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Medline photos by John Evans Photography

# Columbus Resolves North Market **Air Quality**

VENTILATION AND EFFICIENCY SOLUTIONS IN A RESTAURANT AND RETAIL SPACE

**P**ete Oesterling is a suit-and-tie guy. As associate vice president for Nationwide Insurance, complete with legal staff and an office with a lofty view of Columbus, OH, his daily apparel is the requisite uniform. It's rumored, though, that he favors Harley T-shirts and has a collection of two-wheeled machines in his garage.

But it's because of the suit and tie that Oesterling, for years, was reluctant to visit one of his favorite spots for a bite to eat just a block away. All that it took was a few minutes at the North Market to be odorously marked for the remainder of the day.

"It didn't matter how quickly I tried to make the trip into the market," he says. "The smell of cooking oils, onions, garlic, and smoke stuck to me like Velcro. That's OK on a day off, but not on weekdays when I have meetings to attend."

Like most of the folks in Columbus, Oesterling—now in his 30th year at Nationwide—quickly grew to like the ambience, social atmosphere, and the widely varied experiences anyone can expect at the market.

But the olfactory "glue" was too great a deterrent. So, like many others at Nationwide—with a population of professionals well above 10,000, most within a quick walk of the market on weekdays—Oesterling avoided trips there during the week.

“As much as I liked going there for a lunchtime treat, the stigma of smelling like the market was too great a penalty,” he says.

### Fried Fish, Taters, and Smoked Pork, Oh My!

Oddly, the smells and rich airborne aromas at North Market are an important part of the generously sensual experience that customers—more than 1 million each year—have come to enjoy. The cultural mix, wide variety of vendor offerings, colors, taste, and textures commingle with the wafting fragrance of it all.

“That mix of goodness is highly prized here,” says Rick Harrison Wolfe, the market’s executive director. “Though, over the years, our ventilation woes became something we needed to deal with.”

And there’s plentiful goodness in the mix at North Market:

- At Best of the Wurst, Nick and Kye mix fine brats with Bangkok cuisine.
- The Fish Guys offer the freshest, line-caught fish in town, and hope to grill some of it for patrons soon.
- At Holy Smoke BBQ, meats acquire heavenly goodness.

Yet, that’s mentioning only a few of the many vendors who ply their trade at the market seven days a week. The

eclectic band of merchants, including produce, retail, and food stands, surely contributes to the market’s ambiance and defines its uniqueness.

Though, without a doubt, the market’s burgeoning indoor air quality (IAQ) problems—a byproduct of the enterprise inside—had to be resolved if the non-profit venue and its 36 vendors were to survive.

Years ago, city managers and market executives knew they had a problem, but they also had to find a way to solve it, and to pay for it. Gradually, a plan emerged.

Wolfe, who joined the market’s executive staff in May 2013, learned about plans to overhaul the building’s ventilation system during his very first day on the job. When he went home that evening, his girlfriend sweetly demanded that he quarantine his work clothes.

“She said I smelled like a Vietnamese, Polish, and German stir-fry with fish, peppers, and sourdough clove,” he says.

Undoubtedly, people were aware of the smells of cooking and food preparation, especially at lunchtime, and especially during the winter months when doors and windows were closed.

### Engineered Solution

Of course, the science behind the market’s inadequate ventilation was the purview of trade professionals, with a language foreign to the market’s every-

day patrons, with terms like “particulate parts per billion,” “IAQ,” and “CFMs.”

Enter Stuart Schlotterbeck, P.E., and IAQ linguist. Schlotterbeck is a senior mechanical engineer for Columbus-based Dynamix Engineering Ltd., the firm chosen by city managers to engineer a solution to the market’s IAQ problem.

One of the first decisions made by Schlotterbeck was the specification of four, 20-ton Atherion packaged ventilation rooftop systems manufactured by Modine—ultimately chosen to be the crown jewels for the market’s IAQ



Installation of unit

improvement project. Next in line were the central exhaust fan and innovative venting and kitchen hoods. They, too, were soon to become integral components to make the whole, an engineered solution built precisely to meet the current and future needs of the expanding market.

“Of key importance was the need for make-up air,” says Schlotterbeck. Prior to the renovation, air balance tests for the building proved negative: more air was being exhausted from the building than was supplied from outside.

“Net pressurization for the building



should be positive,” he says. “Tests confirmed the need for more make-up air.”

### General Temperature Control

The North Market retrofit project came out for bid about two years before actual work began. Canal Winchester, OH-based General Temperature Control (GTC)—armed with Schlotterbeck’s design—submitted the winning proposal during the rebid process. GTC was chosen to replace the ailing rooftop equipment and to overhaul the ducted ventilation system within the building.

GTC was a natural choice for the



job, which began in August 2013 and concluded three months later. The firm’s 35+ employees include eight sheet metal pros, 12 pipefitters, and six service personnel. The market’s budget for the total project was \$1.2 million.

President Bob Billings, whose father was a pipefitter, and who began his career as a refrigeration pipefitter, explained that as a union shop they simply draw on the local unions (Local 189 of the United Association of Plumbers & Pipefitters, and Local 24 of the International Association of Sheetmetal Workers) for skilled labor support as needed.



According to Billings, GTC’s territory includes all of Central Ohio within a 100-mile radius of Columbus. The firm is exclusively focused on industrial and commercial HVAC and mechanical systems work.

