CASE STUDY:

FORSTA SELF-CLEANING FILTER ENSURES RELIABILITY OF COOLING SYSTEM IN BIOMEDICAL MANUFACTURING FACILITY ON THE COVID-19 FRONTLINES

According to the U.S. Office of Energy Efficiency & Renewable Energy, installing a sidestream filtration system to cleanse cooling tower water will help maintain water efficiency across facilities. Although this applies to many types of applications and throughout industries, systems that are exposed to a large amount of airborne particulates are at a greater risk for compromised efficiency and system failure.

Cooling towers are an essential aspect of many refrigeration systems, providing temperature regulation for comfort in places of work, residences, and service centers. They also provide process cooling throughout a broad range of applications in the industrial sector including manufacturing and power generation.

Likewise, biomedical and pharmeceutical production facilities require effective cooling systems. Cooling towers in these facilities may protect ancillary equipment in the system including condensers, chillers, and heat exchangers.

During the unprecedented COVID-19 health crisis, biomedical facilities are at the forefront of developing plasma therapies until a vaccine is available. The plasma recovered from COVID-19 donors contains antibodies which are specific against SARS-CoV-2, the virus that causes COVID-19. Convalescent plasma can be used for direct transfusion as well as to develop medicines.

In one Los Angeles biodemical facility, production of plasma therapies, immunoglobulin medicines, and screening tests has become a top priority.

Fortunately, in late 2019, the facility's Director of Maintenance noticed that dirty cooling tower water was causing adverse effects on chiller performance, requiring increased maintenance on the heat exchangers. He contacted Forsta Filters to come up with a solution to the problems being caused by the dirty cooling tower water. The facility needed a reliable way to keep the cooling water clean. The proper and uninterrupted function of chillers and heat exchangers relied on it.

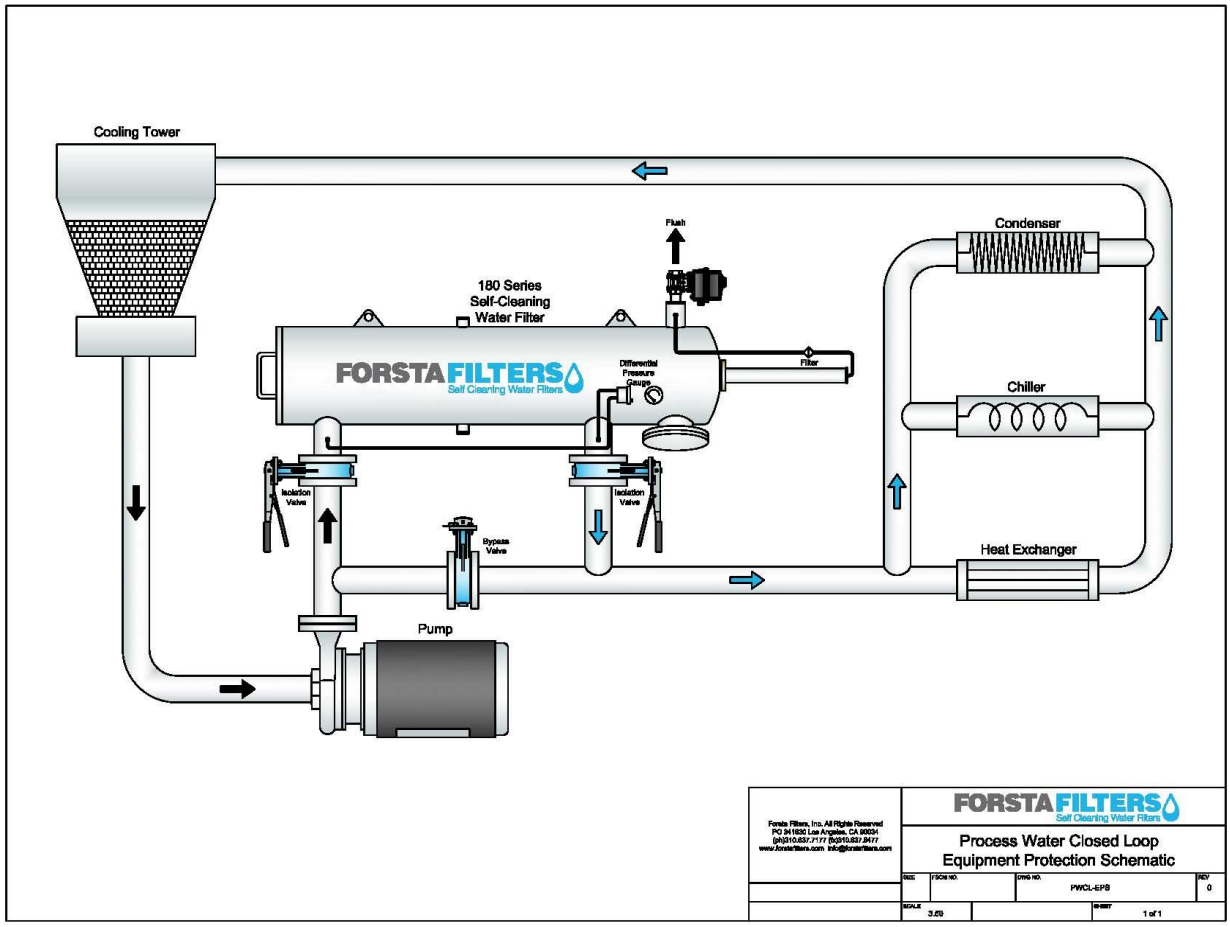
Cooling towers are located at the point in a cooling system where unwanted heat is released into to the atmosphere through evaporation. Keeping the heat transfer surfaces of a cooling tower system clean is widely recognized as the best way to ensure efficient operation.

