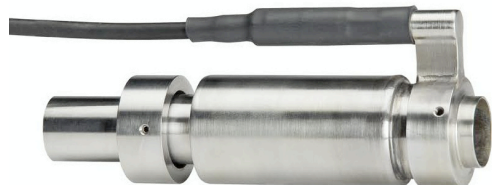


RHEOTHERM®

Circulating Water Flow and Fouling Sensor*



A revolutionary step toward more efficient condenser operation

This unique sensor allows you – for the first time – to positively differentiate between steam-side and water-side causes of excessive back pressure. Where traditional approaches lump all condenser performance degradations into the cleanliness factor, the CWFF provides the keystone measurement for advanced analysis to distinguish individual root causes.

The flow rate and temperature rise of circulating water in individual tubes can now be directly measured. Typically, four to twelve sensors are installed at selected locations in the outlet water box. These individual measurements are used to characterize baseline conditions and provide continuous monitoring across the tube sheet. Trending data reveals root causes for poor performance, i.e., micro-fouling, macro-fouling, air binding, or circulating water pump performance changes.

The *Rheotherm* CWFF sensor is a valuable tool for decision makers, providing accurate, real time data for more precise identification of water-side causes of condenser problems. It reduces the manhours spent in physical inspections and diagnostic analysis, permits more orderly maintenance scheduling, and lowers the risk of untimely outages.



CWFF sensors installed on tube sheet. Waterbox compatible epoxy adhesive seals the units in place and protects signal transmission wiring.

Features:

- Measures multiple individual tube flows and temperatures for bundle evaluation
- Calculates total circulating water flow rate
- Identifies trends caused by tube fouling
- Maintenance-free operation with no moving parts
- Compatibility with power plant chemicals
- Does not impede fluid flow or tube cleaning

Benefits:

- Positive indication of the need for cleaning or reverse flushing
- Quantifies extent to which condenser efficiency is affected by water-side fouling, including debris, biologic growths and scaling
- Provides data for accurate determination of heat transfer coefficient
- Monitors the effectiveness of pre-screening, water treatment, cleaning systems, and reverse flushing

Output:

Data is stored locally and is also accessible through Modbus TCP/IP or OPC.

Optional local display shows measured values of flow rate and temperature and calculated values of total circulating water flow, as well as other specified elements.

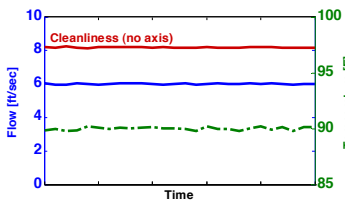
All *Rheotherm* and *RheoVac*® instruments are manufactured under an ISO-9001:2008 Certified Quality Assurance program.

* Patent Pending

The gateway to improved condenser performance, fast response maintenance, and optimized operations

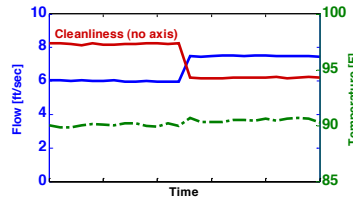
The sensor system measures and displays circulating water flow rate and tube outlet water temperature. Deviations from normal can identify macro-fouling (caused by inlet debris), bio-fouling, and diminished pump capacity.

Normal Clean Operation



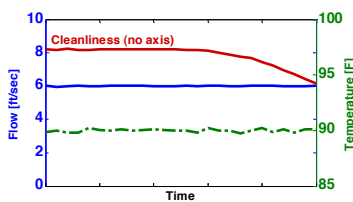
Steady normal operation, at design flow rate and outlet temperature.

Macro-Fouling



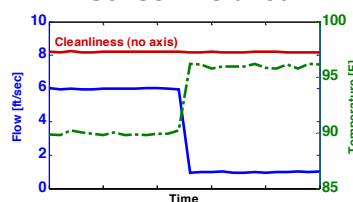
Debris obstruction at inlet tube sheet decreases the number of active tubes, and increases flow velocities in the active tubes.

Micro-Fouling



Gradual (uniform or preferential) coating of tubes with biological growth or scaling deposits is indicated by a decreasing trend in calculated cleanliness factor. Severe micro-fouling may reduce flow through tubes.

Obstructed Tube with Sensor Installed



Flow signal drops suddenly due to obstruction of a single monitored tube, and temperature rises. This type of event is the reason that multiple sensors are installed to obtain accurate total flow measurement.

Rheotherm tube fouling meters, when used in conjunction with *RheoVac* air in-leakage detection systems, give you complete condenser diagnostic capability to maintain quality performance. Only *Rheotherm* and *RheoVac* instruments can provide valuable and verifiable data on:

- Air in-leakage
- Circulating water flow rate
- Tube fouling
- Individual tube and bundle heat transfer coefficient
- Vacuum quality
- Tube bundle flow and thermal profile
- Exhauster capacity
- Individual tube bundle performance

For assistance with any condenser performance issue, contact an application engineer at INTEK, Your Process Flow Partner. Call 800-RheoVac (743-6822)



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Specifications

Tube Size Compatibility

Inserts in the rolled tube ends of the outlet water box tubesheet

Response Time

1 second

Time Constant (63% of flow change)

3 to 5 seconds (typical)

Repeatability

± 0.5% of reading (typical)

Accuracy

Better than ± 2% of reading

Enclosure

- Standard: NEMA 4

Display

- LCD (Optional)

Output

- Modbus TCP/IP
- OPC

Input Power

- 85-250 Vac; UPS recommended

Installation

Intek's experienced technicians perform system installation and provide start-up support as required.

In-Depth Studies in Support of Your Continuous Monitoring Program

Intek, Inc. offers advanced performance analysis and design improvements of steam surface condensers. Intek's proprietary analysis methods identify individual sources of excess back pressure that can only be aggregated in the cleanliness factor by the commonly used average value analysis techniques.

The CWFF is one of many instruments providing data used in these analyses. Other instruments manufactured by Intek to improve condenser performance and for analysis include the *RheoVac* condenser monitor, saturated steam pressure and temperature sensor, waterside differential pressure transducer, and precision thermocouples. Together, these instruments form a complete condenser monitoring system. Contact Intek today to see how our unique instruments and expertise can help you improve condenser performance, provide responsive maintenance support and optimize plant operations.