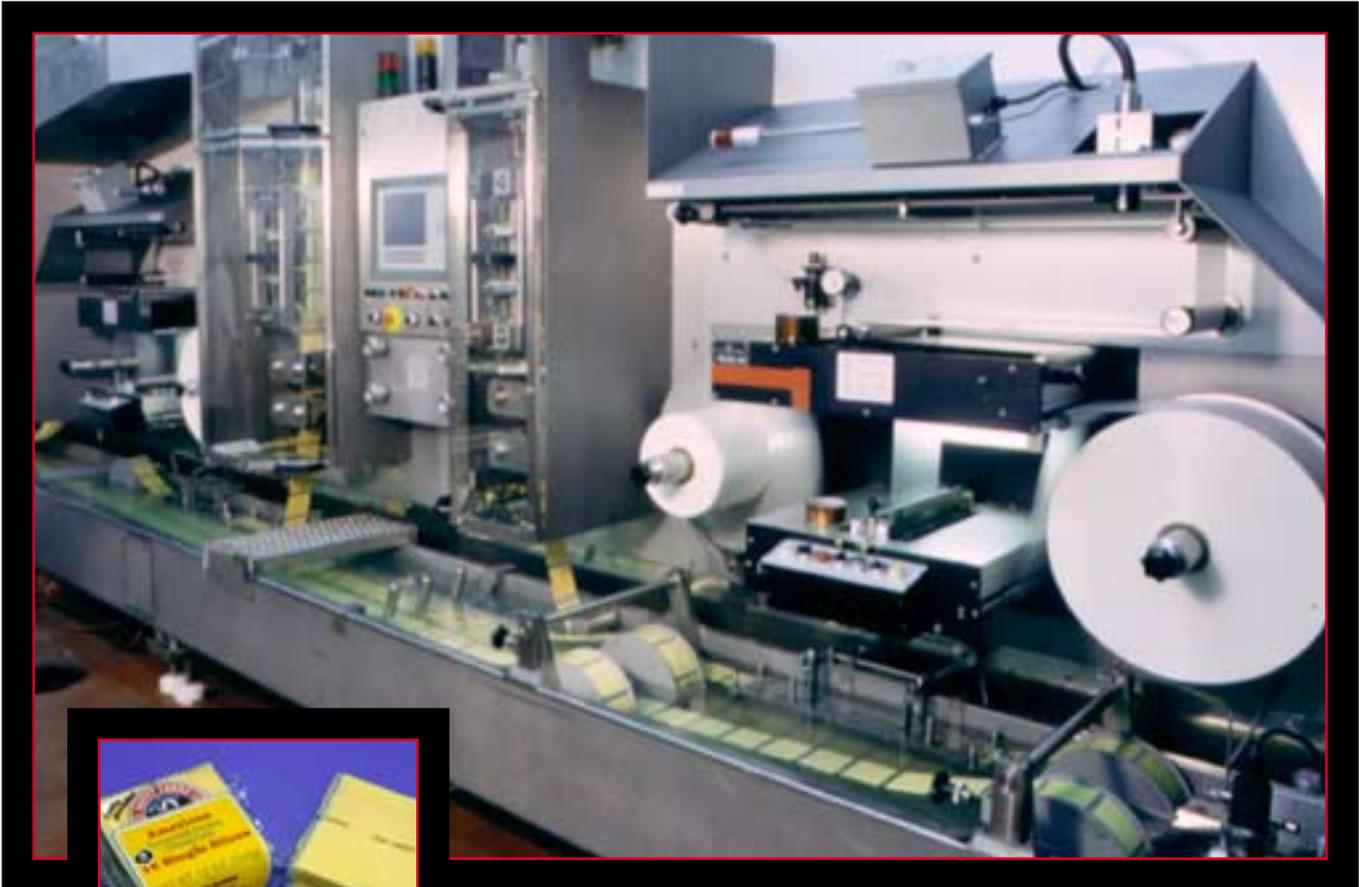


Cheese wrapping on the double

State-of-the-art dual-lane 'hot pack' technology produces cheese slices hermetically sealed in film at 1,600/min., with one operator. Integrated ink-jet printers code each slice for consumer convenience and quality control.

by David Newcorn, Senior Editor Packaging World



Above: Cheese is pumped hot into the film in the two center form/fill/seal sections, which are flanked by dual-film roll infeeds on either end of the machine.

