

Application News

Ultrasonic Meter Optimizes Cooling Tower Energy Efficiency

Industry: Industrial/Power Generation

Service: Flow Monitoring & Control

Fluid: Water

Overview

In industrial plants, a cooling tower is the portion of a cooling system that rejects heat to the atmosphere through the cooling of a water stream to a lower temperature. A cooling tower typically cools a chiller which, in turn, cools equipment or a facility, but can also be connected directly to equipment in need of cooling.

Cooling towers are commonly used to provide cooled water for air-conditioning, manufacturing and electric power generation. The smallest cooling towers are designed to handle water streams of only a few gallons of water per minute, while the largest may cool hundreds of thousands of gallons per minute.

Situation

Industrial and commercial sites employing chiller-based cooling systems typically use 10 to 30 percent of their total power consumption on cooling functions, so any improvement in energy efficiency goes straight to the bottom line. Furthermore, a time-consuming maintenance task called "drawdown" periodically takes the cooling tower offline, so optimizing scheduled maintenance maximizes uptime, and ensures increased life and overall efficiency of the cooling system.

Solution

Flow Technology provides a versatile flow measurement system for industrial plants seeking to maintain the delicate balance between low cooling system energy consumption and capital investments. At the heart of this system is the SLF-500 clamp-on ultrasonic flow meter—an accurate, reliable and cost-effective instrument capable of measuring bidirectional flow through metal, plastic and even lined pipes.

The SLF-500 clamp-on ultrasonic flow meter is an ideal meter choice for this application since it eliminates the need to alter process piping. In addition, there is no pressure drop through the meter as there would be with other technologies. Unlike doppler-type ultrasonic meters requiring large particles or bubbles in the flow path to read a flow rate, the SLF-500 uses a transit-time measurement method providing an accurate and reliable output without modifying the cooling water flow.

System Description

Flow Technology's flow measurement control solution consists of an SLF-500 ultrasonic meter and an RTD installed in the cooling water line, and SL9100 flow computer providing precise temperature control. This system controls the cooling capacity of the tower by varying the speed of the variable speed motor(s) that maintain proper airflow.

A second control system employing an SLF-500 ultrasonic meter installed in the cooling water line, as well as two MB1000 miniature batch controllers, automates the drawdown process.

To simplify installation, the SLF-500 ultrasonic flow meter was designed with three open collector outputs. This allows users to receive the benefits of both control systems with the purchase of a single flow meter.

When combined, the two control systems enable constant monitoring and control of cooling system energy consumption. This solution maximizes the energy efficiency of the chiller, minimizes the energy consumption of the fan motor(s), and ultimately, increases the energy efficiency of the system as a whole.

Technical Information

Flow Meter: Model SLF-500

Flow Rate: 3.3 to 33 ft/sec

Fluid: Water



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