Because of the operating environment of cooling towers, and because of the nature of their technology, cooling towers are vulnerable to the elements. They are susceptible to a variety of particulates that are introduced by the wind. As air quality and wind conditions change, cooling towers undergo wide variations in particulate loading.

Operation can be significantly affected by the quality of the water making up the system. Atmospheric particulate matter can originate from dust storms, living vegetation, fires and industrial processes, which may all, at various times contribute to patterns of particle loading in cooling towers. The mineral dusts

of airborne soils/sand, ash, cement etc. (comprised of oxides and carbonates) can all contribute to higher particle loading in cooling tower water.

It is commonly known that poor water quality (including high particle loading) can lead to the following common problems within an open-recirculating cooling tower system: corrosion, scaling, fouling and microbiological activity. These problems are inter-dependent to the extent that prevention of one may help reduce the magnitude of the others.



Forsta utilized samples from the Los Angeles biomedical facility's cooling tower water to inform screen selection. The filter screen needed to be fine enough to capture the debris of concern, without being so fine that it wasted too much cooling tower water through excessive backwash.

Forsta conducted its in-house seive test on the cooling tower water. The seive test takes a representative 1-2 gallon sample to simulate filter operations across a small area of screen. Design engineers take note of the interval required to create differential pressure, as well as conduct an analysis of the debris present before and after the sample test.

Debris collected on a 200 micron screen shows the efficacy of that screen for the water source.

Filter screens are typically selected with margins to allow for a reduction in screen pore size, if desired over time. Once an installation has an established performance baseline, including a recorded average backwash frequency, field adjustments may be made to size the screen up or down. In some cases, spare screens are kept on hand for seasonal variation.

Based on results from the cooling tower water test, Forsta recommended a 200 micron screen to address the problem.

The customer needed a filter to integrate with a straight 8-inch pipe flowing 380gpm of cooling tower water at 40psi. Taking into consideration all of the application data, Forsta recommended the B8-180 model filter with a 200 micron screen.

The filter was brought online in August of 2019, and evaluated against a rigorous list of inspection points.

The evaluation included a confirmation of adequate flush piping, proper wiring, and installation of pressure gauges.

Of particular importance was a review confirming proper hydraulics so as to avoid excessive pressure loss to other sensitive equipment in the system.

Flush duration was set to 16 seconds to match the timing of the hydraulic piston stroke.

Once the system became fully operational on a 24-hour basis, performance baseline was determined at an average of five backwashes per day. The onsite maintenance team reported that the overall system had improved since installation of the Forsta self-cleaning filter. In June of 2020, the facility's Director of Maintenance cited performance of the chilling equipment and recent heat exchanger inspections as revealing surprisingly clean results.

The filtration system has reduced both maintenance and labor costs in the facility, at a time when efficient production in biomedical facilities such as this one is more important than ever. When asked

whether he would recommend Forsta self-cleaning filters to others with similar applications, the Maintenance Director replied saying, “Definitely!”

About the Author:

Polly Stenberg is Director of Sales with Forsta Filters Inc. - A California-based original equipment manufacturer. Stenberg has conducted case study reviews with customers using Forsta self-cleaning filters in drinking water, wastewater, cooling, agricultural/landscape irrigation and industrial process systems.

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More About Forsta:

Forsta Filters, Inc. specializes in design and fabrication of self-cleaning screen water filtration systems. Using an efficient point-of-suction backwash technique, Forsta products offer filtration solutions that do not interrupt system flow during the self-cleaning cycle.

Forsta’s expertise includes filter design, fabrication, research and development, technical support, installation and startup, servicing, and onsite training.