Left: An ink jet code on each slice of cheese helps consumers locate the lap seal for opening. It could also consist of a promotional message.

Last November, Wapakoneta, OH-based Nu-Tek Foods Corp. upgraded its individually wrapped slice cheese packaging operation with the installation of a brand new, state-of-the-art "hot pack" machine from Europe. John Behm, Nu-Tek's director of engineering, calls it "a revolutionary new concept in cheese packaging."

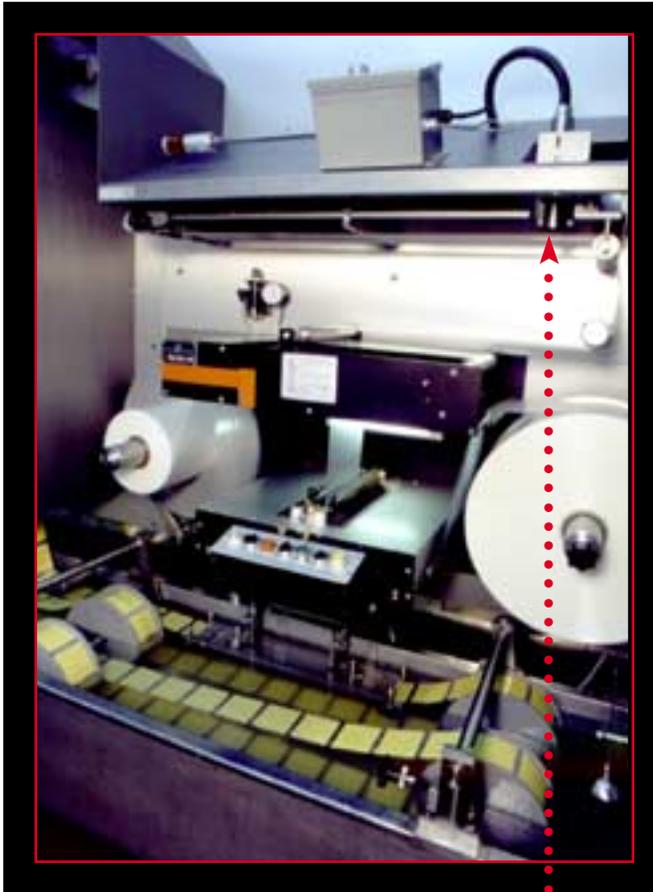
Nu-Tek manufactures processed cheese products for private label accounts nationwide, and it produces

under its own Sun Valley label.

Constituting just the third such installation of this machine in the U.S., the \$2 million machine-built by Kustner Industries S.A. (Geneva, Switzerland) provides Nu-Tek with several advantages:

- **Speed.** Essentially two machines built into a common frame, each of two lanes produce 800 individually wrapped cheese slices/min. Nu-Tek's previous IWS

- Products: Linx
- Industry: Food



Film is ink jet coded prior to filling at speeds of 250 fpm.

ink jet printhead

equipment, which is still in use, tops out at 1,200 slices/min. The speed breakthrough is due to the hot-pack operating principle: the cheese is extruded while still hot-directly into a tube of film which is then cross-sealed and chilled in a water bath. On Nu-Tek's conventional machine, the cheese is chilled prior to wrapping by passing over a series of chill rollers as a 60"-wide sheet. That extra handling limits speed.

- **Labor savings.** The Kustner machine requires only one operator compared to three operators on the old IWS machine.
- **Simpler operation.** The old machine slits a 60"-wide ribbon of extruded cheese into 12 lanes for wrapping, slicing and stacking. "That meant you had 12 lanes that could mess up: 12 stackers, all those sealing bars, et cetera," says Behm. By contrast, the Kustner machine only has two lanes, resulting in fewer potential trouble points.

