Pouching equipment on a roll

Five horizontal form/fill/seal machines at Lane Ltd. produce 65 pouches of tobacco/min for roll-your-own cigarettes.
Lane Ltd. is a long-established manufacturer and/or marketer of specialty tobacco products, including roll-your-own and pipe tobaccos, Dunhill and State Express 555 premium international cigarettes, Captain Black and Winchester little cigars and premium Dunhill cigars. Lane became part of Reynolds American Inc. in 2004. Its Bugle-brand roll-your-own product, which accounts for 24.5 percent of U.S. RYO sales volume, is produced at its plant in Tucker, GA.

In 2001, the company decided to redesign the packaging of its roll-your-own products from paper to foil pouches. After investigating several suppliers, Lane decided to proceed with Southern Packaging Machinery, Inc. (www.southernpackaging.com) and, over the next two years, developed a “J-type” pouch and purchased five horizontal form/fill/seal machines that fill 0.75 oz of tobacco and a small package of rolling papers into individual pouches at a speed of about 65 pouches/min. Southern Machinery also served as a system integrator for the project. “We talked to a number of companies,” says assistant shift manager Lou Simonini, “but we’ve always had a good relationship with Southern Packaging Machinery. In addition, they’re right down the road from us, and their machines were very competitively priced, so they were an obvious choice. We had never run this type of equipment before, so we hired them to put together the whole operation for us, and it has worked out very well. They helped us with installation and startup and, while the machines have run very well with very little downtime, Southern has been right there with parts and service.

The hf/f/s machine, upper left, fills 0.75 oz of tobacco and places a small package of cigarette rolling papers into individual pouches at a speed of about 65 pouches/min. An ink-jet printer applies a lot code to the pouch after it is formed. Tobacco is weighed on an in-line combinational scale system that is mounted on a platform above the pouch machine. The system, lower left, picks a package of cigarette rolling papers from a magazine using a vacuum cup and places it in a spot of glue on the inside of the pouch. Tray loader, lower right, incorporates shuttles to transport pouches to the tray-loading robot, which uses a mechanical end effector to pick them up. The system includes four servo drives—two on the shuttle collation system and two on the robot.
any time we needed them.” Benchmark Automation (www.benchmarkautomation.net) has recently purchased the hf/f/s technology from Southern Packaging Machinery.

The hf/f/s machines are combined into three packaging lines with two of these lines incorporating two of the hf/f/s machines and the third line using only one of the hf/f/s machines. A roll of laminated polyolefin/aluminum film from Alcan Packaging (www.alcanpackaging.com) or Printpack, Inc. (www.printpack.com) is mounted on the end of the machine and a vertical-feed roll located after the side sealer pulls the film into the machine. A power-unwind system on the roll shaft automatically feeds the film and maintains the proper tension. The film travels over a bottom plough that folds it up and forms the gusset bottom of the pouch. After folding, one side of the film is about twice as long as the other side so it can be folded over to form the final pouch. A web edge aligner adjusts the film to ensure that the sides of the film align properly.

At this point in the operation, a product code is applied to the film by a Model 9064 ink-jet printer from Markem Corp. (www.markem.com). The vertical feed roll that pulls the film into the machine that was mentioned previously is located at this point on the machine. Vertical knives/heat sealing bars simultaneously cut and side seal the individual pouches, after which they enter the filling zone of the machine.

An air jet blows open the top of the pouch, after which a duck-bill depositor descends into the pouch, opens and deposits 0.65 or 0.75 oz of tobacco, depending on what product the plant is running. The product is weighed on an in-line combinational scale system from Triangle Package Machinery Co. (www.trianglepackage.com) that is mounted on a platform above the pouch machine. The scale system consists of eight individual weighing systems mounted horizontally. Each system contains a series of vertical buckets installed above each other. Product drops from the vibrating infeed conveyor into the collection buckets, which are intended to contain about one fourth of the finished package weight; about 0.18 oz in this case. These buckets discharge into the weigh buckets, where the actual weighing takes place. The weigh buckets then discharge into the staging buckets. The system has 16 staging buckets mounted in two rows of eight each. The control system remembers the weight of product in each staging bucket, and for each weighment, the system selects the combination of three or four of these staging buckets that comes closest to the total bag weight without being under that weight. These discharge the tobacco down a chute into the pouch. After the staging buckets discharge, they are refilled from the weigh buckets above them. Because tobacco is so stringy, graders with counter-rotating fingers are installed above the collection buckets to disperse clumps and help feed the product evenly.

