Case Study

Fan Powered Terminal Unit

Project & Location
PNC Place, Washington D.C.
First LEED Platinum Building

Designed By
Architect: Gensler
Engineer: GHT, Limited
Mechanical Contractor: W.E. Bowers
Developer: PNC/Vornado
Consultant: Paladino & Company

Krueger Representative
DMR & Associates, Inc. | www.dmr-hvac.com

Krueger Product Used
KLPP Fan Powered Terminal Unit

Photo courtesy of www.pnc.com.

About the Project

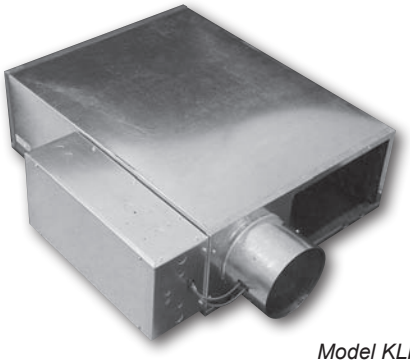
Just two blocks from the White House, PNC Place is building a 12-story, 365,000 square foot office building, which will be their new Greater Washington regional headquarters. This will in fact be Washington D.C.'s first office building designed to achieve U.S. Green Building Council LEED (Leadership in Energy and Environmental Design) Platinum certification. The LEED Platinum certification reflects the highest level of environmentally sustainable building design recognized by the council. Opening in 2010, it will be a host to a number of office tenants and provide retail space, including a PNC Bank branch.

This building features several solutions to reduce energy consumption, of which the most impressive is a 3-story "climate wall", which is a wall of water to help naturally cool and condition the space. Having brought together natural elements and sustainable building design, the goal was to find an air distribution solution that would complement the application and fulfill the LEED requirements for energy-savings.

Challenges & Considerations

Working with local representative, DMR & Associates based out of Gaithersburg, MD and engineers at GHT, Limited, we found that they were challenged by the potential problems with delivering very cold air directly into a space, primarily due to condensation concerns, especially in critical areas such as the building entranceway, where building humidities are likely the highest. Previous designs had used series terminal units to mix some return air with cold primary air to raise the discharge temperature above the expected building dewpoint. This design has worked well, but is limited by the capacity of the fan in the unit, which must handle all the air being delivered to the space.

The Washington D.C. market typically utilizes low profile devices in the plenum, due to building height restrictions. Shallow plenums often allow an additional floor. All of the low profile series terminal units available on the market have either limited fan capacity (due to space issues) or have two small fans, and are often noisier than single fan units. The energy use of series fan terminal units is also a concern, as the fans run at full flow all the time during occupancy. Switching to ECM motors may save some energy, but at full flow, an ECM uses almost the same energy as a PSC motor, and the dual fan series unit with an ECM motor is prohibitively expensive.



Model KLPP

Case Study :: Fan Powered Terminal Units, Model KLPP

PNC Place, Washington D.C.

Product Solution

Several options were discussed. It was determined that the best option was a parallel, low profile unit with the backdraft damper removed (as it wouldn't be needed) with a single DDC controlled ECM motor to often run at a reduced airflow (saving energy). The combined flow-rate of the primary and parallel fan could exceed that of a series unit, at lower unit fan energy, lower first-cost, and lower sound levels than any other option.

To arrive at this decision, Krueger developed a mockup to test different scenarios for jobsite conditions in which acoustical, energy, and airflow performance data were collected. This testing helped find an operating range that would deliver the optimum performance for the application. It also allowed GHT, Limited to be comfortable with using the Krueger KLPP terminal unit in this high profile project.

With assurance from prior testing, Krueger's KLPP parallel fan powered terminal unit was specified for the job. Designed to continuously operate the fan, this unit allows 47ºF primary air to be delivered to the unit and mix with warm plenum air to raise the discharge air temperature in cooling to 54ºF. Providing 47ºF air allows for a 30% reduction in the airflow requirement, which results in using smaller fans, smaller motors, and smaller ductwork, all of which result in energy savings. The KLPP was provided with an ECM motor, which provides additional energy savings.

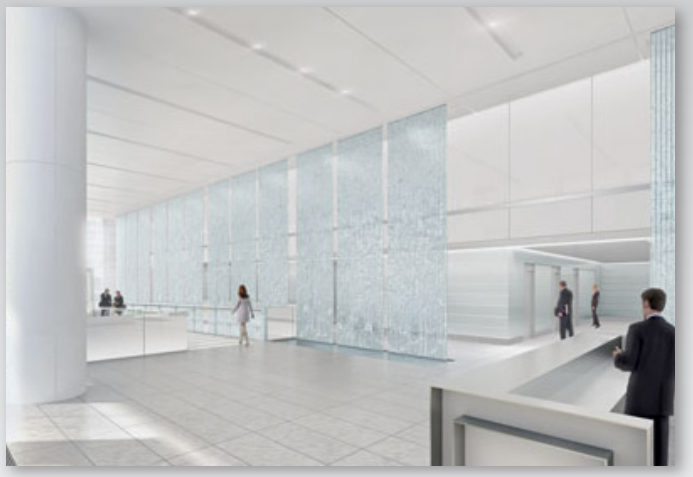
The End Result

Krueger is pleased to have had the opportunity to be involved with the engineers and designers of PNC Place to develop a product solution to fit such stringent energy requirements and help contribute to the LEED platinum certification.

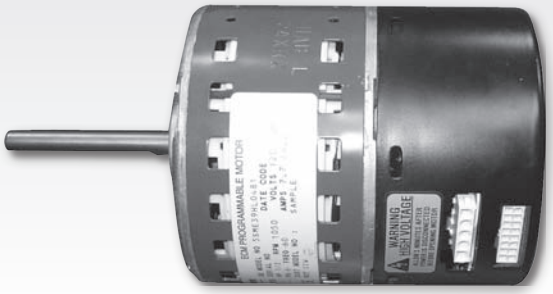
Scheduled to open in June of 2010, the true results of their planning have yet to be realized, but we are confident that the design and implementation of the 555 KLPP fan powered terminal units promote occupant comfort, lower first-costs, and capture energy savings.

More Information

For more information on Krueger's KLPP fan powered terminal unit or to learn about other air distribution solutions, simply contact your local Krueger representative or visit us on the web at www.krueger-hvac.com.



Lobby, View of "Climate Wall" courtesy of www.pnc.com.



Krueger offers energy-efficient ECM motors throughout its entire line of fan powered terminal units. Krueger was the first manufacturer with an ECM motor option on parallel fan units. Whether you are meeting new municipal requirements or the total building energy reduction requirements of both LEED -CI and -NC rating manuals, ECM motors can help.

Product Features

20 Gage Construction with Removable Bottom Service Panel
Fan Motor w/ Electronic Speed Control or ECM Motor
Airflow Capacities to 2060 CFM
Hot Water or Electric Heat with Solid State Relays Available
Dual Density Liner Standard, Optional Liners Available
Pneumatic, Analog Electronic, or Direct Digital Controls (By Others)
AHRI and ETL Listed
Meets NFPA 90A, UL 181, and ASTM C 665 Requirements

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Engineering Information

Krueger continues to lead the industry in the development of innovative products and air distribution solutions. To learn more about what we can do for you, contact your local Krueger representative or visit us on the web at www.krueger-hvac.com.

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Supporting Sustainable
Green Building Design

PNC CASE STUDY | 03/2010