

YASKAWA

Chiller Condenser water reset option enhances chiller efficiency to reduce energy consumption. Most of the energy consumed by a chiller is used to move refrigerant vapor from the evaporator (low pressure) to the condenser (high pressure). As the pressure differential between the evaporator and condenser increases, the compressor must work harder to move the refrigerant. Lowering condenser water temperature decreases this pressure differential, so the compressor does less work. As shown in Figure 1, reducing the water temperature leaving the tower can increase the operating efficiency (kW per ton) of a given chiller.

Cooling tower controls are usually set so that 85°F tower water is produced. When ambient conditions are appropriate, the controls can be reset to produce water that is cooler than 85°F. Depending on chiller type and operating conditions, it may be possible to reset the water temperature leaving the tower downward by as much as 30°F (i.e., to 55°F).

Resetting the water temperature leaving the tower is most effectively accomplished by applying a variable frequency drive to the cooling tower fan.

Application Considerations.

A multi-step thermostat or transmitter is required to monitor and control the condenser water reset operation.

To ensure adequate refrigerant flow and maintain proper oil movement within the chiller, a minimum pressure differential must be maintained between the condenser and evaporator.

Because low condenser water temperature can hamper the return of refrigerant to the evaporator, chiller efficiency may actually suffer if the tower water temperature drops too much.

It is important to remember that any reduction in tower water temperature is derived from an increase in tower fan energy consumption. The key is to use systems that can automatically optimize the trade off between tower fan and chiller energy consumption.

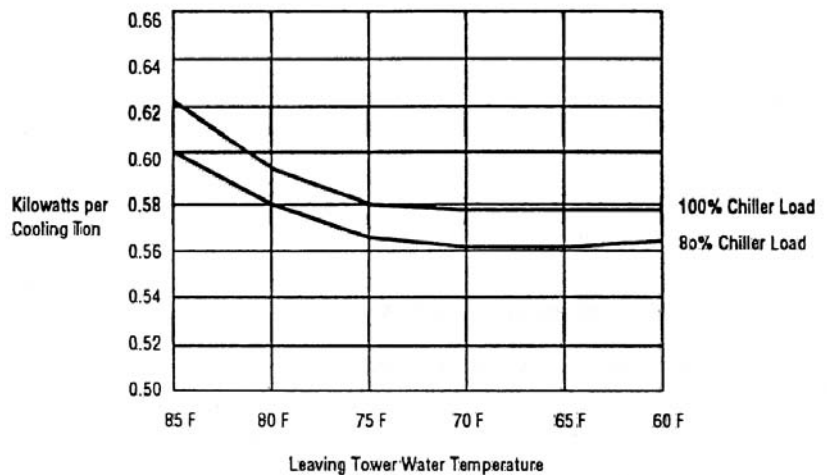


Figure 1.