Dectron® for better air

Case Study

(2) DRY-O-TRON® DSV-080 DEHUMIDIFIERS
(1) DRY-O-TRON® RA5-120 DEHUMIDIFIERS

A World-Class Aquatic Facility Fit For NCAA Swim and Dive Champions

Drury University Breech Pool — Springfield, Missouri

The Challenge

The Drury University Men's and Women's Swim and Dive teams had dominated the national championships for nearly a decade, and yet their aquatic facility, Breech Pool, had not been updated or renovated in more than 25 years. The existing system supplied less than 4 air changes per hour and pumped in very limited amounts of ventilation air. Furthermore, the dehumidification and cooling system had not been working for a couple of years. The decision was made to replace the entire system during a complete natatorium remodel.

While the facility met basic standards for swim meets in the areas of air and water temperature, the air quality was poor and the high levels of chloramines in the pool gave off a strong smell. Tri-chloramines are formed when nitrogen-based organic by-products of the human body combine with chlorine molecules. Because tri-chloramines do not easily dissolve in water, they become airborne. The airborne tri-chloramine molecules are very corrosive and can lead to irritated eyes and swimmer's lung, which are potentially harmful to the health and athletic performance of the swimmers and divers. Moreover, the existing ventilation system attempted to adequately expel the chloramine-filled air outside and pump in new air, which was expensive to heat, especially in winter when temperatures dropped outside.

The facility's management knew that a new system was needed, but space limitations made it difficult to find a standard HVAC system that would fit in the existing available space. A customized solution would be required, one that involved some literal "thinking outside the box," as some of the system's components would have to be designed to sit outside the pool enclosure.

The Dectron Solution

Engineer Cameron Collins of Springfield's Malone Finkle Eckhardt and Collins, Inc. (MFEC) was tasked with designing a custom HVAC system for Drury University's Breech Pool. Collins, who specializes in this type of large complex design, relished the challenge.

"The main challenge was to provide a new HVAC system in the space provided by the original system," explains Collins. "The first problem was getting the existing unit out of the basement and getting new equipment back into the space. It was determined that the existing indoor mechanical room was too small to fit new equipment to get the targeted 6 air changes per hour, so the design incorporated three **Dectron** dehumidifier units: two **DRY-O-TRON®** DSV-080 vertical units in the existing space, and one new RA5-120 outdoor unit. The units work together in parallel when the pool is in use and stage as needed when it is not." The design also provides redundancy for the system during maintenance.

The outdoor unit allowed a purge system to be installed, harnessing the energy in the air to use it to heat the pool and the indoor air in the pool area and reducing heating and energy costs, particularly in the winter months.

Allan Atkins from Rollie Johnson Inc. of Chesterfield, MO supplied the **Dectron** equipment for the project. The challenges of the space available made for a complex

system, Atkins explains. “To fit the units in the mechanical space, we needed to “twin” two of the smaller units [the DSV-080s] together to take care of the bleachers and one side of the pool. We supplemented that with a large outdoor unit [the RA5-120] to take care of the windows along the building and treat the rest of the pool.”

Each unit is equipped with Dectron’s Chloraguard®, a chemical filter that captures the tri-chloramines in the air, preventing irritated eyes and inhalation hazards for those swimming on a regular basis. This also allows the system to remove these toxic chemical compounds in the warm air in the pool area so that the ambient air can be re-used, eliminating the need to heat fresh air at great expense. Atkins adds, “The pool at Drury went from having no ventilation to having one of the best ventilation and filtration system in the Midwest after the job was done.”

Another consideration was Dectron’s reputation for quality and excellent customer service. Says Collins, “I have used Dectron on numerous hotel pools throughout the country and am impressed with not only their operation but also their support by both the factory and the area sales representatives.”

When it came to the installation, which was performed by Gold Mechanical of Springfield, MO, the first obstacle to overcome was to remove the existing system, a 25-year-old retrofit that was clearly obsolete. Doing so required the raising of the facility’s ceiling. A custom split outdoor over/under system was constructed to minimize the footprint to fit the limited available space.

The space limitations in the mechanical room also led to an innovative breakthrough in the system design for the two DSV-080 units equipped with Chloraguard® filters. As Allan Atkins explains, “Normally the filters are attached to the return of each unit. But we were using the mechanical room as a big return plenum, which means that we were returning chemical filled air into the mechanical room and over time this would cause everything else in the room to rust and deteriorate. Once the units were installed the owner posed a question to Cam [Collins, the engineer] and me: ‘Why don’t we put the filters in the wall and protect the entire mechanical room?’ So Cam went to work on a new design for the filters, sent it over to us for review and everything checked out. We ended up opening a huge hole in the wall and removed the filters from the back of the units, then stacked them up the wall with new filter racks. To overcome the additional static pressure, Gold Mechanical installed an inline fan to help compensate for that loss. Now, the entire mechanical room is protected from the pool chemicals, thereby extending the life of all the pool equipment and not just the **Dectron** units.”

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The Results

The improvement in indoor air quality (IAQ) was immediate and dramatic. Said Brian Reynolds, Drury’s head swim coach, “The athletes are noticing the difference every day – the water is cleaner and clearer, and the better air quality makes it perfect for training.” New recruits to the university’s Swim and Dive teams notice right away that the air isn’t as hot and humid as it is elsewhere, and there is no smell.

DRY-O-TRON® DSV-080s w/Chloraguard® filter racks relocated in the wall to protect entire mechanical room.

Dectron’s reputation for customer service was put to the test during the installation. Allan Atkins explains, “We had a bit of a hiccup on the programming of the outdoor unit. **Dectron** service flew in that week, diagnosed the problem within an hour and had the factory working on fixing it immediately. I can’t say enough good things about Gary Jones and how well he knows these units, even though almost all of them are custom units.”

The new system should stand the aquatic athletes at Drury in good stead for many years to come. “With proper maintenance, I fully expect these units to last over 20 years,” says Atkins. “The Chloraguard® filters not only protect the people inside, they protect the unit from corrosion as well, leading to a longer life span.”

Along with the new HVAC system, the interior of the pool was re-tiled and the pool deck was resurfaced with a new, more slip-resistant material, resulting in a much improved swimming and diving experience for the Drury aquatic athletes. The facility’s windows were also replaced, and new acoustic ceiling panels were also installed.

Shortly after the installation was completed, Drury’s Men’s and Women’s swim and dive teams went on to sweep the NCAA-II National Swimming and Diving Championships, with the men winning their record 10th consecutive national title and the women winning for the fifth time in six years. With a state-of-the-art pool facility in which to train, the Drury teams are poised for continued dominance in the years to come.