

The Not-So-Big Chill

New spiral design provides compact but efficient freezing for Canadian processor.

Among the ever-widening range of value-added meat and poultry products available today, marinated and individually quick-frozen (IQF) chicken breasts remain a perennial favorite. In fact, one Canadian processor has encountered such heavy demand that he actually found himself turning away orders for lack of processing firepower.



Whole chicken breasts pass through Praxair's immersion freezer before moving on to a ColdFront spiral freezer.

Guy Chevalier, founder and president of DESCO, in Boisbriand, just outside Montreal, Quebec, has seen quite a few changes in the market for poultry since he started in business as a jobber with a single truck back in 1980. Over the past 24 years he has slowly but steadily expanded into processing, setting up a chicken-deboning operation in 1989 and moving into IQF in the mid-1990s.

He attributes his success at least in part to competitive pricing, "Chicken is not like beef," he observes. "There are no grades, so you're dealing with a commodity product."

To keep his prices attractive to a customer base that includes major Canadian chains like A&P, Safeway Canada, and Loblaws, along with a handful of U.S. food brokers, Chevalier has made DESCO's plant environment an efficient and productive one. This strategy obviously works: 2003 was a banner year for the company, with sales up C\$15 million over the previous year.

However, continuing to fill customer orders became a real challenge as demand in the burgeoning sector began to outstrip plant capacity. Chevalier realized it was essential to make some kind of change to keep sales on their upward climb. Acquiring more freezing equipment was the logical solution, but space constraints in

his primary facility made it difficult to add another tunnel freezer to the two already installed.

Consulting with long-term supplier Praxair, he determined that upgrading to the new ColdFront Ultra Performance Spiral Freezer was the perfect solution given the limited real estate on his production floor.

A brand-new design, the spiral freezer houses 450 feet of stainless steel belt that winds 15 feet upward, transporting value-added product through the heat-transfer process inside a box that measures just 20 feet on each side. Incoming product chills from its initial temperature of 40°F down to 0°F in just 10 minutes. Compared to a standard 18 foot-long straight tunnel, the spiral configuration provides 6.5 times more capacity for the heat transfer, dramatically reducing the time it takes to reach the IQF target.

Using high-velocity cryogenic liquid and vapor directed onto the product, the Ultra Performance Spiral Freezer incorporates a patented air flow engineered for maximum efficiency. Vapor that in previous designs was lost from the system as exhaust is now tapped for its cooling power.

"Our engineers devised a way to use every last cooling BTU in the vapor, which translates into vastly more production," says Talaat Girgis, Praxair Canada's national manager for food marketing and technology. "The spiral freezer offers 30 percent more production with 10 percent less cryogen consumption in the same footprint as a similar cryogenic system," he adds.

The spiral configuration is especially well suited to DESCO's production of whole chicken breasts, which because of their size require more time to freeze

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than other, smaller cuts. In addition to size, other IQF variables include product consistency and composition. Experts at Praxair's Food Technologies Lab in Burr Ridge, Ill. ran tests with actual DESCO products to determine the exact combination of belt speed, dwell time, and amount of cryogen necessary to achieve the expected results. Programmable controls make it easy to change these parameters for other product formats the processor runs occasionally like chicken wings or tournedos formed chicken filets wrapped with bacon, with the touch of a few buttons.

Operating at -100 °F, the spiral freezer takes the chicken breasts down to their target temperature in just 10 minutes. The rapid processing minimizes dehydration (less than one percent) and results in a superior-quality product that also retains its original color.

Along with saving space and boosting productivity, DESCO is now seeing increased yields thanks to the new immersion freezer installed as part of the ColdFront system. Previously, the chicken breasts, after being cut, marinated, tumbled, and massaged, were loaded on the conveyor and sent straight into the tunnel freezer. Because of their tacky surface, parts of the breast would stick to the belt and chip off, creating waste. Now, an intervening phase through the new immersion freezer allows a crust to form over the product so it remains intact during the entire heat transfer eliminating all sticking and breakage.

"When a piece breaks off, you lose it, says Chevalier "At six or seven dollars per kilo, at the end of the day it is a big thing. Keeping product intact means I get the get the

full product intact means I get the full product weight and better yield" – an essential component of this competitive-pricing strategy.

Currently processing at speeds averaging 6,000 pounds per hour, DESCO has added a second shift and two more days to his work week, while increasing its workforce to more than 200 employees. The company is now on track to grow 2004 revenue by C\$35 million, pushing annual sales up over C\$110 Million.

By considering a creative solution to his space constraints, Chevalier has been able to address productivity, quality, and yield issues in his plant. With the spiral freezer's potential to run 10,000 pounds per hour, it will be a while before he again encounters capacity concerns. In the meantime, he's quite happy with the new equipment, "My operation is now faster, more economical, and has lower labor costs," he confides.

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