

Chemical Manufacturer Improves Quality and Throughput with Improve Temperature Control

RESULTS

- Improved quality and throughput
- Reduced downtime
- Reduced maintenance cost



APPLICATION

Temperature control in a gas – liquid reactor

CUSTOMER

A large chemical manufacturer in Europe

CHALLENGE

This chemical manufacturer had challenges obtaining good temperature measurement of the reactor. If process temperatures were too high, synthetic materials would build up on the reactor walls. This would eventually plug the inlet and outlet lines of the reactor. If process temperatures were too low, reacting material could clump preventing complete reaction. The company needed to better control temperature in the reactor at specific points.

Conventional temperature sensor placement using thermowells was not possible due to aggressive process materials and refractory movement. The inner wall of the reactor is made of a special material to prevent process materials from adhering to the reactor surfaces. Any interruption in the reactor lining would cause process material build-up on the reactor inner wall. Previously used external surface mounted temperature sensors had suffered from poor accuracy and slow speed of response. Poor long term sensor stability further increased the temperature measurement error.

Throughput was decreased due to the need for frequent maintenance shutdowns. Maintenance costs increased due to the frequent need to remove synthetic material buildup from the reactor. Product quality was reduced if temperatures were too low and the process materials clumped. Energy costs were increased due to operation at higher than optimum process temperatures.

Rosemount surface mounted temperature sensors allowed the manufacturer to reduce downtime and maintenance costs.



Figure 1. Rosemount Application and Industry Solution sensor

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SOLUTION

Rosemount Application and Industry Solution (AIS) surface mounted sensors were installed to improve temperature control. PT100 sensors were used instead of thermocouples to improve accuracy and long term stability. A level machined tip on the sensor improved thermal contact with the reactor leading to faster sensor speed of response. Multiple measurement points were implemented improving control and reliability. Finally, Transmitter-Sensor Matching was used to obtain the highest measurement accuracy. These improvements reduced both over and under temperature conditions in the reactor. As a result the manufacturer was able to lower the temperature setpoint for the reactor.

The manufacturer experienced many positive business results. Both shutdowns and maintenance costs were reduced due to less synthetic material buildup inside the reactor. Product quality was improved due to reduced material clumping. Less off-spec product reduced feedstock costs and waste. Finally, energy costs were reduced due to higher yield at a lower setpoint.

RESOURCES**Rosemount Temperature**

<http://www.emersonprocess.com/rosemount/products/temperature/index.html>

Rosemount Application and Industry Solution Sensor

<http://www2.emersonprocess.com/en-US/brands/rosemount/Temperature/AIS-Sensors/Pages/index.aspx>

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