



AC-FS-1000 Fouling Sensor by Neosens



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BACKGROUND:

The AC-FS-1000 fouling sensor from Neosens offers an innovative, cost-effective solution for monitoring the presence of biofilm and scale in cooling towers, heat exchangers and other industrial process applications. Fouling in cooling systems is a worldwide, multi-billion dollar problem, reducing energy efficiency, increasing maintenance costs and creating health risks due to Legionella. Even sub-millimeter levels of fouling can have a significant negative impact on system efficiency and environmental safety. The conventional approach to fouling control combines the “blind” application of biocides and anti-scale chemicals with periodic lab testing. This often results in the excessive use of chemicals with the inherent side effects of accelerating system corrosion. Periodic lab testing is a valuable means to check for Legionella bacteria, but it is difficult to predict the optimum testing interval, and Legionella may form in between samples, making it harder to treat safely. The Neosens approach is early, preventive, online monitoring of biofilm and scale. Our sensors continuously monitor the thickness of fouling within the cooling system, enabling the optimization of chemical treatments, maintenance procedures and lab testing intervals. Neosens customers benefit from reduced operating costs, less environmental impact and health risk, and extended life of their equipment.



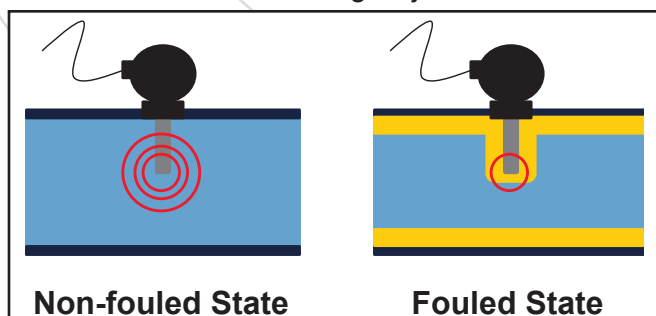
APPLICATION:

Neosens fouling sensors continuously monitor the thickness of biofilm and scale formation in commercial and industrial cooling towers. The use of the sensors in cooling towers has the additional benefit of detecting biofilm that can lead to Legionella formation, thereby helping to reduce health risks. By continuously monitoring the extent of fouling in the system, one can optimize the frequency and amount of chemical treatments used to control biofilm and scale, and thereby reduce maintenance costs, while ensuring that the system is operating at maximum efficiency and safety.



PRINCIPLE OF OPERATION:

Neosens FS-series fouling sensors utilize a patented thermal analysis technique for measuring the minute changes in local thermal conductivity and heat transfer due to fouling of just a few microns in thickness. The sensors are based on MEMS (Micro-Electro-Mechanical Systems) technology, which offers the integration sensors and control electronics on a common silicon substrate. By using MEMS Neosens is able to reduce the size and cost of the sensors, while increasing their precision and reliability in harsh environments.



CASE STUDIES

The fouling detection capabilities of the AC-FS-1000 have been validated by independent labs and industrial water treatment firms in the U.S. and abroad.

Case Study #1: Phigenics Pilot Cooling Tower

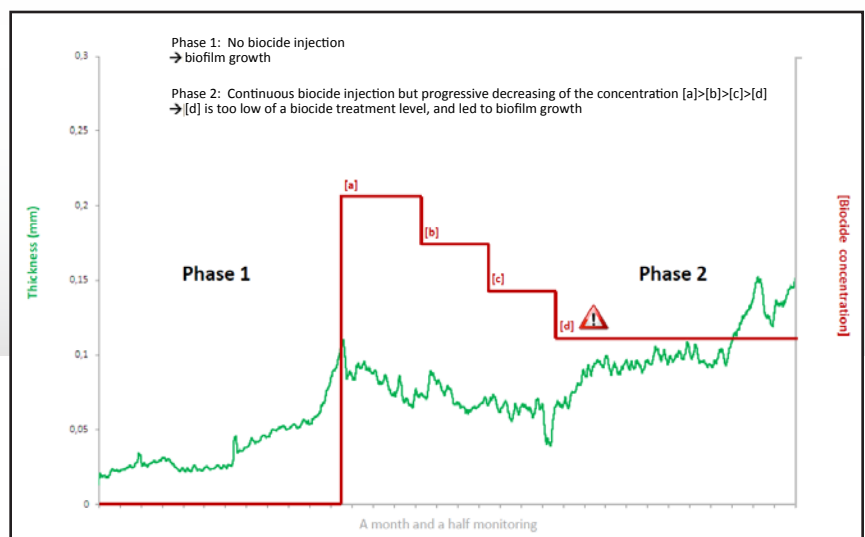
The test results shown here display the fouling thickness as measured by two Neosens fouling sensors installed in parallel pilot cooling systems. Left untreated, fouling thickness on sensor #1 increased dramatically during the first two weeks (blue line). After this time, an oxidizing biocide was added to system #1, and the resulting fouling thickness dropped to its original non-fouled level. System #2, indicated by the red line, was initially treated with an oxidizing biocide for the first two weeks, after which time treatment was stopped. Fouling thickness on both sensors rose in lockstep as biofouling returned. Oxidizing biocide treatments were added again to both systems after 18 days, and sensor fouling thickness returned once again to non-fouled levels.



