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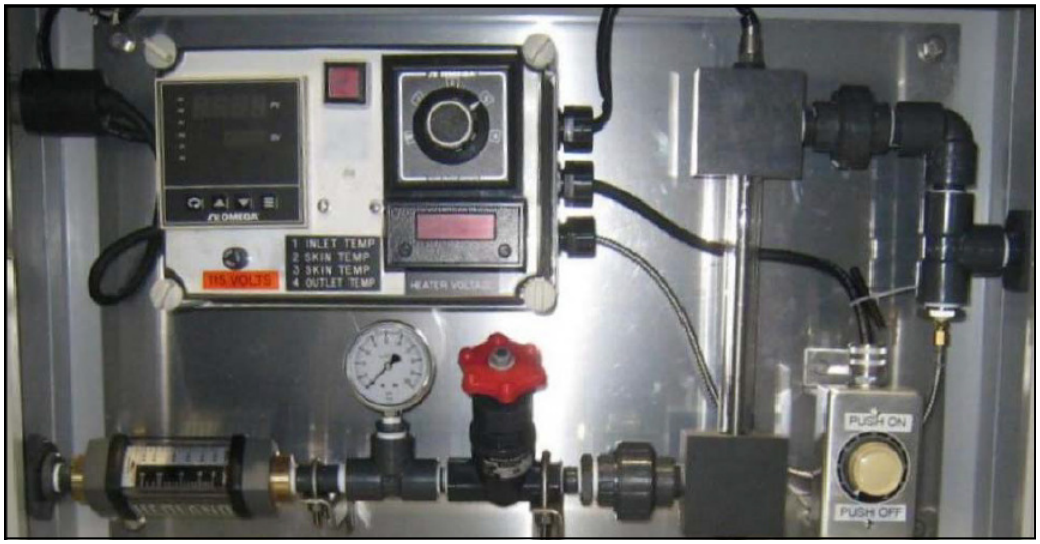
DM100—Deposit Monitor



DM100 with enclosure door open

Monitors Fouling Rates By Simulating Conditions of an Operating Heat Exchanger

The DM100 Deposit Monitor is a simple to install monitoring tool that aids in evaluating the performance of cooling water treatment programs.

The unit monitors fouling rates by simulating the conditions of a heat exchanger in the actual operating system.

A sample tube of the proper metallurgy is inserted over a heating element and is surrounded by a glass forming a jacket configuration.

Cooling water flows between the sample tube and the glass jacket. The metal surface of the sample tube can be observed at any time during the testing period.

Cooling water flow rates are controlled by using a flow control valve to duplicate the velocity of the equipment in the process being monitored. Heat transfer rates can also be controlled by using the voltage controller.

The heater has an automatic shut off device incorporated as a safety feature.

The red light on top of the Monitor will go out when the heater temperature cut-off has tripped.

Mild steel, admiralty and stainless tubes are available.

Determine Fouling Factor: The Deposit Monitor allows you to calculate fouling factors by monitoring voltage to the heater to convert to heat flux, temperature in, surface temperature, and temperature out of the sample tube section.

(Two surface temperatures are provided in case one of the thermocouples at the heater surface is damaged.)

Ask about installation and Start Up!

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DM-100 Deposit Monitor

The digital temperature indicator also serves as a controller for the heater safety cut-off feature. By pushing the small button on the left and holding it depressed you can display the surface temperature at which the heater will shut off. The controller set point will read out on the digital display as you are adjusting the setting. To check this set point at any time, depress the small button. The set point should be at least 50^0F above the inlet water temperature, BUT NOT GREATER THAN 210^0F. ALWAYS KEEP THE SELECTOR SWITCH AT ONE ON THE SURFACE TEMPERATURE POINTS WHEN IN OPERATION AND NOT TAKING TEMPERATURE READINGS.

To monitor the temperature of the sample tube section, turn the selector switch to the desired temperature monitoring point and that temperature will appear on the digital display. The switch must be turned briskly from one position to another. If this is not done quickly and accurately, the temperature indicator will drift upward and may shut off the heater. If this should occur, simply turn the switch to the desired temperature and reset (by pushing the red reset button) the power to the heater, Wait until the display stabilizes and read the temperature.

Fouling factors are calculated by using the following equations:

HEAT FLUX (BTU/ FT^2 / Hour) – 1.88 x V^2

$$\text{U Value} = \frac{\text{Heat Flux}}{\text{T. Sur} - \frac{\text{T. In} + \text{T. Out}}{2}}$$

$$\text{F. Fact} = \frac{1}{\text{U. Val. (Fouled)}} - \frac{1}{\text{U, Val. (Clean)}}$$

U. Value = U Value
T. Sur = Surface Temperature
T. In = Inlet Temperature
T. Out = Outlet Temperature

From the plant technical data, determine the average velocity, in feet per second, in the tubes of the actual heat exchange equipment. Convert this velocity to a gallon per minute (gpm) flow setting for the DM100) control valve from the following table:

FLOW CONTROL VALVE SETTINGS

Valve Settings (GPM)	Velocities (Ft/Sec)
1.0	1.5
2.0	3.0
3.0	4.5
4.0	6.0
5.0	7.5
6.0	9.0

Determining Heat Flux

From the technical data obtained form the plant for the actual operating equipment, determine the heat flux for the system heat exchanger. Divide the heat exchanger heat transfer rate (in BTU/hour) by the heat transfer surface area (in square feet).

HEAT FLUX = BTU/FT^2 / HR

After determining the heat flux, set the voltage controller to read out the desired voltage on the digital display. The heat flux is determined by the following equation for the DM100 heater. Push knob in when setting.

HEAT FLUX (BTU/FT^2/HR) = $1.88V^2$

Where:

1.88 = Constant calculated from watt density and resistance of heater

V = Voltage going to the heater in VAC.

By solving the equation for V, you can determine the voltage setting required to provide a given heat flux.

$$V = \sqrt{\frac{\text{Heat Flux}}{1.88}}$$

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