Chillers

How can chiller technology help save you money?

Over half of the energy used for Heating, Ventilation, and Air Conditioning (HVAC) is used for cooling buildings. Chillers are commonly used to cool commercial buildings and industrial process applications, where cooling is accomplished by chilling water and sending it throughout the building. Most chillers make use of the vapor-compression refrigeration cycle (composed of a compressor, evaporator, condenser, and some form of metering device), where refrigerant is used as the internal working fluid. In air conditioning systems, chilled water is sent through coils. Air then flows over the coils, cooling it, and then the air gets sent throughout the building. In industrial processes, the chilled water or refrigerant is pumped through the equipment to cool it.

If your chiller is over 20 years old, replacing it with a newer, more energy efficient model should be considered. Chiller efficiency has improved dramatically over the past 20 years and the economics – with utility incentives – are reasonably attractive to replace an older unit. When considering a replacement, it is important to size the new chiller correctly to avoid wasting energy due to low-load efficiency.

CHILLER OVERVIEW

- Chiller efficiency is measured in kW/ton.
- The lower the kW/ton rating a chiller has, the more efficient it is.
- The minimum efficiency requirements for chillers are dependent on the type and size chosen.
- There are two types of vapor compression chillers: air cooled and water cooled.
- Air-cooled chillers are located outdoors with all refrigeration equipment contained in one package.
- Water-cooled chillers are located indoors connected to outdoor cooling towers.
- Air-cooled chillers tend to be significantly less efficient that water-cooled chillers.

Chillers may have a Full-Load (FL) rating and an Integrated Part Load Value (IPLV) rating. IPLV is a weighted average of efficiency measurements at part-load conditions. It is a standardized way of comparing chillers at conditions more representative of field conditions. IPLV is preferred for situations with variable loads. For staged chiller installations, more emphasis on full-load performance should be considered.

If a chiller is too new to be considered for replacement, other energy saving measures can be considered. These include the following:

Chilled Water Supply Temperature Controls – Typically, a chiller supplies water at a constant temperature to the chilled water loop regardless of the various space cooling requirements. This causes the chiller to run less efficiently during moderate weather when the water temperature could be raised. Adding controls allows the water temperature to drift up when the demand for chilled water is low. This saves approximately one percent per degree that the temperature is raised.

Condenser Water Temperature Set-Point Control – Standard cooling tower controls maintain a constant condenser water temperature causing the chiller to work more than necessary. Adding controls allows the condenser water temperature to decrease as the outdoor wet-bulb temperature decreases. This measure can save 0.5% per degree that the temperature is decreased.

Chiller Sequencing – Chillers typically display a much reduced efficiency when they are operated at very low loads. If you have a multi-chiller system, sequencing can help ensure that the most efficient combination of chillers is being used.

In addition to these controls, it is also important to perform regular maintenance on your chiller. Be sure to check the set-point calibration, properly treat the water, and clean the tubes to improve the efficiency of the heat exchanger.

To participate in the Energy Smart program, contact us at 877-NRG-SAV1 (877-674-7281).