

Why Does a Closed System Need a Filter?

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

- Hot water heating of buildings, offices, institutions and industry; and
- Chilled water systems used for air conditioning in large buildings and factories.

The fluid in closed systems usually contains a suspension of fine, abrasive particles, which are harmful to the equipment and lead to unscheduled shutdowns and increased maintenance. There are various sources of these particles, many of which are corrosion by-products. Oxygen, dissolved in the fluid, may be an important contributor to corrosion of the system metals. Other sources of particulate matter are millscale and debris left over from assembly, as well as material introduced when the system is opened up for routine maintenance.

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. Closed systems are frequently constructed of a variety of metals, with the potential to generate even more iron oxide particles as a result of galvanic corrosion.

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Suspended iron oxide particles and other debris may be very abrasive to mechanical pumps seals or may coat and possibly plug 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 attack of the metals. However, since it is virtually impossible to prevent the introduction of suspended material, an excellent way to keep the system clean is by use of a side stream filter.

A side stream filter is one that filters a small portion of the total circulation, usually between 5 and 10%. These units are relatively small, inexpensive and use replaceable elements that may be obtained in different pore sizes. For most applications, a 30 micron cartridge performs well. In the event that the

filter becomes plugged by the sudden introduction of large amounts of material, the main circulation stream remains unrestricted.

The preferred protection combination is a comprehensive chemical treatment program used in conjunction with a side stream filter and a flow indicator. Suspension agents

keep particles suspended until the side stream filter removes the particles from the fluid. The flow indicator indicates when it is necessary to change the filter cartridge. More information on side stream filters can be obtained from AWT member companies specializing in filtration equipment. ♦

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