- **Less expensive product formulations.** "We can cut back on certain ingredients," explains Behm, that were required for adhesion or release or melting characteristics on the previous machine. "Less-expensive formulations were part of the justification of this equipment," says Behm.

Custom-integrated ink jet

One unique aspect of the IWS operation is the fact that two small-character ink-jet coding systems, both Linx 6200 coders from Diagraph (St. Louis, MO), were custom-integrated inside the IWS machine, one dedicated to each lane. Each ink-jet coder prints the message "OPEN HERE #1" or "OPEN HERE #2" on the film for each wrapped slice of cheese, the number indicating the machine's lane.

The message has two purposes, according to Behm. The lane identifier allows Nu-Tek to trace the product back to the production lane. The "OPEN HERE" is for the consumer's convenience, helping the consumer to quickly locate the lap seal across the middle of the slice.

"The beauty of that message is that at holiday time, you could print 'Happy Holidays' or any other promotional message," explains Behm. He adds that ink-jet coding on individual cheese slices is not common.

The ink dries quickly enough that it doesn't smear when the film goes through a couple of rollers immediately after ink-jet coding. And the printed message doesn't come off in the water bath, says Behm.

One aspect of the coding equipment that Behm appreciates is the cleanup, which can be done at the touch of a button, according to Behm. "We run three shifts," he says, "and at the end of the third shift, the operator hits the stop button and it circulates the solvents and cleans the head up."

Nu-Tek selected the Diagraph equipment because it wanted to standardize on the vendor's coding equipment after using Diagraph small- and large-character coders elsewhere in the plant (see [Cheese Wrapping on the Double](#)).

Two machines in one

As the Kustner machine is actually two machines in one, each machine starts out with two rolls of flat film. One roll is running at any given time and the other is on standby. An auto-splicing feature automatically splices the new film roll on the fly when the other runs out.

Behm points out that the film itself-a 1.5-mil polypropylene/ethylene vinyl acetate coextrusion-is a

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unique material that was custom engineered for the Kustner machine by Printpack Inc. (Atlanta, GA). Printpack says the film has excellent release properties that allow consumers to easily unwrap the cheese. The hot-pack process would cause conventional film to stick to the cheese. Also, the film has the required high-speed machinability. The film also has a higher coefficient of friction to aid during stacking. Behm admits the film is "a little bit more expensive" than conventional IWS film.

After the film unwinds from the roll, it is coded by the Diagraph unit. The film then enters the forming section, where it passes over a forming collar and is sealed into a tube, much like on a vertical form/fill/seal machine. But unlike most packages made by f/f/s machines, that back



Each of the two ink jet coders has its own control panel embedded right in the hot-pack cheese wrapping machine.

seal becomes the seal that the consumer uses to open the slice.

Behm points out that unlike traditional individually wrapped cheese slices, each slice produced on the hot-pack machine is a hermetically sealed package. "It has to be, because it's completely submerged in a water bath," says Behm. Traditional IWS slices typically have a simple fold-over lap seam without a seal.

After the tube of film is formed, cheese is pumped at roughly 170°F directly into the sealed film tube in a continuous 3/4"-wide extrusion. The machine's PLC maintains the pump speed to precisely match the speed of the film.

The tube of film with the cheese inside then passes between synchronized forming belts. Voiding bars flatten the film and squeeze the molten cheese out of the intended seal area between each slice. The film

is heat-sealed, but not cut, resulting in a continuous ribbon of individually sealed slices of cheese.

This ribbon is plunged into a 27'-long tank of chilled water. Rollers enable the ribbon to snake back and forth several times to cool the cheese down to 55°F. That takes about a minute at full speed. The cheese slices then pass through a drying chimney that blows excess moisture off with hot air.

The web of slices then passes over a rotary drum that meshes with a three-bladed rotating knife assembly that cuts the ribbon into individual slices. Both lanes of production are held on to the drum by vacuum cups, which quickly shuttle either left, middle or right to drop the slices onto a flat takeaway conveyor. The result is six lanes of cheese slices.

