

## Aircuity case study

# Meade County School District

## Aircuity vs. Traditional Discrete CO2 Sensing for Demand Control Ventilation

THE MEADE COUNTY SCHOOL DISTRICT, located in Brandenburg, KY, provides educational services for approximately 5,100 students in Pre-Kindergarten thru 12th grade. With a district motto to “Make Excellence a District-Wide Endeavor”, school officials strive to provide the most productive learning environment while concentrating school funds on the classroom.

The Meade County School district was looking to save energy by implementing demand control ventilation (DCV) within their schools. The school district was presented with two different ideas about how to achieve CO2 based DCV: using discrete CO2 sensors throughout the building or

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Rodney Pickering, Director of Buildings and Grounds  
Meade County School District

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using Aircuity’s centrally located CO2 sensors with remote sampling. The school district had implemented both strategies at different schools previously and wanted to decide which should be implemented during an upcoming renovation to the high school. One of the key considerations for the school district centered on the issue of sensor calibration; which method would be more reliable, delivering more accurate control and better energy savings, year after year, over the life of the school?



To answer this question, a study was conducted at the Brandenburg Primary School where discrete CO2 sensors had been installed several years earlier. The school district’s vendor had a stated intention of replacing the sensors every 3-5 years, rather than calibrating the installed sensors. “It was our understanding that these sensors did not require frequent calibration,” explained Rodney Pickering, Director of Buildings and Grounds for the school district.

Technicians came to the school to examine the state of the discrete sensors. A TSI handheld CO2 monitor was used to measure the actual CO2 levels at every discrete sensor location. These “actual” readings were compared to the current readings of the installed sensors to determine if the sensors were still reading accurately, and if not, provide data on how inaccurate the devices had become.

## DISCRETE SENSOR TEST RESULTS: CALIBRATION MATTERS

The results showed a distinct and troubling situation. Of the 65 sensors installed at the school, less than 10 of them were operating within a 10% margin of error. Almost 2/3rds of the sensors had errors exceeding 25%, in fact the average error across all sensors was 62%!

Discrete Sensor Test Results	
Total # of Sensors	65
Average Error	62%
±10%	9
11-25%	13
26-50%	24
>50%	15
# of dead sensors	4

The vast majority of errors amongst the discrete CO2 sensors were erroneously high readings, which would cause the HVAC system to mistakenly believe that there were more occupants in the spaces than were actually present. This would drive the ventilation system to provide significantly more outside air than was necessary—not just diminishing the potential DCV savings, but wasting energy by providing an estimated 2.7 times more outside air than was actually needed!

## REMOTE SAMPLING WITH CENTRALIZED SENSING: A SUPERIOR SOLUTION

Aircuity's approach to demand control ventilation addresses the shortcomings of discrete CO2 sensors in several different ways. The architecture of the system draws air samples from throughout a facility and delivers them sequentially to a centrally located sensor suite, eliminating errors that can result from using multiple sensors to detect CO2 levels. These sensors are also replaced every 6 months with freshly calibrated sensors as part of Aircuity's Assurance Services program, ensuring accuracy year after year. Finally, Aircuity also remotely monitors the performance of their sensors

so that any malfunction of the sensor gets proactively addressed by service personnel in a timely manner.



## CONCLUSION

Meade County made the decision to implement Aircuity in their high school renovation and is considering Aircuity for additional energy retrofits in other existing schools. “We are always looking for ways to save money, but not at the expense of our students’ comfort or productivity,” explained Pickering. “Money saved on energy is money that can be reapplied directly to the classroom, which is good for everyone.”

## ABOUT AIRCUITY

Aircuity is the smart airside efficiency company providing building owners with sustained energy savings through its intelligent measurement solutions. By combining real-time sensing and continuous analysis of indoor environments, the company has helped commercial, institutional and lab building owners lower operating costs, improve safety and become more energy efficient. Founded in 2000 and headquartered in Newton, MA, Aircuity's solutions have benefitted organizations such as the University of Pennsylvania, Eli Lilly, Masdar City, the Bank of America Tower and the University of California-Irvine. For additional information on the company and its solutions, please visit: <http://www.aircuity.com>.

