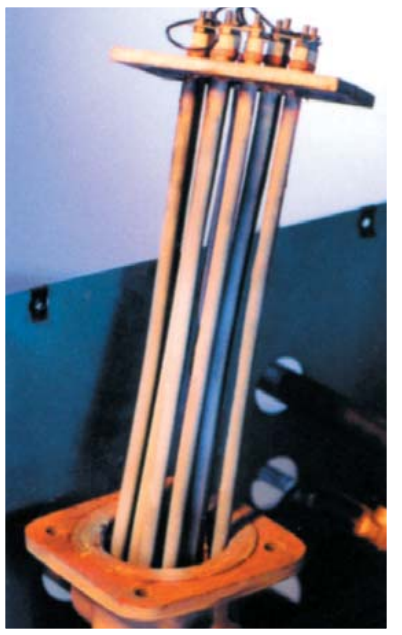

FILTRATION

KDF media offers better efficiency and lower maintenance cost in cooling towers water treatment system applications

Scale… it is a vicious never-ending problem that can kill the overall efficiency of water-cooling systems or towers. It can also clog sand-type filtering systems and turn the sand to cement, eventually shutting it down altogether.

Contributed by KDF Fluid Treatment, Inc.

For industrial or commercial companies and municipalities that use water towers, cooling or filtering systems, scale along with pollutants such as algae, heavy metals, debris, etc., can cause costly problems and destroy the system's efficiency.

TowerKlean

TowerKlean LLC, Waterford, Mich., specializing in water treatment technologies, searched out a scale-reducing media to ensure its cooling water-processing equipment better fits the needs of its customers.

TowerKlean's primary customers include industrial plastic-injection molding companies that use water-cooling towers to supply water used for cooling molds in the injection molding process. But other customers, such as municipalities and a host of many others also purchase the equipment for treating water.

"In typical cooling tower applications, there's heat involved that is heating the water and combined with a concentration of hardness through evaporation precipitates the scale forming compounds as filterable solids" said Harry Manvel, sales manager for TowerKlean. "It [scale] coats pipes, heat exchangers and has a big effect on efficiency. What our system [TowerKlean Cooling Water Treatment System] does is eliminates the creation of scale and it also removes any existing scale from a process water system."

Manvel's wife, Karen, owns TowerKlean, and they have been in business since March 2004. The system was developed by a company called Innovative Water Technologies, Grand Rapids, Mich., in 1995. "I'm a manufacturers' representative. For six years we were the Michigan sales agency for Innovative Water Technologies (IWT) and were very successful selling this product line," Manvel said. "An opportunity came up where IWT was looking to sell the business, so Karen bought it."

According to Manvel, IWT discovered a process media solution produced by KDF Fluid Treatment, Inc., Three Rivers, Mich., and realized it works well in water tower treatment applications.

Scale Formation

When water evaporates, the dissolved minerals in the water concentrate. The minerals and contaminants eventually reach a concentration where they precipitate as scale and interfere with the performance of both the tower and the cooling system itself. Typically, chemicals are added to the water to inhibit the formation of scale, control algae and bacteria, and provide corrosion protection. However, the use of KDF Process Media eliminates the need for any chemicals. "With the reaction of the KDF media we are able to modify the crystal structure of the scale compound (calcium carbonate), changing it from calcite to aragonite," Manvel explained. "In its modified form, aragonite is suspended in the water until it is removed by the filter. As the filter backwashes, the scale is flushed down the drain."

Eliminating Scale

To turn the scale into aragonite and eliminate it, IWT developed a patented fluidized bed using a column of water concept, which is the "heart" of the TowerKlean Cooling Water Treatment System, along with the KDF 55 medium. This column allows water to flow up through it and fluidize the media.

An important feature of this up-flow design is the graduated two-diameter clear column where the lower pipe is smaller in diameter than the top pipe. When the water travels upward, the upper and wider pipe reduces the velocity and pressure of the water and allows the media to fluidize.

Above: **TowerKlean Cooling Water Treatment System eliminates the creation of scale, as well as removes any existing scale from a process water system.**
Top Right: **Before and after shots of scale removal.**

It is also a self-regulating design that would not allow the media to migrate out of the column chamber.

"Without fluidizing the media, our system would work for about a week, then scale would form in the reaction column and turn it into cement," said Karen Manvel. "The KDF media typically only needs changing once a year, which helps keep maintenance costs down."

TowerKlean has several different filtration system sizes that have one to eight columns.

KDF Media

Manvel explained that because KDF media is a combination of copper and zinc, and the zinc is given off over time, it modifies the scale, and a very thin coating of it is deposited on the pipe walls (plastic or metal), which serves as a corrosion inhibitor and is the key to the system. "It also raises the pH level of the water system to one that is not conducive to corrosion," Manvel said. "It actually gives off a low-voltage current because of the reaction of the copper, zinc and water, and develops an electrical field that kills algae. KDF's filter media can't be washed and reused because it changes shape and eventually wears out, but lasts for a long time... and it's environmentally recyclable. After its use, it can be sold for its scrap metal value."

System Design

A strainer is the first part of the TowerKlean system, which filters out any

large debris. Followed by a filter that has a single grade of sand to remove smaller debris, silt and turbidity. Next are one or more graduated columns, depending on water volume, containing the KDF media.

Water is cycled through the system on a by-pass design, where only a certain percentage of its capacity goes through the treatment system. Unlike systems that treat only the cooling tower's make-up water, this system is integrated to treat the actual water already in the loop. For certain flow rates, the treatment systems are skid mounted and package designed. More than one system can be installed if the flow rate exceeds the capacity that one system can generate.

Currently, TowerKlean has several different filtration system sizes that have one to eight columns. The largest size will go up to a 12,000 gal. total capacity of the system. Systems are sized so the entire volume of water is exposed to the media every 90 minutes.

According to Manvel, the system eliminates virtually all chemical treatments. He explained that while other systems are available on the market, often several different devices are needed to take care of corrosion inhibiting, scale removal and biological treatment.

Karen Manvel added, "By eliminating chemicals, companies can free up storage space, and not have to worry about health and safety issues related to using harsh chemicals. So this system has a lot of advantages."

Conclusion

Even though the war on eliminating scale is still on, it appears the TowerKlean System is winning the battle for water-purification equipment. Not only that, the system also provides the user filtration for algae and other contaminants. *wqp*

Additional information on the TowerKlean System is available at 248.666.9200, or by e-mail at karen@towerklean.com; www.towerklean.com. KDF Fluid Treatment, Inc can be contacted at 800.437.2745, ext. 24, or by e-mail at info@kdfft.com; www.kdfft.com.

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