Tower water filtration application

Cooling process water filtration is becoming more common as companies discover the relative low cost of the filtration systems that help:

- Increase cooling tower efficiencies. Solid contaminants in cooling towers reduce cooling tower efficiencies. Deposits on heat transfer surfaces increase the fouling factor which significantly increases energy consumption. These same solid contaminants can clog small spray nozzle orifices causing poor distribution through the fill. Filtration minimizes deposits on heat transfer surfaces and prevents nozzle clogging
- Increase cooling tower life. The life of the cold water basin may determine the life of the cooling tower. A thick layer of solid contaminants in the cold water basin reduces the benefit of treatment chemicals such as corrosion inhibitors or oxidizers to reach the basin. Filtered cooling tower water prevents solid contaminants from building up in the basin.
- Reduce treatment chemical costs. A layer of solid contaminants in the cold water basin provides an excellent environment for bacteria and algae growth. Also, suspended solid contaminants may buffer the beneficial effects of treatment chemicals, hence requiring additional chemical treatment. Filtering cooling tower water prevents solid contaminant contribution to bacteria and algae growth, and minimizes the need for additional chemicals.
- Reduce maintenance. A layer of solid contaminants will eventually require removal from the cold water basin. Filtration of the cooling tower water will minimize the need for manually cleaning the basin.
- Reduce shut-down time for the manually cleaning of cooling towers.

Solid contaminants enter cooling towers from three primary sources:

- Ambient air dirt load. Cooling towers make excellent air scrubbers. Relatively high volumes of air pass through cooling towers and most of the contaminants in the air end up in the cooling tower basin.
- Circulation water build-up. Calcium carbonate scale that forms in the tower can flake off. Treatment chemical residue and algae will also build up in the circulation water.
- Make-up water. Depending on the source, the make-up water may also contribute to contaminant build-up.

In closed-loop water circulation systems such as those in cooling towers, filtration systems may be sized to filter around 10% of the full stream (side-stream filtration). With 10% of the full stream filtered, the water is cleaned and its particle load condition stabilizes in a very short time (two to three days).

There are several technologies available that have been used to filter cooling tower water. They include:

1. Centrifugal separators
2. Sand media
3. Automatic self-cleaning filters
4. Cartridges or bags filters

Centrifugal separators may remove more than 90% of the particles that have a specific gravity greater than water and are larger than 70 micron. This means that any particles that are organic or lighter than water or any particles smaller than 70 micron will not be filtered. Some centrifugal separator manufacturers claim that smaller particles will be removed with multiple passes through the separator. These devices are cleaned by either purging the particle collection chamber or by allowing a continuous small flow from the collection chamber.

Sand media filters require a relatively large foot print and the flush waste is relatively high. Back-

flushing sand media takes about 3 minutes and is off-line during the back-flush process. Sand media can remove particles to 10 micron or less and is excellent for organic removal. However, it is difficult to back-flush heavy particles (such as dirt/sand) collected from the tower from the sand media without loss of the media itself. So, occasional replacement of the media is part of the maintenance requirement of sand media filtration systems.

Automatic self-cleaning filters are becoming more common with cooling tower filtration applications. This technology removes both organic and inorganic particles down to 10 micron and uses a very small amount of water for the cleaning of the screen. Also, the filtration process is uninterrupted during the cleaning process.

Cartridges or bags are available to filter down to 0.5 micron. Cartridges/bags remove both organic and inorganic particles, and no back-flush is required. However, this technology can be expensive in the frequent changing of the cartridges/bags.

Choose a technology that:

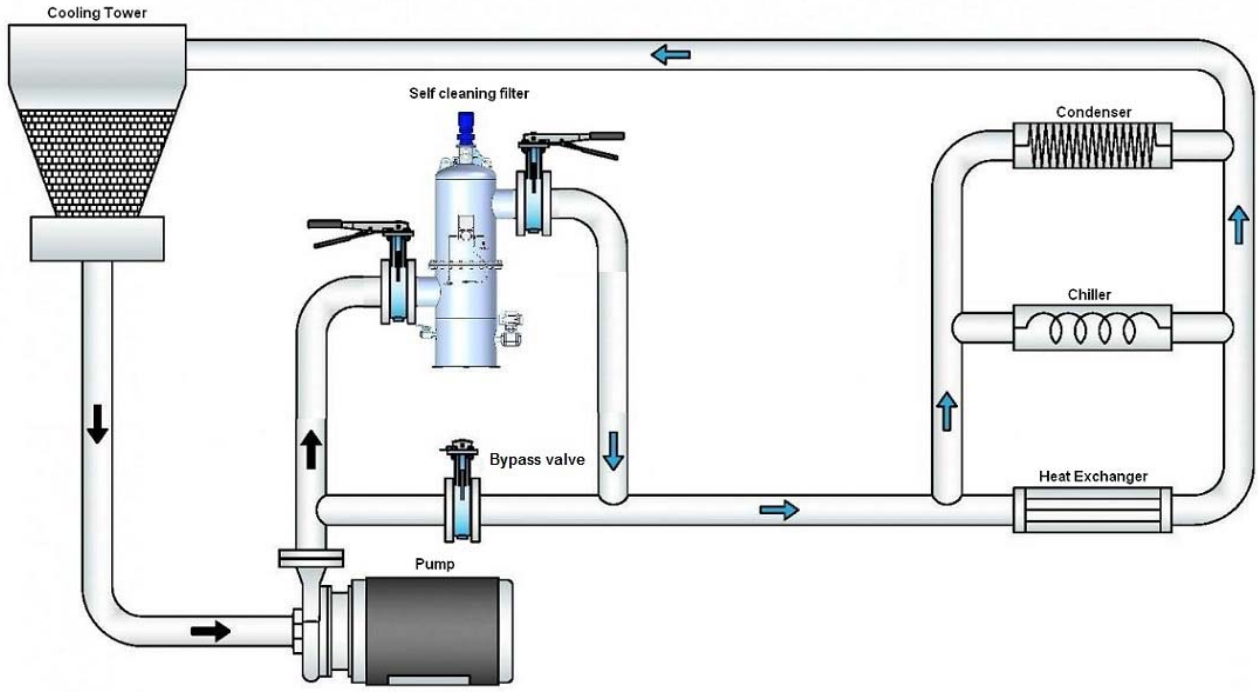
- Minimizes flush waste
- Removes finer particles that are both organic and inorganic

If an efficient tower with a long life, and low maintenance costs is the objective, then the solution is to provide cooling tower water filtration. Several filtration technologies are available for cooling towers and work well removing these particles. Filtration features to look for include:

1. Remove both organic and inorganic suspended solid particles with the filtration technology.
2. Uninterrupted filtration during the flush or screen cleaning process. Keep the filtration process on line.
3. Low flush flow rates somewhere in the range of 5 percent of the filter's total flow rate. Lower flush flow rates in percent of total flow will minimize wasted treatment chemicals as well as minimize make-up water.
4. Short cleaning cycles result in less water waste to clean the screen.
5. Simplicity for ease of maintenance. Fewer moving parts and simpler controls result in less maintenance and training requirements. Look for the simplest drive mechanisms.

25 to 50 micron filtration is the most common filtration degree for cooling tower water. The filtration degree required may be less depending on tower location and local conditions.

Self cleaning filters:



Filtration experts since 1984

Information is for reference only, and may vary depending on specific application

Hispano Europea de Comercio e Industria S.L.
Calidad, 24 - Pol. Los Olivos - 28906 Getafe (Madrid) España
Tel. (34) 916 967 039 Fax (34) 916 950 352
e-mail: sales@hecisa.com http://www.hecisa.com