PACE Technical Bulletin

WATER TREATMENT SOLUTIONS

Why does a closed system need a filter?

How to improve system performance and save money at the same time

Closed systems circulate the same body of fluid and are not subject to blowdown and makeup in the way that steam boilers and cooling towers are. The most common closed systems are used for;

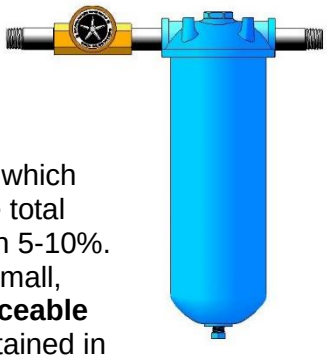
- **Hot Water Heating** of apartments, offices, institutions and industry.
- **Chilled Water Systems** for HVAC building comfort systems or cooling systems in manufacturing facilities.

The fluid in closed systems usually contains a suspension of fine, abrasive particles which is harmful to the equipment and leads to **unscheduled shutdowns** and **increased maintenance.** There are various sources of these particles, mostly resulting from corrosion. Oxygen dissolved in the fluid is an important contributor to this corrosion.

Closed systems are **rarely oxygen-free** during operation, due to constant air leakage through pressure equalization valves, pipe joints, pump packing, etc. In addition, a quantity of oxygen, although small, is continually added to the system through makeup water. Since most systems are largely constructed of steel, this leads to the generation and circulation of suspended iron oxide particles throughout the equipment. Other sources of particulate matter are **millscale** and **debris** left over from assembly, as well as material introduced when the system is opened for routine maintenance. Closed systems are frequently constructed of a variety of metals, generating more iron oxide particles because of galvanic corrosion.

Suspended iron oxide particles and other debris, are very abrasive to mechanical pump seals and can coat or plug up heating coils, causing them to lose their **heat-transfer ability.**
Additionally, areas of the piping and equipment that become covered with debris are subject to **under-deposit corrosion**, leading to further damage and release of corrosion by-products.

Implementing and maintaining a properly designed chemical treatment program is the first step towards preventing corrosive oxygen from attacking the metals in the system. However, since it is virtually impossible to prevent the introduction of suspended material, the best way to keep the system clean is by use of a sidestream filter.



A sidestream filter is one which filters a small portion of the total circulation, usually between 5-10%. These units are relatively small, inexpensive and use **replaceable cartridges** that may be obtained in different pore sizes. For most applications, a 30-micron cartridge gives the best performance. If the filter becomes plugged by the sudden introduction of large amounts of material, the main circulation stream remains unrestricted.

The ideal protection combination is a comprehensive **chemical treatment program** used in conjunction with a **sidestream filter** and a **flow indicator.** Suspension agents keep particles suspended until the sidestream filter removes them from the fluid. The flow indicator indicates when it is necessary to change the filter cartridge and provides a visual check on the appearance of the fluid.

Your Pace Technical Representative can advise you on all your water treatment needs. Also, refer to our technical bulletin, ***"Does a closed system need chemical treatment?".*** Call the experts at Pace today for more information.

Benefits of a filter in a closed system:

- Keeps the system clean
- Protects pump seals
- Prolongs the life of mechanical equipment
- Provides a warning of sudden system disruptions
- Reduces downtime
- Reduces maintenance and energy costs