



OUTDOOR AIR — AN EASY CHOICE FOR LAKEVILLE AREA SCHOOLS' NEW NATATORIUM

PROJECT GOALS

- **Use of outdoor air to improve indoor air quality** by removing harmful chloramines and increasing air movement.
- **Host competitive events with increased capacity.** The two existing pools are not large enough to house big events.
- **Retain reliability provided by existing Innovent units.** The facility and maintenance crew wanted easy-to-operate, reliable equipment operation consistent across the district that Innovent units had provided previously.



THE CHALLENGES

Lakeville Area Schools pool projects included adding a natatorium at Century Middle School and replacing air handling units at two existing pool facilities. After years of reliable operation, the district needed to replace original Innovent units at Kenwood Trail Middle School and McGuire Middle School simply because of age. The district has consistently chosen Innovent as the pool AHU because of Innovent's use of outdoor air. "That's why we wanted Innovent — because their unit uses outside air," said Andrew Nordstrom, Mechanical and Energy System Manager, Lakeville Area Schools. Each member of the facilities team is pool certified and keenly aware of the importance of using outdoor air to improve indoor air quality in pool spaces. In addition to the high outdoor air delivery, the district and its facilities team trusted that the Innovent units would again meet their high standards for quality and reliability.





“Innovent makes a solid unit. What does it take to keep it running? Not much!”

– Andrew Nordstrom

The district wanted an Innovent unit at the Blanchard Aquatic Center because they were impressed by the reliability and construction of the existing Innovent units. The two replacement units serve lap pools only, but this facility is much larger, including a dive pool, lap pool, and large spectator area that seats 476.

- Two-story, 20,604 sq. ft. pool facility
- Eight-lane, 25-yard competition pool
- Diving well
- Locker rooms, pool office, multi-purpose classroom, spectator seating, and concessions
- \$16.5 million total construction cost

In addition to quality construction and reliable operation, Innovent’s controls expertise is vital for the unique needs of pool spaces. Space conditions for indoor pools are quite different than other spaces. With the competition pool water maintained at 80 °F, the district wanted to deliver a space temperature of 82 °F in the pool area. Keeping the space temperature two degrees warmer than the pool water will:

- Minimize condensation and potential deterioration of the structure
- Reduce pool water evaporation – dollar savings

THE INNOVENT SOLUTION

Century Middle School hosts a substantial amount of swim meets at this facility, with stands that can hold 400+ spectators. Creating a warm space for the swimmers and divers while keeping spectators comfortable is challenging. Innovent has extensive experience with large-capacity natatoriums, delivering fresh air to the breathing zones of swimmers, people on deck, and spectators — key to creating a healthy indoor climate. Innovent provided a system with integrated control sequences to prevent spectators from getting too warm during meets. The Innovent system delivers 46,000 CFM with 20% to 40% outdoor air depending on the mode. Innovent’s factory-programmed controls integrated seamlessly into the schools’ building management system, BACnet. The goal of the facilities team was to be consistent from school to school, so there was familiarity in running the systems.

While touring the Blanchard Aquatic Center, Andrew demonstrated Innovent’s implementation of controlled negative air pressure by putting a dollar bill up to the

exhaust air intake near the pool surface. The dollar bill sat solidly against the grate, held in place by the negative pressure.

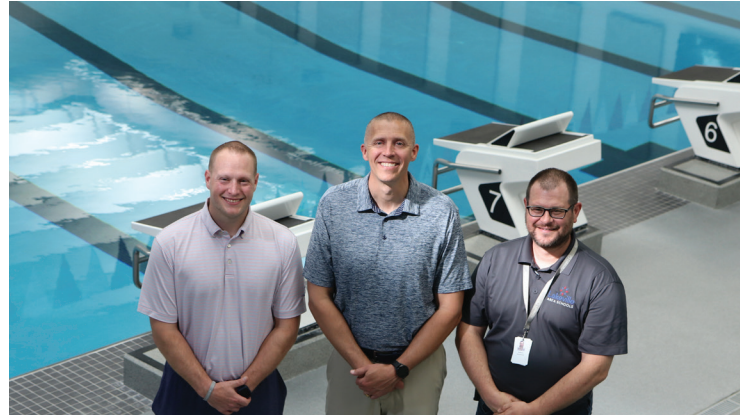
Properly controlling air pressure in buildings and interior spaces is critical to meet HVAC application requirements and preserving building structural integrity. Indoor swimming pool spaces are very humid and can contain chloramine gas, a corrosive byproduct of the chlorine sanitizing process. Maintaining pool spaces at negative air pressure, relative to outdoor air and adjacent space air pressures, protects pool building structures and materials from harmful condensation and corrosion while keeping chlorine odors out of adjacent spaces.

