



Robert E. David Building houses South Carolina Department of Employment and Workforce headquarters.

South Carolina State Agency Unlocks 37 Percent Annual Energy Savings

ISSUE:

Among a number of manufacturers considered, Daikin beat out the competition with its Magnitude® magnetic bearing chiller, on a lifecycle-cost basis. “The customer was looking for the chiller with the best lifecycle cost over a 20-year period of operation,” says Danny Wilds, P.E., LEED AP, president of MDI in Columbia, SC, adding the specification process also required the new chiller to meet a noise threshold of 81.5 dBA.

Mechanical Design, Inc. (MDI), the mechanical engineering firm on the project, provided engineering services for the replacement of the chiller, chilled-water pumps, condenser-water pumps, and all related piping. “Most state office buildings have hot-water heat and this building relies on electric strip heaters for warm air. One key objective of the separate controls upgrade was to avoid the use of simultaneous heating and cooling,” Wilds says.

“The customer was looking for high energy efficiency and low sound in a replacement chiller as noise was a consideration since the mechanical room is located above executive offices,” says Todd Woodrow, Daikin Applied representative and sales engineer at Hoffman & Hoffman, Inc. in Cayce, SC.

SOLUTION:

The process to vet chiller manufacturers and specific products began in 2012. “The customer was looking for the chiller with the best lifecycle cost over a 20-year period of operation,” Wilds says, adding the specification process also required the new chiller to meet a noise threshold of 81.5 dBA.

Among a number of manufacturers considered, hands down, Daikin beat out the competition with its Magnitude magnetic bearing chiller, on a lifecycle-cost basis.

The award-winning Magnitude chiller renders part-load performance of 0.32 kW/ton IPLV and sound pressure ratings as low as 76 dBA. “The Magnitude chiller hardly ever has to run at full capacity and the part-load efficiency (of 0.32 IPV) was taken into account for our firm to calculate cost on weighted averages of operation throughout the year,” Wilds says.



NAME:

Robert E. David Building

LOCATION:

Columbia, SC, USA



FACILITY SIZE:

106,380 ft²



ISSUE:

Procure a quiet chiller with the best life-cycle cost over a 20-year period of operation



SOLUTION:

(1) 260-ton Daikin Magnitude® magnetic bearing centrifugal chiller

SOLUTION (CONTINUED):

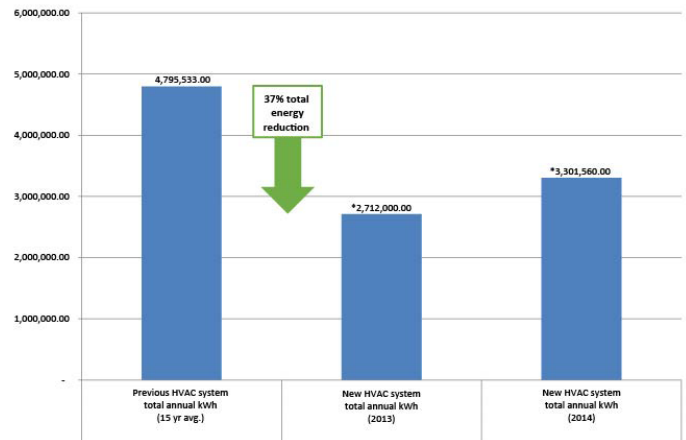
"From the chiller standpoint, using a magnetic bearing chiller is unique. The renovation also brought the ability to better control the electric heat which also contributes to significant energy savings for the owner," Wilds says. The controllers in the variable air volume (VAV) boxes that modulate cool air were also replaced as part of a separate contract.

Mechanical contractors McCarter Mechanical of Spartanburg, SC, removed the old chiller and installed the Daikin chiller. Adds Woodrow of Hoffman & Hoffman: "The new chiller was started up in March 2013 and the project overall was a quick changeout with the work done over a four to six week period."

The unusually warm winter temperatures that occurred during the replacement process was one of the only challenges the project team encountered. With the air conditioning inoperable and dynamic weather hard to predict, it was a temporary inconvenience. Yet, the agency didn't believe it needed to address a temporary cooling solution since the equipment changeout would occur quickly.

During the chiller project in 2012-2013, a new building automation system featuring direct digital controls (DDC) was installed to replace the building's original pneumatic controls. "In addition to new controls and the chiller technology, having non-simultaneous heating and cooling helps to control the owner's energy costs," Wilds says.

David Building Energy Comparison - Before and After Retrofit



Non-simultaneous heating and cooling helps to control the owner's energy costs.

OUTCOME:

"Replacing our 40-year-old chiller with the new Daikin magnetic bearing frictionless chiller, along with new DDC controls, has really been a great energy savings for our agency," says Doug Kirkland, facilities manager at the South Carolina Department of Employment and Workforce (DEW) in Columbia, SC.

The Daikin Magnitude chiller contributes to impressive energy savings at the DEW. Since the new chiller system, controls, and lighting were installed, on a two-year average, the state agency has realized energy savings of approximately 37 percent annually. Moreover, the agency

also received an incentive rebate on its capital investment in the Daikin Magnitude chiller from the South Carolina Electric & Gas Company's EnergyWise program of \$29,640.

DEW appreciates the preventative maintenance from the Daikin Service. "The chiller has been performing flawlessly with no real issues to speak of. We have it on a yearly maintenance program that keeps it running at peak performance and provides us with confidence that the system will remain operational for our employees and customers," Kirkland concludes.



Daikin Magnitude chillers contribute to impressive energy savings.

"...the new Daikin magnetic bearing frictionless chiller, along with new DDC controls, has really been a great energy savings for our agency."

– Doug Kirkland, Facilities Manager, South Carolina Department of Employment and Workforce