The filled pouches travel through two tamping stages where plastic plungers descend and push the tobacco down into the packages. “Tobacco is very springy, and Southern developed the duck bill and the tampers to overcome this,” says Simonini. After filling and tamping, the pouches travel past horizontal heating bars that seal the pouch above the tobacco. The long vertical flap is still held in an upright position at this point. The pouches then travel to a system supplied by Minnesota Automation Products (www.minnesotaautomation.com) that fastens small packages of gummed cigarette papers to the inside of the pouch. In this operation, a glue gun deposits a drop of hot-melt glue on the inside of the extended flap of the pouch, and a vacuum cup on a pivoting arm picks a package of rolling papers out of a vertical magazine and places it in the glue.

The next step is to wrap this flap around the pouch. To accomplish this, the pouch is gripped by vacuum cups on a pivoting arm and is laid flat in a rotating unit that folds the flap over the pouch as it rotates. The pouches, which are now laying flat on the conveyor, immediately enter a unit from Label-Aire, Inc. (www.labelaire.com) that applies a small, pressure-sensitive label over the edge of the flap to hold it onto the pouch. The label has a section that has no glue, so the user can easily pull it lose to open the pouch, and the glue is formulated so that the label can be reapplied by the user to keep the tobacco fresh. This is the end of the single lane of equipment on the lanes incorporating two hf/f/s machines.

At this point, the pouches from two adjacent lines are combined into a single lane to feed the down-stream equipment. To accomplish this, the pouches from adjacent lines enter a conveyor from Dorner Manufacturing Corp. (www.dorner.com) that delivers them to a combiner/checkweigher from Mettler-Toledo Hi-Speed (www.hispeedcheckweigher.com). The Hi-Speed Magna-Switch combiner utilizes a unique roller assembly to converge pouches from each lane into a single lane that travels over the checkweigher. The pouches then enter a Linium 301 flowwrapper from Doboy (www.doboy.com). The unit pulls film from a roll mounted overhead, forms it around the pouch and creates a longitudinal fin seal to form a continuous tube around the pouches as they travel through the machine. The packages then travel through a set of rollers containing heating bars that seal and cut the film to produce individual packages.

Next, the wrapped pouches travel to a robotic tray loader from Blueprint Automation, Inc. (www.blueprintautomation.com) that incorporates the company’s smart-trak™ collation system, along with the robotic loader. The system includes four
servo drives—two on the collation system and two on the robot. The collation system features a vertical racetrack with two sets of holding bins, or shuttles, each powered by its own servo-driven timing belt. Each shuttle has 12 vertical partitions and the pouches are “shot” into the partitions by a variable speed conveyor as the shuttle indexes forward. The pouches are in a vertical position in the pockets, which are designed so both ends of the pouches protrude from the shuttle to facilitate robotic handling. While one shuttle is being loaded with pouches, the other belt has moved to the robotic pick-up position, where it stops. After the robotic picks up the pouches, this shuttle travels around the track back to the loading station, while the other shuttle moves to the pickup position.

The robotic loader uses a mechanical end effector to pick up the pouches. The robot descends and rods move inward from both sides beneath the protruding ends of the pouches. The robot then rises and lifts the pouches out of the shuttle. Simultaneously, an end plate moves inward to push the pouches together to compensate for the space taken up by the partitions and side plates move inward to align the pouches for loading into the trays, which are on a parallel conveyor to the shuttle racetrack.

Trays with hinged covers are formed, conveyed for product loading, closed and sealed in a T-System from Econocorp, Inc. (www.econocorp.com). The Econoform tray former pulls a die-cut blank from the magazine, feeds it to the forming area and glues the four corners of the tray, while leaving the top open. The Econoseal tray former includes a hot-melt glue system from Nordson Corp. (www.nordson.com). The formed tray is deposited onto an intermittent-motion, flighted conveyor that transports it to the robotic loading station. After the pouches are loaded, the tray is conveyed to the Econoseal Reverse Triseal cover sealer. The covers are plowed closed automatically as the loaded trays approach the automatic transfer station of the closing unit. The presence of the carton in the transfer station triggers the right-angle transfer mechanism and the three cover flaps of the tray are automatically sealed using the Econoseal hot-melt dauber system. Completed and securely glued trays are then discharged onto a conveyor that transports them to a side-loading case packer from Focke & Co., Inc. (www.focke.biz).