



TUNNEL VISION

Custom shrinkwrapper and heat tunnel boost pizza maker's speed and output

BY JIM MCMAHON

While food trends come and go, frozen pizza remains one of the ubiquitous foods in the typical North American household, with convenience, low price and a constantly growing assortment of topping and flavors making it one of the continent's heat-and-serve choice for any households constrained by time and budgets.

According to the **American Frozen Food Institute**, 66 per cent of U.S. households consumed frozen pizza in 2010, with sales of US\$3.2 billion accounting for almost 10 per cent of the country's mass-market frozen food sales.

Keeping up with market demand for this very popular consumer product can be a challenge for food processors—not only because of the high throughputs required, but also because frozen pizza can be a difficult product to package.

Few frozen food products require more careful handling through the packaging process than pizza, and nowhere in the packaging cycle is this more critical than during the shrinkwrapping stage.

Automated shrinkwrapping of frozen pizzas has long tested the patience of many food processors, requiring extremely delicate handling of frozen pizza pies in order to keep the sauce and loose toppings—pepperoni, mushrooms, sausage, etc.—fully intact during wrapping. These ingredients tend to shift around and fall to the bottom of the shrink bag before sealing.

Low Profile

Being a low-profile product, frozen pizza is also prone to shingling while traveling back-to-back on the infeed conveyor before entering the wrapper—often resulting in poor infeed registration, missed flights, double product bagging and broken crust.

The conventional machinery employed for high-speed shrink wrapping of frozen pizzas—at the rate of 100 to 150 pizzas per minute—typically uses lap-seal technology for sealing the shrink bag.

The lap-seal method wraps the film around the pizza as it goes through a forming shoe, and then overlaps the film on the bottom of the pizza—thereby static sealing it before going into the shrink tunnel. A key problem with this sealing method is that pizza toppings will frequently fall underneath where the seal is being made, thereby compromising the integrity of the seal.

When the wrapped pizza comes out of the tunnel, the loose or open lap-seal can be very hard to detect, so it is often consumers who discover that the pizza they purchased was not securely sealed.

To ensure a better-quality seal, some food processors have utilized continuous-motion side-seal shrink wrappers. Because the seal is being formed on the edge of the pizza, rather than across the bottom, the risk of loose toppings contaminating the seal area is eliminated—resulting in a much more reliably sealed package.

However, most continuous side-seal wrappers have a limited speed range—topping out at about 100 pizzas per minute—leaving processors with the hard choice between quality and speed at the other's expense.

But that's no longer the case for the Milwaukee, Wis.-based **Palermo's Pizza**—at least not since it started using a new generation of continuous-motion side-seal shrinkwrapper employing continuous side-sealing technology.

Opened on Milwaukee's east side in 1964 by Sicilian immigrants Gaspare and Zina Fallucca, the popular eatery started manufacturing frozen pizza in 1979, using traditional Sicilian recipes.

Widely acknowledged as an innovator in the frozen pizza category—credited with creating the industry's first self-rising frozen pizza and its first ultra-thin crust product—the company produces a diverse range of popular **Palermo's** flagship brand products, including *Primo Thin*, *Naturally Rising*, *Stone Baked*, *Classics by Palermo's* and, most recently, the **Palermo's Hand Tossed Style** pizza featuring 'family-favorite flavors' on a middle-thickness crust.



The popularity of these brands has made Palermo's one of the fastest growing manufacturers of frozen pizzas in the U.S., ultimately prompting it to expand its manufacturing facility.

Started up in 2011, the company's new 250,000-square-foot, **USDA**-approved plant is a veritable showpiece of packaging technology—operating four packaging lines.

According to the plant's vice-president of operations Mike Walz, the plant's main packaging line is dedicated to producing the company's bestselling 12-inch frozen pizzas, which arrive there after having the sauce and topping deposited onto dough to form the pizzas, which then travel through an ammonia-based spiral freezer.

Exiting the freezer, the now-frozen pizzas are conveyed through the shrinkwrapper and shrink tunnel, followed by labeling and cartoning. The finished product is then cased, palletized and sent off to shipping or deep freeze storage.

"We have been experiencing continued growth

at a double-digit rate every year," says Walz. "As we grew and the demand for product went up, it generated a need for us to operate at a higher level of speed to meet the demand.

"The challenge we were facing as we tried to push our line speeds up was the ability of our existing lap-seal wrappers to run at the higher rate of speed, and provide a reliable seal," recalls Walz. "The lap-sealers use a static sealing process, with an overlap on the bottom of the pizza, but sometimes we would lose that seal, which would then open up in the shrink tunnel.

