

Decentralized & QUIET

an unexpected air handling solution for NYC classrooms



Could a remarkably quiet air handling unit be part of a solution to the overcrowding problem in New York City schools? An expansion/relocation of the highly regarded Beacon High School into a former Manhattan factory building suggests that it might be so.



A remarkably quiet air handling units for classroom environment

Unit air handlers solved what could have been a very costly problem with classroom conditioned air delivery at the new school, located at **530 West 44th Street** in Hell's Kitchen. Set to open in Fall 2015, the school is located in what was once a factory and then a book storage facility used by the public library. Retrofitting such a space for a school, given its pre-war, concrete-laden construction would have been extremely complex and expensive had it not been for this quiet, decentralized solution to classroom air delivery.

Quiet Air Handler

"Quiet" is not a term typically associated with unit air handlers or ventilators. In fact, such equipment has become all but obsolete in many schools because of the associated noise issues. New York City School Construction Authority (SCA) has strongly upheld a policy for avoiding such equipment in classrooms for many years. But the former factory building left few other options.

According to George Varthalamis, the onsite architect from John Ciardullo Associates, the existing seven-story structure did not afford the opportunity to raise the floor-to-floor height for the purpose of hiding ductwork in individual classrooms. Large, mushroom-type columns located throughout the building also limited the design flexibility required for a completely centralized air handling system. Installing unit air handlers in each classroom was the only affordable option, but the equipment would have to meet strict acoustic specifications.

Specifically, the air handlers would have to perform at a decibel level for a case radiated sound level less than 72 dBA and a discharge sound level of less than 56.2 dBA. An onsite sound test would also be required to confirm the noise levels were suitably low.

Freshman IQ by Changeair

The Freshman Series of Vertical Classroom Air Handlers from Changeair was selected for the project. The units were specially equipped with Changeair's "IQ" Intelligently Quiet package to assure suitable acoustic performance. Literally decades of acoustic attenuation experience has gone into the design of the Freshman Series and the IQ package. The bar has always been set high, with one goal being to develop a product that would support the acoustic requirements under the Indoor Environmental Quality (IEQ) section of LEED. The end result is a product that performs far and above conventional equipment in terms of acoustics.

Sound of Silence

On December 2013, several parties gathered at the jobsite for a preliminary start-up and the required sound test of one fully customized Freshman unit, installed according to specifications. What followed surprised everyone recalled Jeremy Stockmans, Senior Design Engineer for Changeair.

"When I arrived at the job site, the test party [engineer, architect, contractor, and acoustic consultant] was assembled around the room where the Freshman unit was installed. The installers were working in the electrical box internal to the unit, with the doors of the unit removed.

Although they had completed the start-up procedures, they assumed the unit wasn't operating because they couldn't hear the fan.

"I proceeded to check the wiring and controls and confirmed that the unit was operating and delivering the rated airflow. I could feel the air movement with my hand and on my face. It was just so quiet that no one could hear the fan, which is located behind the electrical box. It was that quiet - even with the doors removed from the unit", said Stockmans.

Robert Grande, owner of Grand Mechanical, was at the sound test and confirmed what Stockmans had to say.

“We had the unit running on low speed but we couldn’t hear a thing,” said Grande. “I’ve seen enough of these types of units over the years, and this is not your typical unit air handler. It is exceptionally quiet”.

The unit design and IQ “Intelligently Quiet” attributes virtually eliminated all case radiated sound between 1000 Hz to 8000Hz, while also keeping discharge sound power to a minimum. The SCA and acoustic consultants required sound power levels be kept below 72 dBA case and 56.2 dBA discharge. The Freshman units delivered 51 dBA case and 50.7 dBA discharge.

“Certain requirements specific to this job actually limited our ability to achieve the lowest possible dBA. Even so, what we delivered far exceeded expectations”, said Stockmans.

Revisiting Decentralized Air In Schools Both Grande and Varthalamis agree that the success of this project could initiate the use of decentralized air handling units in future NYC school retrofits as well as other school systems where unit ventilators/air handlers have lost favor.

“I think this project will certainly open doors to decentralized air handling in existing classroom spaces. The biggest advantage is that this approach brings local control to individual classrooms”, said Varthalamis.

Such individualized, local control could include ventilation air (with or without energy recovery) and/or heating and cooling via internal coils. One or all of these functions are available in one remarkably quiet and highly customizable Freshman unit.

As overcrowded cities look more toward vacant and underutilized buildings to fulfill their need for educational space, this decentralized solution from Changeair could be a beacon of light in what might otherwise be a very expensive and complex mechanical retrofit.





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