

ProDATS Fouling Monitor System

Principles of Operation:

The ProDATS fouling monitor operates on thermal heat transfer principles. The device exposes and monitors two heated, tubular inert metal substrates in the aqueous environment of a customer's heat transfer media. Sensors in the system quantify the extent to which fouling material deposits on the surfaces. As the inside surface of the tubular element is subjected to the fouling phenomena, the heater elements' temperature rises. The temperatures, flow rate and heat flux are used to calculate the total fouling environment (mineral scale and biofilm). A magnetic type flow meter quantifies the fluid flow velocity. Fluid flow velocity is determined by the pipeline environment for the insertion geometry or controlled with an external pump for the side stream geometry. Heat flux is independently selectable for each tube over the range typical of shell and tube heat exchangers. Heat transfer parameters expressed as % cleanliness are computed, displayed and stored in the device and transferred periodically via the PC software.



Intended Applications:

The ProDATS is intended to operate in a laboratory or field site on salt or fresh water. The analog outputs of the device can be used as feedback elements for biocide or scale monitoring and/or control. Power plants, petroleum refineries, paper pulp, HVAC systems and industrial chemical facilities may all benefit from a better understanding of the fouling rate in their local environment. The natural variation of fouling and the efficacy of the mechanical and chemical tools available to control it are objectively quantified. Chemical vendors may use the system to verify the control of fouling and or tune their injection rate for maximum cost effectiveness. Performance engineers may use the produced data to calculate the economic impact at a specific facility.

Measurements and Controls:

Fluid and Heater Temperatures, Heat Flux, Flow Velocity, Heat Transfer Resistance, Percent Cleanliness

Analog and Digital Connections:

PC communications software included, compatible with Windows 98/2000, XP via RS-232 serial port
Two, analog outputs, 0-4 vdc, software selectable amongst % clean total, scale, biological, flow, HTR...

Digital alarm set point to alert on user selectable fouling threshold

Digital heat flux control via dip switch settings

Specifications:

Power Requirements: 24 Vdc, 3 amps

(power supply included for 120/240 50/60 hz to 24vdc conversion)

Maximum heat flux simulated: 40,000 Btu/hr ft² [126 kW/M²]

Maximum fluid temperature: 120 deg F [50C]

Flow velocity range: 1-20 ft/sec [.3-6 m/s]

.12-2.3 gal/min [.3-6 liter/min]

Tube Specifications:

Titanium alloy 3Al-2.5V and platinum coated titanium alloy

Inside diameter .219 inches [5.56 mm]

Environmental Resistance:

Nema 4 rated enclosure w/cord grips and O-rings all penetrations

Ambient temperature from 32 to 120 deg F [0 to 50C]

Power supply not rated / requires protected environment

Fiberglass/polycarbonate enclosure and nylon cord grips

Wetted Components:

Titanium and platinum coated titanium alloy tube

Polysulfone tube supports

EPDM O-rings

316 stainless steel electrode surfaces and pipe nipples

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