"That tended to be a limiting factor when running at higher speeds," Walz relates. "Moreover, our main packaging line was using a lap sealer that was operating at less than 90 12-inch pizzas per minute, prompting us to embark on a project to increase the line rate on that line first.

"After reviewing several shrinkwrap designs, we settled on one system that could be custom-configured to meet our specific needs, instead of adapting to an existing format."

The system ultimately chosen by Palermo's is a high-speed, continuous-motion, servo-controlled side-seal shrinkwrapper manufactured by **Texwrap Packaging Systems**, a well-established manufacturer of fully-automatic shrinkwrapping systems based in Washington, Mo.

What makes this system unique, according to Texwrap, is its utilization of multiple technologies which are integrated into one system architecture—enabling high-speed throughput of up to 150 frozen pizzas per minute with consistent high-quality seals and no product damage.

Built for Speed

The robust throughput speed of the wrapper is achieved by the sealing head, incorporating a patented servo orbital-motion technology that eliminates the need for the head to move with the product while the seal is being made.

The sealing head moves in an ellipse without the back-and-forth motion of typical sealing heads, which dramatically increases the throughput speed of the wrapper.

The orbital head is controlled by very fast and precise servo motors, as is the entire wrapper and infeed.

The system is built with *Generation 3* servo technology, meaning that it was designed from the ground-up to integrate servo technology, PLC (programmable logic controller) and the mechanical elements of the system, with the system's 10-axis servo controls ensuring extremely accurate registration, minimizing the amount of film used for wrapping, and reducing the need for maintenance.

The wrapper is also equipped with an innovative product protection system which ensures that the orbital head will not close down on any pizza, using a sensor to map the position of each pizza as it enters the orbital head operating space.



Frozen pizzas being spaced out for loading inside the plastic shrinkwrap bags.



Pizzas and supporting cardboard disks being matched up before entering the shrinkwrapper.



Bagged frozen pizzas entering the plant's newly-installed Texwrap shrinkwrapper.

“We tested the wrapper at 180 pizzas per minute,” relates Walz. “This is very fast throughput, but it performed just as promised, with accurate registration, secure seals and no product damage.”

“On a continual basis, we normally operate the system at 120 to 140 pizzas per minute, which is considerably faster than the maximum 90 pizzas per minute with our previous lap-sealer.”

During sealing, the self-compensating system's belts grip the film securely over a long distance—allowing the seal to be made on the pizza, with the excess trim cleanly separated with the use of a special heating element.

The line's infeed has also been optimized for maximized throughput and careful product handling, with a Texwrap-designed lane-combining system taking three lanes of pizzas exiting the freezer and consolidating them onto one lane.

Likewise, a servo-driven flying nose bar is pro-

grammed to not only place the pizzas inline at a set spacing without touching each other, but also to automatically adjust the speed of the entire line to match incoming production.

Seal the Deal


After the seal is made, a lug conveyor automatically inserts a cardboard circle underneath the pizzas, and indexes the product into the wrapper.

To support the shrinkwrapper, Palermo's installed a Texwrap triple-chamber forced air convection tunnel equipped with digital temperature controls, high-velocity fans, individual top and bottom controls for air direction, and variable-speed conveyors.

The heat tunnel incorporates a special feature called *Seams Down*, which ensures that the side-seal seams do not position over the printed circular label on top of the pizza.

Engineered to meet the highest sanitary standards, the entire infeed and shrinkwrap system features washdown-rated, corrosion-resistant, welded stainless-steel design that eliminate all crevices and areas where food particles may collect.

As Walz sums up: “Both the speed and the quality of the seal have been tremendously improved with this continuous system.”

“We were able to get a shrinkwrap system on our primary line that not only met our design specifications, but exceeded it.” 

Jim McMahon is a freelance writer specializing in food-processing automation.

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APPOINTMENT



WeighPack Systems Inc., a leading provider of high performance packaging equipment, is pleased to announce the appointment of Andy Wischmann as Sales Manager – Distributor Accounts effective September 2013.

This important position at WeighPack will allow Andy to provide focused attention to

Distributors and Agents throughout North and South America. His vast experience in the food industry will help WeighPack to expand its services within the Americas as well and provide significant support for its partners and re-sellers.

Andy's prior experience includes being Managing Director, Principal Operator, and Owner of WHG, Inc. and the Wischmann Company in Hamburg, Germany. In 1994 Andy moved to the USA to build and oversee international distribution for Beehive, Inc. / Provisur Technologies, a leading manufacturer of food processing equipment.

“I do look forward to work not only with the excellent team at WeighPack but also with our partners concentrating on streamlining and supporting the relationship between our Distributors and Agents with WeighPack as we consider this as one of our most important business relations,” says Andy.

For more information, visit us at www.weighpack.com or call 1.888.934.4472