Photoeyes over each lane count slices before they enter the stacking assembly that stacks all six lanes of cheese. Nu-Tek produces 12-, 16- and 24-count stacks, depending on the product and the customer. Once the proper number of slices have been accumulated in the stackers, the stacks drop down onto another takeaway conveyor, exiting the Kustner machine and heading downstream toward over-wrapping, case packing and sealing operations.

Behm says a final benefit of hot-pack IWS technology is the heightened sanitation of the packaging operation. On the old equipment, "there was a lot of exposed cheese," he explains. While never a problem, the exposure could make the product "susceptible to airborne bacteria contamination," he says. On the new equipment, "it's a closed system," explains Behm. "You don't have any product exposed to the atmosphere."‡

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Reliability, ease-of-use help Nu-Tek standardize coders

In late '94, Nu-Tek Foods purchased a PEL High-Resolution Large-Character Ink-Jet Case Coding System from Diagraph (St. Louis, MO), its first from that vendor. It uses the PEL to print cases of individually wrapped slices (IWS) of cheese produced on Nu-Tek's new Kustner hot-pack machine. The PEL prints standard information such as item number, date, time, and description. A little less than a year ago, due to demand from its customers, Nu-Tek used the high-resolution capabilities of the PEL coders to add a bar code on its corrugated cases. Nu-Tek's customers can scan the bar code for inventory control purposes.

"The PELs have been very dependable," says John Behm, director of engineering. The reliability of the PEL coder has led the company to standardize on Diagraph ink-jet coders, such as the Linx 6200 coders used on cheese slices.

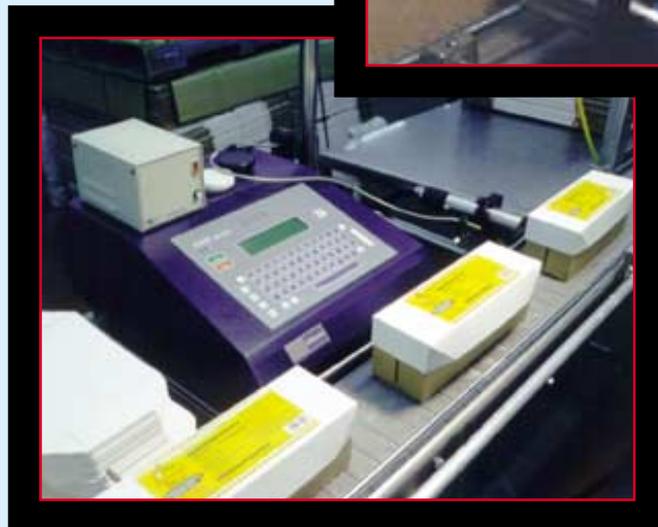
For cases of product packed on Nu-Tek's old IWS packaging machine (now dedicated to one customer), the company installed in January two of Diagraph's new Model I.V./700 Large-Character Case Coders.

"On the old line," explains Behm, "all the customer required was a time and an item number on the outside of the box." Since a bar code wasn't required, Nu-Tek found that the I.V./700 was an economical choice for basic case coding. That model costs about a fifth that of high-resolution coders.

Portability adds flexibility

Since Nu-Tek manufactures a variety of processed cheese products in glass jars, plastic squeeze bottles and loaves, it needed a small-character coder portable enough to be moved to different packaging lines as needed. A Linx 4200 Small-Character Coder permitted just such flexibility.

"We are able to wheel the unit to four or five production lines," says Behm. It mainly prints a date code, but it is sometimes also used to print product-specific messages, such as "refrigerate before opening" on jars and squeeze bottles.



This portable coder, shown coding 5-lb loaf cheese sold to supermarket delis, can be wheeled to different production lines as needed.

Several features common to all of the coders benefit Nu-Tek. Changing codes is easy using the portable terminals to enter new information or to call up information from memory. "They're user-friendly," confirms Behm. "You can call up the new information in a couple of minutes."

Changing ink supplies is also uncomplicated, says Behm. Each of the coders can be changed on the fly, without disrupting operation. "Of course, a reservoir maintains the coding operation while we just change the can." ‡

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