

Green Proving Ground Test Bed Project

Technology Fact Sheet

Category:

HVAC

Technology Name:

Variable-speed Chiller with Magnetic Bearing Compressor

What is this Technology?

Magnetic bearing compressors are essentially frictionless, and their speed is controlled by a variable frequency drive. Eliminating the friction in these compressors greatly increases their efficiency at part load conditions. These chillers have just recently been introduced to the commercial market.

Why is GSA interested?

Energy Efficiency - While the chiller compressor at full load is only moderately more energy efficient than its conventional counterparts, at partial-load (where a chiller operates the vast majority of the time), the chiller compressor appears to be notably more energy efficient than conventional chiller compressors. Demonstration projects have shown that this technology can reduce space cooling energy by an average of 40%.

Cost effectiveness - First costs for this new technology are more than conventional chiller compressors, but simple paybacks range from 4 to 10 years.

Simplified Maintenance - Maintenance requirements for the new technology are expected to be lower than conventional systems, mostly because of the oil-free operation, the magnetic bearings, and the fact that the compressor only has one moving part.

Applicability - The technology is appropriate to new construction, major renovation, replace-on-failure, and in some cases, can be cost effective as a chiller retrofit. It is applicable to most chilled-water plants: while the largest compressor is rated between 170 and 200 tons, a modular approach can meet larger capacity requirements.

Adapted from report by Pacific Northwest National Laboratory