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TECHNICAL PUBLICATION

INFORMATION & STRATEGY FOR THE
FACILITY MANAGER

Cooling Tower Water Filtration

A Technical Publication of **Tower-Flo®**

Cooling towers act as giant air washers. Finely misted water is sprayed into a column of moving air. In a cooling tower, this mist is intended to increase the surface area of the water so heat will be more effectively transferred from the water to the air. In an air washer, this mist is intended to trap particulate matter out of the air and "wash" it into a sump for disposal. In cooling towers, unintended though it may be, large quantities of dirt, dust, and other airborne solids are washed into cooling system water. As dirt and particulate matter build in cooling system water, there are a number of undesirable results.

Fouling and energy consumption increase:

Dirt and suspended solids in cooling system water will foul all heat transferring surfaces the water contacts, reducing the equipment's efficiency. When that efficiency falls below the equipment's operating standard, controls sense the residual heat and force the machinery to work harder; a condition known as "false loading" which drives up energy consumption. A, continuously removing dirt and suspended solids, will reduce the energy consumption of an open loop cooling system in the range of 1% for clean environments to 10% in severely contaminated situations; 2% is a reasonable assumption.

Chemical consumption increases while effectiveness decreases:

Dirty water accelerates consumption of treatment chemicals which cannot distinguish among algae, bacteria or organic dirt so chemical dollars are spent treating dirt. Dirt can adversely effect pH accelerating consumption of pH controlling chemicals. Many treatment programs include polymers intended to keep dirt in suspension so it can be blown down; chemicals cannot remove dirt just as filters cannot control water chemistry! The dirt accumulated in areas of low water velocity (such as the cooling tower basin) provides an excellent breeding ground for algae and bacteria (i.e.; legionella), plus the dirt provides a layer under which anaerobic bacteria can be protected from the biocide treatments while it corrodes the basin floor. A **Tower-Flo® Filter** can reduce chemical consumption from 20 to 25%; as much as 40% in severely contaminated situations. This savings will be realized in two ways:

- a 10% decrease in total chemical treatment due to reduced blowdown and treatment of make-up water
- a 25-50% reduction in algaecide/biocides treatments

Blow down increases:

Dirty water increases conductivity which, in turn, increases blowdown/bleed-off rates and makeup water requirements. As make-up water requirements increase, the consumption of chemicals required to treat that make-up water is increased. A **Tower-Flo® Filter** will reduce sewer surcharges for disposal of blowdown and the cost of make-up water from 10% to 17% depending on the degree of dirt contamination.



Maintenance and downtime increases while equipment life spans are shortened:

Dirty water increases the maintenance required on cooling tower basins and compressor or chiller tubes, plus dirt acts as an abrasive in the water stream, eroding seals, pump impellers, etc. Unfiltered cooling tower basins demand at least annual "muck out" while severely contaminated environments can demand monthly cleaning. Chillers and compressors cooled with unfiltered water usually get at least annual "rod outs" but often clog-up at the worst possible moments forcing "emergency" clean outs to get equipment back into operation or get cooling back into an office building or hospital. A properly designed **Tower-Flo® Filter** installation will significantly reduce cooling tower basin cleaning and extend condenser tube cleaning intervals. Continuous sidestream filtration for removal of suspended solids is one, very important portion of a total water quality management program, which should also include the services of competent water treatment professionals for proper control of water hardness, pH, and biological contaminants. In order to have the best possible control of cooling tower water and problems with equipment served by that water, it is important that dirt and suspended solids be continuously removed.