“We do a wide variety of work, including renovations and service,” says Billings. “A large percentage of our commercial work is done for schools and universities, with a lot of work for OSU, projects for the city of Columbus, and many State of Ohio projects as well.”

Billings chose Mike House, project manager, to direct the North Market’s ventilation retrofit. House, who began his career at GTC 15 years ago as a sheetmetal pre-apprentice, says the North Market project involved a lot of coordination and well-defined logistics because of the need for the market and the vendors to remain operational during the entire retrofit project.

“I met with managers of the market and vendors every day during our work there,” says House. “They always needed to know where we’d be so that everyone could remain in operation. The phone was ringing all the time, and we did most of our work at night. We also had to coordinate with all of the other trades. Adding to the challenge was the inability to store our tools and materials there.

### More Than Meeting Code

“The market’s in an older building, so

there was a lot of stuff on the ground, and attached to the ceiling that had to be moved for us to complete the ventilation work,” adds House. “The commercial ductwork was a fairly specialized installation.”

GTC pros installed hundreds of feet of 14-inch to 36-inch Selkirk kitchen grease duct with a zero clearance to combustible rating and integral chase construction. The high-temp fiber insulated, double wall construction provides a two-hour fire resistance rating and eliminates the need for a separately constructed, fire-rated enclosure around the duct.

Also installed by GTC crews were eight 10-foot, and two 8-foot Halton Capture Jet kitchen hoods, designed to efficiently eliminate heat and all emissions within the convected plume from all cooking spaces. All of the (NFPA) Type 1 hoods—designed to remove heat, smoke, vapors, and grease—are served by a single, central fan.

Ritch Lewis, partner with the Cleveland-based manufacturer’s rep firm, Thermal Products, explains that the hoods are 30% more efficient than conventional hoods by reducing the amount of exhaust and required make-up air. Less exhaust is needed to remove the particulate- and moisture-laden plume seeking airborne status from the market’s many ovens, griddles, fryers, broilers, and wok ranges.

“When that effluent *isn’t* removed

—which was the case before the new ventilation work was complete—it condenses and falls out of the plume, leaving smelly grease particulates everywhere, on clothing, skin, and in hair,” says Lewis. “That’s at the very heart of why this project began in the first place.”

Another key facet to Schlotterbeck’s design was an integrated fire suppression system. “If the ducting was a manifold-based system, the entire fire suppression system would need to be discharged simultaneously,” he says. “But with Type 1 hoods, fire suppression is controlled independently at each hood.”

### Rooftop-Ready Solution

“Compared to the work we did inside the building, the actual installation of the new rooftop equipment was quite simple,” says House. “The Modine Atherion ventilation systems are sized ideally to fit into the old Aeon rooftop curbs, so there was very little prep work involved in swapping-out the old systems with the new. We’re well-acquainted with the Atherion equipment,” adds House.

The Atherion units specified by Dynamix are designed to meet ASHRAE 189.1 and 62.1 standards for IEER efficiency and indoor air quality. The systems also provide high-efficiency gas heating, MERV16 air filtration, and the capability for 100% outside air ventilation for greater energy savings.

According to Schlotterbeck, the Atherion’s gas burners maintain more than 90% burner efficiency and operate with a 15:1 turndown ratio. This allows high-efficiency operation, while maintaining discharge air temperatures during the heating season within a few degrees of setpoint.

“The makeup air units are specifically designed to vary the amount of outside air to the inside space,” explains Schlotterbeck. “A controls signal originating from the exhaust hoods and passed through the building automation system [BAS] to the make-up units ensures that they draw enough outside air, while precisely tracking the amount of air evacuated by the central fan and kitchen hoods to maintain positive pressurization of the building.”

### Up on the Roof

Through September and October of 2013, GTC crews worked evenings to complete most of the interior grease duct and kitchen hood installations. On an overcast day in November 2013, Mike House and others from GCT arrived at North Market for the long-awaited opportunity to remove all of



Market roof with air handlers

the old rooftop equipment, with ready replacements.

“We had to cordon-off about one quarter of the parking lot,” he says. “A small crane arrived to unload the rooftop units, curb adapters, and all of our other material. We needed a much larger, 90-ton crane with a 120-foot boom to lift the rooftop equipment onto the roof because of the need to reach so far up, and in, from just one location on the ground.”

At four in the afternoon, the building closed as the big crane cranked up for its fist task: GTC crews were in place to eliminate the old rooftop systems. As quickly as the old equipment came down, new curb adapters were fitted and preparations were made to line up the new supply and return ducts, gas supply, and all wiring.

By 8 p.m., the big crane’s work complete, one GTC crew remained behind to activate two of the new Atherion units and the big fan for morning operation. When the sun rose, and soon

vendors began to arrive for the new day, the ventilation system was mostly operational. GTC crews made quick work of the remaining installation work.

### Odor-Free at Last

Several weeks ago, and about three months after completion of the market’s HVAC and ventilation retrofit,

Pete Oesterling returned to North Market with a couple of business associates. Ignoring the impulse to rush through, they strolled among the vendors, quick to see that larger crowds of people—many in suits and ties—were doing the same.

“Each of us ordered lunch from different vendors, and we enjoyed great meals—inside! We all noticed a huge difference in the air inside the market,” he said. “It *felt* clean and fresh; we were in no rush to leave.”

The ultimate test was returning to the office, and then home. At last, it was an odor-free experience. **BE**

*John Vastyan writes about plumbing, HVAC, and related industries.*

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