Tech Sheet #125
Heat Exchange Institute
1300 Sumner Avenue • Cleveland, Ohio 44115-2851 • 216-241-7333 • Fax: 216-241-0105 • www.heatexchange.org

CONDENSER TUBE CLEANING

Macro and micro fouling and scaling of condenser tubes will adversely impact the performance of any well designed condenser or heat exchanger. The results are reduced heat transfer, reduced output, and reduced availability, while increasing the number of plant outages and increasing the maintenance costs.

Macro-fouling (accumulation of debris), not only reduces the cooling water flow rate through the tubes it can cause tube corrosion and tube erosion failures. Micro-fouling (biological growth) and scaling reduces the heat transfer coefficient and could cause under deposit corrosion resulting in premature tube failures.

Various tube cleaning options are available to reduce or eliminate the micro/macro fouling and scaling. They are divided in two (2) main categories; off-line and on-line methods.

Off-Line Methods

These methods require shutting down the plant and obtaining access inside the condenser. The effectiveness is only temporary and the problem could return before long.

- The debris removal process requires manual collection of debris from the waterbox, tube sheet and the tubes. The condenser can also be cleaned by water jet.
- For micro-fouling and scale removal, devices such as brushes, scrapers, plastic plugs, water lance, or cutters can be used. These methods require insertion of a device inside the tube and use high pressure water or air to push it through each tube. The cleaning devices are then collected and reused several times.

These methods of cleaning require a plant outage.

On-Line Automatic System

These systems are fully automatic and are installed as part of the condenser system to continuously eliminate the micro/macro-fouling and scaling.

- Debris removal requires installation of an on-line automatic self-flushing filter. These filters are installed in the circulating water inlet piping system.. They continuously collect and remove debris from the incoming circulating water, preventing it from entering into the condenser.
- To eliminate micro-fouling and scaling, an on-line automatic tube cleaning system (ATCS) could be utilized. There are two types of systems; the brush and basket, which requires a backwash system, or the circulating rubber ball type.

The self-flushing debris filter and the ATCS do not require any plant shut down or outage to clean the tubes.

Please refer to the latest edition of the Heat Exchange Institute Standards for Steam Surface Condensers for more information.

This Tech Sheet was developed by the members of the Heat Exchange Institute's (HEI) Condenser Section. HEI is a trade association comprising the leading manufacturers of heat exchange and vacuum equipment. HEI Tech Sheets are information tools and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their equipment.