



Importance of Monitoring Chiller Approach Temperatures

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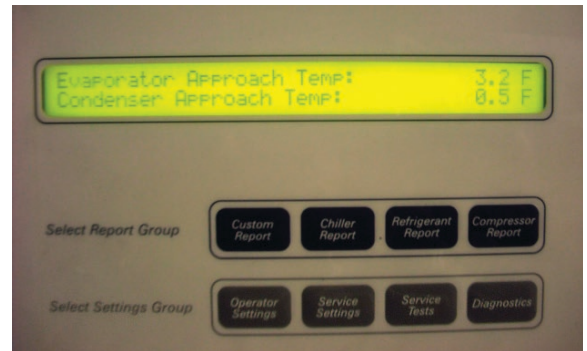
Chiller approach temperatures are key indicators of chiller performance and should be routinely monitored to ensure maximum efficiency.

Condenser approach temperature is defined as the difference between the condenser liquid refrigerant temperature (measured at the bottom of the condenser vessel) and the leaving condenser water temperature. The closer these temperatures are to each other, the more efficient the condenser heat transfer. Similarly, the evaporator approach temperature is the difference between the evaporator refrigerant temperature (measured at the bottom of the evaporator vessel) and the leaving chilled water temperature. Most later model centrifugal and screw chillers provide the approach temperatures on the chiller control panel and/or remotely.

As a general guide, approach temperatures of less than 5.0°F for chillers manufactured prior to 1985 suggests a clean and efficient condenser along with no detectable non-condensable gases. For newer chillers with high efficiency tubes, the approach temperatures can run as low as 0.6°F and up to 2.0°F. Increasing or high approach temperatures (greater than 2.0°F) may indicate one or more of the following conditions

- Fouled tubes (biofilm, scale, sludge, etc.)
- Non-condensable gases, such as air in the refrigerant
- Low refrigerant charge
- Improper cooling tower operation
- Improper water flow to chiller

High chiller approach temperatures indicate reduced heat transfer, increased energy costs, and a reduction in refrigeration capacity and should be promptly investigated. Note that approach temperatures vary based on chiller load, water temperature and flow, refrigerant charge, and tube cleanliness. To determine the normal approach temperature for a chiller, the original startup data for that chiller should be consulted. For accuracy, approach temperatures should be recorded when a chiller is operating near 100% load with the condenser water at the designed temperature (usually 85°F Inlet and 95°F Outlet). Approach temperatures obtained at less than 85% load may not accurately reflect waterside conditions or operational problems.



Chiller Approach Temperatures Indicate Heat Transfer Efficiency and Should Be Routinely Monitored.