

# Enhance Your Performance and Decrease Energy Costs

## Heat Exchanger Health Monitoring



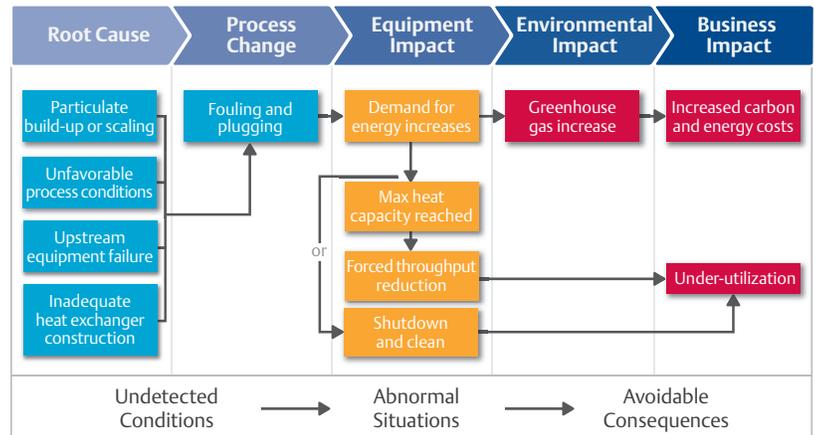
# Integrated Solutions for Effective Decision Support

Energy is one of the largest controllable costs in your plant. However, heat exchanger fouling can increase your energy costs while contributing to poor energy efficiency and production losses.

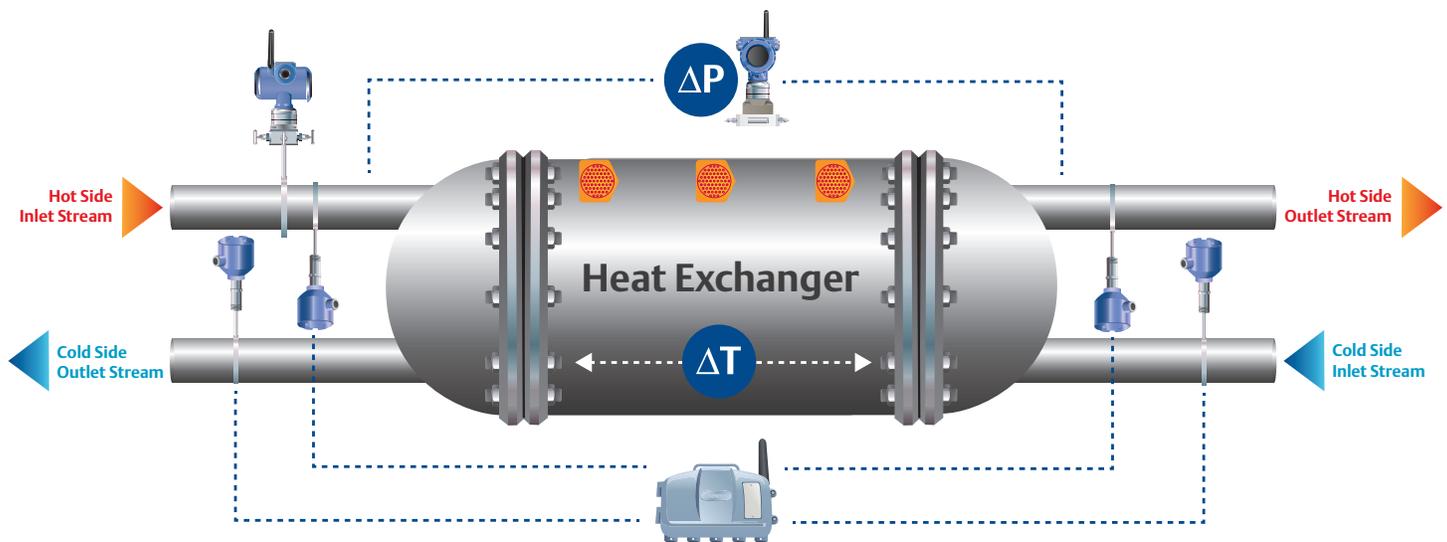
Fouling affects 90 percent of heat exchangers, but multiple complex variables make it difficult to foresee. Scaling or corrosion from particulates can limit the performance of your exchangers, as can unfavorable process conditions or malfunctioning upstream equipment.

Cleaning your heat exchangers according to a cyclical schedule is not always cost effective, but because it can be difficult to get accurate readings of heat-transfer degradation, there are few alternatives.