Funding was procured, and a team was assembled, including the Lakeville Area Schools facility group. The decision was made by the team to replace the existing units with Innovent and use Innovent on the new building. The school district's facility group told their design engineer they wanted to use Innovent for the new natatorium because they had been very happy with the existing Innovent units. Indoor pool HVAC systems are an Innovent core expertise. Innovent's pool dehumidification systems leverage the beneficial properties of fresh air to provide both a healthy environment and economical climate control. Energy recovery technologies and intelligent dehumidification based on seasonal conditions reduce energy costs while providing up to three times as much fresh air as traditional systems.

SVL, an Innovent rep headquartered with a few miles of the district; submitted a proposal and secured the project.

THE RESULTS

As the tour continued, Andrew asked, "Can you smell anything?" There was no chloramine smell! "That's our #1 priority. No chloramines!" he replied. Outdoor air ventilation is the most effective at removing chloramines. Healthy and



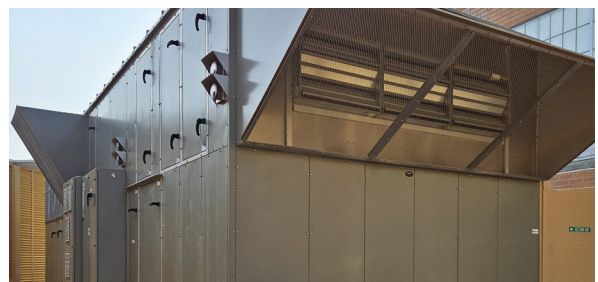
Jon Jackson, Jason Bakke, and Andrew Nordstrom¹

"If you smell it, it's wrong."

– Andrew Nordstrom

durable indoor pool environments require a well-designed ventilation system with effective air distribution and sufficient outdoor and exhaust air to remove toxic and corrosive chloramines from the space. In short, the positives gained through the project were:

- No chloramines
- Local Rep and Innovent Factory support
- Remote access from BAS system to BACnet consistent across the district
- 29 meets hosted, including three larger HS invitationals and two large 3-day swim club hosted meets.
- Consistent space-temp relative to pool — Desired Space Temp - Actual Space Temp



Innovent unit installed at the Blanchard Aquatic Center, Century Middle School

¹Jon Jackson, Assistant Director of Facilities and Plant Planning, Lakeville Area Schools
Jason Bakke, Principal, Century Middle School, Lakeville Area Schools
Andrew Nordstrom, Mechanical and Energy System Manager, Lakeville Area Schools

PROJECT
Blanchard Aquatic Center
Lakeville Middle Schools
Lakeville, MN

ARCHITECT
DLR Group

CONSTRUCTION MANAGER
ADVISER
Loeffler Construction & Consulting

INNOVENT REPRESENTATIVE
SVL



“Keeping the pool in balance is easier with heating versus chemicals.” – Andrew Nordstrom

LEARN MORE

[Innovent Pools Website Page](#)

[University of Minnesota Aquatic Center Case Study](#)

[CDC: Chloramines and Pool Operation](#)

Website by The Centers for Disease Control and Prevention

[ASHRAE Journal Article](#)

[Ventilation Requirements for Natatoriums](#). 2017. Gary Lochner, Innovent.

[HPAC Engineering Webinar](#)

[Indoor Pool Ventilation: A Fresh Perspective](#). 2017. Gary Lochner, Innovent.

[Innovent Application Guides](#)

[Space Air Pressure Control](#): Learn about pressure control strategies using the exhaust fan, supply fan, dampers, and airflow monitoring.

[Pool Source Capture](#): Pool source capture systems are most effective when integrated with the air handling unit.

[Innovent Design Guides](#)

[Energy efficiency in indoor aquatic facilities](#): Thoughtful choices yield significant energy savings.

[Ventilation and air distribution in indoor aquatic facilities](#): Optimize outdoor air to create healthy and durable pool spaces.

[Special operating modes](#): Strategies for maintaining IAQ and saving energy when pools are unoccupied, super-chlorinated, or hosting swim meets.



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