



The McNamara Alumni Center building is a landmark on the University of Minnesota-Minneapolis campus.

Magnitude® Chiller Saves University \$13,000 in Annual Utilities

ISSUE:

The University of Minnesota's McNamara Alumni Center acts as a visitor center, office building and event center on the Minneapolis campus. With a striking granite-covered exterior and 85-foot atrium, the structure is a landmark on the East Bank of the campus. Cooling this ultra-modern building is Daikin's Magnitude magnetic bearing chiller, generating impressive operating cost savings for the university.

The 231,000 ft² Alumni Center building opened before magnetic bearing chillers were available. Another 550-ton chiller with a traditional centrifugal compressor was originally installed in the building. Jon McCombs, operations manager at the Alumni Center, managed by United Properties' Corporate Solutions division, wanted the reliability and redundancy of a second chiller for the building. "I wouldn't recommend any building owner, especially where they have this kind of run time, not to have some redundancy. Yet two of those large, traditional machines wouldn't have fit in our equipment room."

SOLUTION:

Daikin's 300-ton Magnitude chiller was the perfect solution to supplement the building's original machine. Schwab Volhaber Lubratt (SVL), Daikin's Representative in Saint Paul, Minnesota, recommended Magnitude due to its compact footprint, part-load performance and quiet operation to meet the requirements of the Alumni Center with an almost immediate payback on energy savings.

"Weight was one of the first hurdles we had to overcome," says McCombs. The quiet operation of the Daikin Magnitude chiller allowed us to avoid installing it on a housekeeping pad, used to isolate sound, thus greatly reducing the weight and physical foot print." The magnetic bearing compressor weighs a fraction of a typical centrifugal compressor. McCombs adds, "Our previous weight restriction for the open area prior to installing the new chiller was 125 pounds per square foot. We were able to de-rate the remaining area to 100 pounds per square foot and meet the structural engineer's live load requirement."



NAME:

University of Minnesota
McNamara Alumni Center

LOCATION:

Minneapolis, MN, USA



FACILITY SIZE:

231,000 ft²



ISSUE:

Supplement the building's original
550-ton centrifugal chiller



SOLUTION:

(1) 300-ton Daikin Magnitude®
magnetic bearing chiller

SOLUTION (CONINUED):

The compact design of the chiller – at approximately 12 feet by under 48 inches, including the electrical panel – also made a difference, McCombs says. “We had a very tight design. The electrical panel needed to have a three-foot clearance to meet code. We are extremely close to three feet yet have adequate room for service. Given the size and weight of the machine, we ended up with the maximum machine possible as far as shell size and physical weight restrictions.”

Another selling point of Magnitude was the easy integration with the existing Johnson Controls Metasys® building automation system installed in the Alumni Center. The chiller communicates important control and monitoring information to the Metasys system using BACnet®, the standard open protocol developed by ASHRAE, the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Magnitude won out other chillers that use plate heat exchangers for ease of maintenance due to the elimination of oil. “The ease of service and long-term benefit of having a copper tube design over a stainless steel plate heat exchanger means there are no parts to wear out and very few components ever get replaced,” McCombs says.

Sound was another critical consideration at the Alumni Center given the building is frequently used for sound sensitive events such as meetings and wedding receptions. Magnitude was the perfect match with the quietest sound levels in the industry with sound pressure ratings as low as 77 dBA per

ARI Standard 575. “The lower decibel level, particularly the mechanical sound transfer, was a valuable consideration when making the selection,” McCombs states when discussing that the University of Minnesota Board of Regents regularly uses rooms on the floor below the mechanical room.



The 300-ton Daikin Magnitude chiller was selected for the Alumni Center based on its compact footprint, part-load performance, and quiet operation.

OUTCOME:

The Daikin Magnitude chiller was installed just before the school year, in time for a few 80-plus degree days. Because of the excellent part-load performance of the Daikin chiller— as low as .33 kW/ton IPLV—the unit has gone from being the back-up chiller to being the primary chiller. “The Daikin chiller has functioned as our primary chiller from the time we commissioned it, reducing our seasonal run-time hours on the other chiller by approximately 800 hours,” McCombs says. “We use the Daikin chiller about 65 percent of the time on a year-round basis.”

McCombs reports the McNamara Alumni Center has already dramatically reduced its electrical usage since the commission of the Daikin chiller.

“We’ve seen a reduction of around \$13,200 based on the savings of 169,139 kilowatt hours at a rate of \$0.0780 per kilowatt hours when averaging the past three years of energy used.”

Based on the continued use of the Daikin chiller on a primary basis during cooler weather, McCombs anticipates the McNamara Alumni Center will continue to see savings of at least \$13,000 each year. Based on the performance of the Daikin chiller, McCombs is also developing an automated program to switch between the two chillers to further maximize energy savings.



Jon McCombs, operations manager at the Alumni Center, has seen annual electrical energy savings of \$13,000 since the Daikin Magnitude chiller was commissioned.

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— Jon McCombs, Operations Manager, Alumni Center