## Anatomy of a Heat Exchanger Failure



## Common Threats to Heat Exchangers



### FOULING AND PLUGGING

Heat exchanger fouling increases the amount of energy required to achieve the same level of production, adding energy costs. Fouling can also reduce throughput—or force a shutdown for cleaning or replacement. Root causes include corrosion or polymerization; fluctuating process conditions; inadequate levels of additives or anti-fouling compounds in fluid streams; equipment malfunction; and selection of incompatible materials.

## What if you could...

### Increase Process Availability

Emerson's monitoring solutions can analyze asset health information to help you determine the optimum time to clean your heat exchangers. Real-time data lets you see abnormal situations and address accelerated fouling before it results in a slowdown or shutdown.

### Improve Asset Reliability

Our algorithm calculates the economic impact of deteriorating asset health, so you can maintain your equipment according to a more cost-effective schedule. You'll be able to easily gather fault-alert data so you can analyze and address repeat failures.

### Mitigate Safety and Environmental Risks

You'll receive alerts when heat exchangers experience leaks or surpass temperature design limits. This can be vital to preventing accelerated fouling from disrupting your process or compromising the safety of your plant.

## Increasing your profit

Heat loss due to fouling can increase your fuel and utility costs. What if you could optimize your cleaning cycle and get some of that money back?

### INPUT<sup>1</sup>

a. Plant capacity in tons per day	1,700
b. Plant net margin per ton	\$200
c. Capacity utilization	0.93
d. Total energy consumed in MMBTU per ton of product produced	24
e. Total energy consumed by the plant in MMBTU per year (a x c x d x 365)	13,850,000
f. Cost of energy (\$/MMBTU)	5.00
g. Anticipated increase in throughput due to optimized heat exchanger cleaning	0.50%
h. Anticipated reduction in energy cost with monitoring <sup>2</sup>	0.15%
i. Anticipated cost of cleaning and lost production due to cleaning fouled heat exchangers <sup>3</sup>	0.00%

**TOTAL ANNUAL PROFIT IMPROVEMENT PER YEAR (a x b x c x 365(g-i) + (e x f x h)) \$680,940**

#### Notes

- <sup>1</sup> This is an example for an olefin plant.
- <sup>2</sup> Reduction in energy cost is based on increased tonnage, assuming that the impact of energy savings is limited to 30% of the energy in the plant, whereas 70% of the energy is used in other processes such as cracking.
- <sup>3</sup> The cost of heat exchanger cleaning is considered to be negligible and lost production is zero, assuming that heat exchangers are cleaned parallel to a unit shutdown.

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## Heat Exchanger Solution

Emerson's Heat Exchanger Monitoring solution embeds process and exchanger knowledge into software and wireless instrument applications for cost-effective and easy monitoring of individual exchangers for fouling. Dynamic real-time temperature and pressure measurements are trended, historized, and analyzed, delivering alerts in advance of fouling and cleaning needs.



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# Emerson Heat Exchanger Monitoring Products

## SOFTWARE INTERFACE



### AMS SUITE: ASSET GRAPHICS FOR OPERATIONS

Provides real-time graphical displays that indicate abnormal operation, including heat-transfer calculations and high fouling-rate or exchanger cleaning-required notifications. A pre-engineered algorithm delivers diagnostic information for alarms, process analysis, trending, historization, and key performance indicators.



## NETWORK INTERFACE



### SMART WIRELESS GATEWAY

Connects IEC 62591 (WirelessHART®) self-organizing networks with host systems and data applications.



## DEVICES

The minimum requirements are the flow and inlet/outlet temperatures for one side of the exchanger; all four temperatures are required for other key performance indicators.



### ROSEMOUNT WIRELESS TEMPERATURE TRANSMITTER

A wireless solution for high-density temperature measurement applications. Monitors up to four independently configurable RTD, thermocouple, ohm, millivolt, and 4-20 mA inputs, allowing you to access more temperature measurements without any signal wire. Allows measurement of inlet/outlet temperatures for hot or cold sides of the exchanger for heat-transfer calculations and high fouling-rate detection.



### ROSEMOUNT WIRELESS DP FLOWMETER

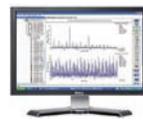
Integrates industry-leading transmitters with industry-leading primary elements, improving flow performance across wider flow ranges. Allows measurement of flow for hot or cold side of the exchanger for heat-transfer calculations and high fouling-rate detection.

## ADDITIONAL OPTIONS



### ROSEMOUNT WIRELESS PRESSURE TRANSMITTER

Offers the industry standard in pressure detection, with capabilities meeting any need. Detects increase in differential pressure across hot or cold side of the exchanger, which indicates the exchanger needs cleaning.



### AMS SUITE FOR MAINTENANCE

Allows maintenance personnel to diagnose equipment problems using predictive diagnostics. Early warning enables planned maintenance practices and reduces downtime.

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