Case Study #2: Laborelec (GDF-Suez Group)

One of the goals of using a Neosens fouling probe was to define the optimal concentration of biocide treatment in an open recirculating cooling circuit of a thermal power plant.

Tests were performed on a pilot installation. During phase 1, the biofilm was allowed to grow without any biocide treatment. Once its thickness reached 100 μm , biocide was injected continuously during phase 2. Its concentration in the water was decreased step by step ([a], [b] and [c]) down to the level where the biofilm thickness began to increase once again ([d]). Concentration [c] was then defined as being the lowest & optimal concentration of biocide at that period of the year in order to keep the cooling system clean and the biofilm growth under control, and biocide treatment costs at a practical minimum.



BENEFITS:

- Fast, reliable, real-time monitoring of biofouling
- Advance notification of potential scaling conditions in heat exchangers
- Optimized water treatment chemical dosage
- Reduced energy and water costs
- Prolonged capital equipment life with early fouling detection and treatment
- Easy integration with existing systems (4-20mA output signal)
- No maintenance required

SPECIFICATIONS:

Electrical:

- Input: 8-18 VDC @ 60mA
- Output: 4-20mA (500 Ω)

Environment:

- Ambient temperature - 0 to 140 F
- Relative humidity - 0 to 100%
- Pressure - 125 PSI Max

Fouling Monitoring:

0-1 mm (0-0.039 in)

Accuracy: 1% of Full scale

Material: PEEK, PVC & 316L SS

Connection: 1" (2.54 cm) MNPT

Shipping Weight: 4 lbs (1.814 kg)

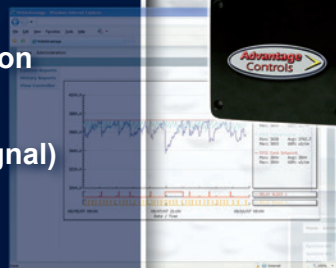
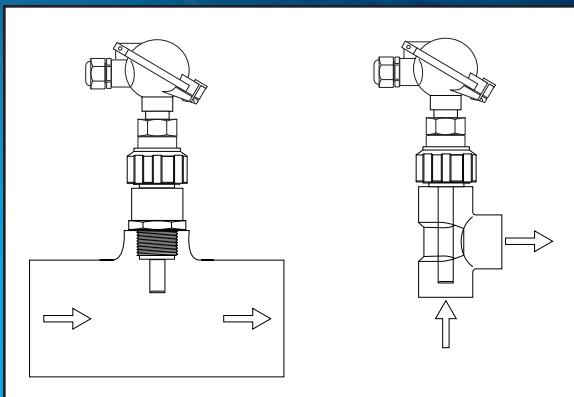
Sensor Length: 9.375" (23.8 cm)

Insertion Depth:

Approx. 3.375" (8.57 cm)

Recommended Installation:

- For scale monitoring, install sensor as close to outlet of heat exchanger as possible.
- For bio fouling monitoring, install at coolest point in loop.



Controller Compatibility

The AC-FS-1000 sensor can connect directly to a MegaTron or MegaTron SS controller with the 4-20mA input card option. Historical graphs, real time readings and email alarm notifications can be generated when the controller is connected to WebAdvantage via the Internet.

Get the Advantage

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