Rotameters in an Olefins Pyrolysis Furnace Replaced with Micro Motion R-Series Meters

RESULTS

- $384,000 per year in production savings
- $92,000 per year in maintenance savings
- Payback in less than six months

APPLICATION

In an olefins pyrolysis furnace, a hydrocarbon feedstock/steam mixture is pumped through a maze of 4 to 6-inch ((DN800 to DN1000) diameter tubes where it is heated to 815-885°C (1500-1600°F). During the cracking process, undesirable by-products, including methane and coke (carbon deposits), are produced. The objective of the process is to be as selective as possible towards Ethylene, making as much of that molecule as possible, while minimizing the production of by-products. Even with the best control schemes, coke is still produced and deposited on the inside of the tubes. This coke acts as an insulator, preventing the feedstock/steam mixture from being heated enough for the cracking process to work and the unit has to be frequently shut down for de-coking. To adequately de-coke a furnace, the hydrocarbon feed is replaced with air and mixed with steam, then fed through the tubes. Both steam and air flows should be measured to properly ratio the components for efficient de-coking.

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CHALLENGE

A large petrochemical company located in south Texas has multiple olefins furnaces that used rotameters to measure decoking air feed. The company needed to keep the tubes from coking up too quickly, prevent furnace tube rupture, and to minimize the downtime required to de-coke the unit. The challenge with the rotameters was that the magnet used to generate the flow signal would become covered with debris from the air line which no longer provided an accurate enough flow signal to adequately control the decoking process.

Ethylene Plant

SOLUTION

The company chose to purchase Micro Motion® R-Series meters with 1700 transmitters to replace each rotameter. This was a cost-

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effective solution because the Micro Motion meters provided a maintenance-free option with a more accurate and reliable flow reading. In one year, the company saved $92,160 in maintenance and $384,000 in production costs.

Coriolis Installation	Costs
Piping Materials & Modification	$30,000
Wire & Conduit	$40,300
R-Series Meter	$153,633
Total Installed	**$223,933**

Coriolis Installation	Savings
Increased Production	$384,000
Decreased Maintenance	$92,160
Total	$476,160

Payback on Coriolis Meters	
Installation Cost	$223,933
Annual Savings	$476,160
Payback = Cost/Savings (Years)	0.46
Payback = Cost/Savings (Months)	5.64

BEFORE: Rotameter Installation

AFTER: R-Series Coriolis Meter - Reduced Maintenance and Improved Decoke Process

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