Lowest $ Kw/Ton™

Check us out!

www.TowerTechInc.com

TOWER TECH
Outperform™

Tower Tech's Variable Flow Capability Delivers Lowest $ kW/Ton

By Barry Woods, P.E.,

Conventional water distribution in cooling towers sacrifices valuable energy saving opportunities. This fact is even more pronounced in today's water filming style heat transfer medias.

The efficiency of evaporative heat transfer is affected by the air-to-water contact area and the mass flow liquid-to-gas ratio. In general, for a given heat load and water mass flow rate, the more surface area involved, the less required air velocity over the water surface, and consequently the less air-moving fan horsepower. If you want lower Kw/ton, buy more air-to-water contact surface area.

Film media, such as the popular PVC cross-fluted corrugated film block, provides a breakthrough in cooling tower design. It greatly increases the contact surface area without increasing the size of the tower box. Adversely, it suffers quickly from scaling and biomass fouling in very compact air channels that negatively impact the flow of air.

Precise water treatment is required to prevent bio growth fouling and the fill must remain "wetted" to avoid evaporative scaling. Conventional water distribution uses fixed orifice spray nozzles that produce a round pattern above a rectangular fill pack. The nozzles are placed in a rectangular overlapping pattern to assure full wetting of the fill at the design water flow rate.

Water flow rates below the design point will not produce a full spray pattern and void areas will start to appear. Any fill's best efficiency is achieved when the liquid-to-gas ratio is evenly balanced throughout the fill media. Short patterns and overlapping patterns cannot accomplish it.

When a cooling tower system is faced with a variable water flow rate (i.e. multiple pump cycling or variable speed pumping) these pattern problems force the operator to isolate whole cooling tower cells to maintain proper water distribution under reduced load in the remaining on-line cells. If this is not done, the tower efficiency will suffer and the fill media will quickly foul. Isolating cells takes away air-to-water contact surface.

A water distribution system that can respond to variable flow rates and keep all of the fill media evenly wetted and in service is needed. This requires a nozzle that responds to flow changes to keep a constant pattern. A square pattern that avoids overlap would be best.

Putting this system on a three-cell tower with three matched pumps would yield the following opportunities. A typical cooling tower would operate at 0.06 kW/ton for the tower alone at full load, 0.06 kW/ton at two-thirds load (two cells operating at 100%), and 0.06 kW/ton at one-third load (one cell operating at 100%). Under the same conditions, a constant pattern, variable spray system with variable speed drives on the fan motors would operate at 0.06 kW/ton at full load, 0.024 kW/ton at two-thirds load (all cells operating at two-thirds load), and 0.005 kW/ton at one-third load (all cells operating at one-third load).

These energy savings can only be achieved through use of a constant pattern, variable flow distribution system. This patented system is available for evaporative water-cooling towers only at Tower Tech. Come visit us at www.TowerTechInc.com to see our complete line of factory-assembled, modular fiberglass cooling towers for flow rates from 15 L/S to 15,000 L/S and more. Our towers are CTI Certified under STD-201 for your assurance of performance.

Tower Tech: We're worth a second look for a great many reasons. Check us out!