

DUCTSOX[®]

CASE Study

DuctSox™ Fabric Air Dispersion System plays important role in new food processing operation designed for 7-Eleven



Using just-in-time manufacturing principles, the state-of-the-art Prime Deli food processing facility assembles and delivers more than 20,000 fresh sandwiches and salads a day.

Providing fresh, quality food products to millions of hungry customers has always been a top priority of The Southland Corporation, operator and franchisor of the 7-Eleven convenience-store chain. But when the company contracted in March 1994 with the Prime Deli Corporation, a state-of-the-art food assembly facility, freshness took on a whole new dimension.

Utilizing just-in-time manufacturing principles popularized by the Japanese, Prime Deli of Lewisville, Texas, assembles and delivers more than 20,000 sandwiches and salads a day for all 244 Dallas/Fort Worth-area 7-Eleven convenience stores.

"We make the products fresh every day based on daily store orders," says Craig Weidner, plant manager of Prime Deli. "No other convenience-store chain can match our freshness guarantee."

Southland's extraordinary freshness guarantee is made possible by Prime Deli's progressive facility design and its highly choreographed system centered around quick assembly and chilled, even temperatures.

In designing the facility—which was modeled after food assembly plants in Japan—every opportunity to streamline production flow, reduce energy consumption and improve product quality was explored.

One of the most innovative products specified into the facility is a unique fabric air dispersion system called DuctSox™, from Frommelt Safety Products. By distributing air evenly throughout the facility and eliminating drafts, DuctSox play an integral role in quality control and employee productivity at Prime Deli.

Uniform Temperatures

Uniform temperatures are critical in every refrigerated food processing plant to ensure freshness and prevent food spoilage. Ironically, most traditional air handling systems, which blow refrigerated air at a rate of 250 to 300 feet per minute from high-powered cooling units, create "lanes" of frigid air and fail to distribute air uniformly throughout the plant.

DuctSox, according to Weidner, have been the key to equalizing temperatures throughout Prime Deli's 24,000-square-foot facility. Tube-like fabric ducts made of USDA-approved fabric, DuctSox capture the high-powered drafts generated by cooling units and gently release the conditioned air over the plant floor below. Prime Deli's DuctSox hang from low 12-foot ceilings using a steel cabling system and are secured to the distribution plenum of a cooling unit with a circular clamp. (Low ceilings are critical in the plant's design to minimize the amount of energy needed to cool the plant.)

To ensure even air distribution, the Prime Deli installation required a total of nine DuctSox in all—five in the "assembly" room and four in the "picking" room. The DuctSox are 50 feet long and are two feet in diameter.



"By eliminating draft exposure and equalizing temperatures, DuctSox help us put out a better quality product," says Production Coordinator Jeff Stephens.

Temperature uniformity is particularly important to Prime Deli which must meet stringent quality control standards imposed by the USDA and by The Southland Corporation. As a USDA-certified facility, Prime Deli is inspected on a daily basis for compliance with strict temperature and cleanliness regulations. While the USDA requires a consistent 42° F temperature in most areas of the plant to pass inspection, The Southland Corporation maintains an even more strict regulation of 40° or less.

DuctSox have helped Prime Deli meet and even surpass their temperature requirements, according to Weidner. "Cool, consistent temperatures are critical to product freshness and, ultimately, to the success of our fast-paced operation," Weidner says. "By evenly distributing conditioned air, DuctSox help us maintain consistent temperatures throughout the plant."

Draft Exposure

To meet the demanding time constraints of their high-speed, just-in-time operation, the productivity of Prime Deli's 116-person workforce is critical. DuctSox play an important role here, too.

By controlling cold, localized drafts, DuctSox make Prime Deli a more comfortable and more enjoyable place to work. And with greater comfort comes greater productivity.

DuctSox eliminate the "wind-chill" effect and make the work environment feel warmer than it actually is, explains Weidner, who has seen first-hand the damaging effects of draft exposure on employee comfort and productivity. "I've worked in food processing plants without fabric ducts, and I can tell you from personal experience that the standard deflectors and baffle designs don't work nearly as well as the DuctSox for controlling drafts."

Controlling draft exposure is particularly important at Prime Deli, where cooling units affixed to low 12-foot ceilings blow refrigerated air on plant workers and food products from a very close range.

"DuctSox eliminate the cold alleys of air that plague most food processing facilities and give our employees a comfortable environment to work in," Weidner says. "DuctSox have definitely had a positive impact on employee productivity and morale. And in the long run, I think we'll see a positive impact on employee longevity."

According to Jeff Stephens, production supervisor, the benefits of DuctSox are never more evident than when they are removed periodically for cleaning. "You should just hear the four-letter words coming out of their mouths when we take them down," he says half-jokingly. "You can just see their attitudes changing."

"Without the DuctSox, workers stationed near the blower units often experience numbness in their hands and feet," he adds. "There's no question in my mind that DuctSox affect their productivity as well as their health. Though I can't prove it, I'm convinced that DuctSox will decrease the number of sick days and reduce our employee turnover."



By effectively controlling bone-chilling drafts and the accompanying "wind-chill" effect, DuctSox improve employee comfort, morale and productivity.

Air Filtration

Cleanliness is, of course, a major concern at every food processing plant—especially USDA-certified plants such as Prime Deli which are inspected on a daily basis.

Weidner and Stephens were pleasantly surprised to discover that DuctSox filter the air as they diffuse it. The USDA-approved fabric provides a secondary wave of protection against harmful bacteria and other airborne particles that goes above and beyond what their standard HVAC filtration system collects.

"DuctSox have been an important weapon in the battle against bacteria growth and have played an important role in maintaining a sanitary, dust-free work environment," says Stephens.



Fresh food orders are transmitted daily to the Prime Deli plant floor from all 244 Dollar/PT. Worth-area 7-Eleven stores via a direct computer link.

Proven to sift particulates as small as 2 to 5 microns from the air, the USDA-approved fabric effectively controls the transmission of airborne dust, microbes and bacteria—ensuring the quality of their food products and helping to meet USDA regulations.

DuctSox also improve sanitary conditions by diffusing high-powered drafts which can stir up dust around the room and affect food quality.

"The USDA inspector loves them," Weidner says. "He thinks they are the greatest thing since sliced bread. He told us that he wishes more plants would use them."

To maintain the filtration effectiveness of the fabric, Prime Deli launders their DuctSox once a month to rid the fabric of any contaminating particulates. "DuctSox are easily taken down for cleaning," Stephens says. "It only takes two guys and a couple of minutes to take them down or put them up. One guy on a ladder and one on the floor to catch them. It's that easy."

A Model Facility

As the first and only food processing plant in the U.S. that has adapted the high productivity/low-inventory principles of just-in-time manufacturing, Prime Deli is being used by Southland as a testing ground for future plants of this kind.

Weidner says that he would highly recommend Frommelt DuctSox in the construction of any additional Prime Deli facilities. "DuctSox diffuse refrigerated air, equalize temperature, filter out bacteria and control dust," he says. "And on top of all that, they're easy to maintain. My employees love them, and so do I."

"As the model for future just-in-time food assembly plants, we get quite a few visitors through here," says Stephens. "The first thing they notice is the odd, blimp-like appearance of the DuctSox. The next thing they notice is the soft, gentle air flow that is unlike any other refrigerated plant they've been in. They never fail to impress our guests."

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