Buenos Aires, Argentina).

### Quality control

Several companies showed on-line, non-destructive package integrity testers that permit 100% inspection. One system detects both small and gross leaks in a fully automatic test cycle, which consists of package loading, closing, and sealing of the test chamber; vacuum application; test process monitoring; unloading the test chamber; and rejection of defective packages. The machine controls permit manual or automatic operation, sensor calibration, graphical operator interface, data acquisition, and real-time report generation to monitor packaging line productivity (on-line package leak detection system, Precision Automation Co., Inc., Cherry Hill, NJ).

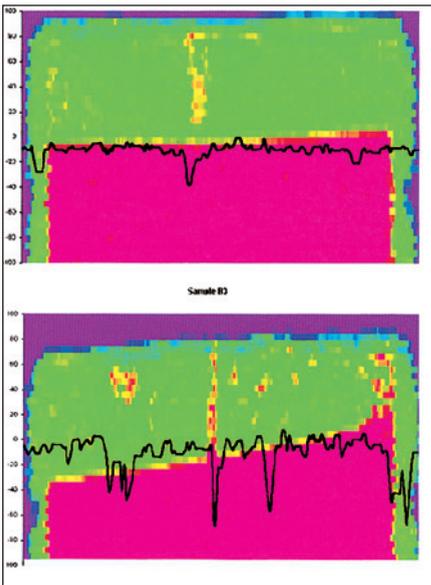
Seal integrity can be examined using ultrasound by transmitting a narrow beam of an airborne ultrasonic signal through the seal. Used on- or off-line to identify both visible and invisible flaws, the system defines the exact location and type of defect. This system can replace visual and destructive test methods such as water bath or burst tests (Model 525 ABUS non-destructive inspection system, Packaging Technologies & Inspection LLC, Tuckahoe, NY).

**Several companies showed on-line, nondestructive package integrity testers that permit 100% inspection.**

X-ray inspection can locate contaminants, detect missing or broken items, and identify incorrectly filled packages. A new X-ray inspection system offers upgraded inspection features, including the ability to examine multiple package zones with different densities. The system is priced about 40% lower than predecessor and competitive units on the market. More rapid inspection speeds permit products to be checked at a rate of <600/min. The easily operated unit relies on electricity as its X-ray source, features a help button on



The DVT Corp. Legend 540 compact vision sensor combines camera and microprocessor functions in a single unit.



The model 525 ABUS seal integrity tester from PTI reads sound waves that pass through the seal, then graphically depicts the seal's condition.

every screen, and offers an operator interface in five languages. An optional modem connection permits remote diagnostics and expedites troubleshooting. Because this X-ray system measures mass and has sufficient computing power to multitask, it's possible for a single machine to perform checkweighing and metal-detecting tasks while checking for missing and broken product. As a result, one

X-ray inspection system can do the work of three or more different quality control devices (Axis X<sup>3</sup> X-ray inspector, Loma Systems, Carol Stream, IL).

An industrial barcode reader also can perform optical character recognition and optical character verification tasks at a rate of  $\leq 200$  codes/s to confirm label accuracy. Built-in Ethernet communications allow integration with existing networks and seamless data transfer (Intelligent Scanner, DVT Corp., Norcross, GA).

Bridging the gap between machine vision sensors and more sophisticated (and expensive) framegrabber-based machine vision systems is a new vision sensor capable of processing images  $\leq 8$  times faster than its predecessor. This ultrafast image processing enables the inspection system to keep up with the fastest packaging lines. The compact unit packages both camera and microprocessor into a  $1.5 \times 4$ -in. housing. Ethernet connectivity simplifies integration into packaging lines and permits remote diagnostics and data acquisition from any point on the network or Internet connection (Legend 540 SmartImage Sensor, DVT Corp.).

### Shrink wrapping

A pharmaceutical shrink-wrapping system wraps groups of cartons or bottles at a rate of  $\leq 50$  multipacks/min. The compact unit simplifies film changeover with slide-out roll cradles and separate drives for the upper and lower film rolls (Model GR pharmaceutical multi-packer, Packaging Machines International, Inc., Elk Grove, IL).

Also targeting pharmaceutical shrink wrapping is a series of six single-lane, side-infeed machines with integrated collator, wrapper, and tunnel system  $< 8$  ft long. Designed for easy film loading, these compact units require no tools to change between different product sizes and pack patterns. Other features include a color touch-screen operator interface and built-in monitoring system to simplify operation and validation, respectively (Pharmaceutical Series multipack shrink wrapper, Polypack, Inc., Pinellas Park, FL).

### Labeling

A pressure-sensitive labeler for pharmaceutical applications replaces traditional wiring with a high-capacity cable databus

to simplify the connection of sensors and control devices. Acting like a ring main, the databus enables sensors and control devices to be connected at any point on the circuit and expedites high-speed communication with microprocessor-based control systems through a standard software protocol. A comprehensive validation documentation package enables the labeler to be ready for performance qualification within three days of installation (S250 labeler, Newman Labeling Systems Inc., San Diego, CA).

A high-speed verifier uses a moving-beam laser scanner to confirm the readability of barcodes without affecting print speed. This feature maximizes thermal-transfer label printer throughput and ensures label quality. The unit interfaces with a 64-bit, microprocessor-controlled label printer and can be adjusted to user-selected quality parameters. The verifier can perform both ANSI and traditional barcode quality measurements and can check labels with multiple codes. A four-key, menu-driven control panel features a two-line, 32-character light-emitting diode display. System setup is accomplished with a few keystrokes or a remote download from a computer or laptop. The verifier also can function as a data-capture device and can upload production data to a remote computer while performing pass/fail analysis. This allows users to monitor printer performance and calculate historical trending and analysis (on-line verifier, Avery Dennison Printer Systems Americas, Philadelphia, PA).

Although PACK EXPO International doesn't return until 7–11 November 2004, pharmaceutical packagers can see pharmaceutical packaging equipment and materials at Interphex, 31 March–2 April 2003 at the Jacob Javits Convention Center in New York, New York and at PACK EXPO Las Vegas, 13–15 October 2003 at the Las Vegas Convention Center, Las Vegas, Nevada. **PT**