A Sustainable Lab
University of St. Thomas

"The replacement of the venturi valve system with the low pressure drop AccuValve system has proven to save the university money by significantly lowering our monthly utility bill."

David Clysdale
St. Thomas Facility Manager

Less Pressure, Less Sound Less Energy, Less Money… More Sustainable

The University of St. Thomas in St. Paul, Minnesota is known for academic excellence and state-of-the-art facilities. An innovative project to upgrade the laboratory airflow control system in Owens Science Hall delivered energy, sound and performance improvements that surpassed even optimistic expectations. In addition, the new system provided over $75,000 in annual energy savings.

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Project Highlights

	Before	After
Exhaust Static Pressure	-5.0" w.c.	-1.0" w.c.
Exhaust Fan Use	150 HP	60-70 HP
Room Sound Level	56 dBA	49 dBA

Annual Energy Savings Over $75,000!

Accutrol's AccuValves deliver quiet, constant airflow measurement and detect and alarm all airflow issues.

The original venturi system sounded like a "freight train rolling through the classroom."

Dr. Tony Borgerding
Chemistry Department Chair

ACCUTROL LLC

The Problem

The Owens Hall facility, constructed in 1996, includes 90 fume hoods with a total of 217 venturi airflow control valves. In 2012, university facility staff identified pressure issues throughout the building that could not be resolved. With annual budgets influencing the potential solution, the university decided to execute a 3-year phased project strategy to replace the system. Two important criteria would need to be addressed for any potential renovation solution. The first would be to minimize the need for modifications to the existing expensive 316 stainless steel exhaust duct work. The second required that any solution would need to operate with the current high static pressure while the old system was phased out over the three year period.

Both Accutrol and the existing system manufacturer were asked to bid on replacement of the system. Despite the inherent advantages of replacing a like-for-like system, Jon Hartman of Midwest Mechanical Solutions submitted a significantly lower cost and was awarded the project. Acting as the general contractor, Jon used his experience as a consulting engineer to deliver a comprehensive solution to the University of St. Thomas that included data collection before and after the upgrade. With this data, the university was able to quantify exact performance gains and energy savings as a result of replacing the venturi valve based system with an AccuValve system.

Prior to project commencement, room differential pressure measurements revealed that only 16 out of 43 (37%) rooms were maintaining a negative static pressure as intended. In addition, removal of the existing venturi plunger airflow control valves revealed numerous obstruction issues (paper towels lodged in the valves, shut fire dampers, plugged reheat coils). By design, the existing venturi valves did not have the capability to provide indications of airflow issues. In contrast, the new AccuValves include constant airflow measurement and immediately detect and alarm any and all airflow issues. Student safety and confidence in the system are greatly increased.

The Solution

Laboratories are notoriously high energy users with Owens Hall being no exception. The existing venturi valves utilized a high-pressure design to achieve performance. Prior to the upgrade, the exhaust static pressure set-point was -5.0" w.c. and the supply static pressure set-point was 2.8" w.c. Low pressure drop AccuValves resulted in a final exhaust static pressure set-point of -1.0" w.c. and a supply static pressure set-point of 0.7" w.c. In addition to the duct static pressure reductions, the minimum air change per hour (ACH) rates were reduced from 8 ACH to 6 ACH when occupied.

Annual energy savings were conservatively estimated as $75,000 (813,000 kWh) and early returns are exceeding those estimates. The energy utility also provided $73,000 in rebates for selecting an energy efficient solution.

Less Pressure, Less Sound, Less Energy, Less Money, More Sustainable – The high pressure requirement of the existing venturi valve system created an exceedingly loud environment in the classroom, which the chemistry department chair, Dr. Tony Borgerding, likened to "the sound of a freight train rolling through the classroom." Dr. Borgerding stated that "professors had to complete lectures with fume hoods in the closed position and move to one-on-one conversations when the hoods were opened." Project testing showed a reduction of sound from 56 dBA to a whisper quiet 49 dBA making it possible to complete classroom lectures in all modes of operation.

The project was completed in three phases over a three year period. As the existing airflow control valves rely on high pressure to operate properly, the static pressure set-points could not be lowered until the end of Phase 3. This forced several AccuValves to operate for years at a pressure of -5.0" w.c. and subsequently perform at a pressure of -0.3" w.c. No other valve on the market is capable of high performance operation at these extreme pressure ranges.

"The fact that the AccuValve can operate at high static pressure just as well as it can at very low static pressures make it the only product that can pull off a phased renovation project like the one for Owens Hall."

David Clysdale
St Thomas Facility Manager

Accutrol, LLC • 21 Commerce Drive • Danbury, CT 06810
p 203-445-9991
www.accutrolllc.com • sales@accutrolllc.com