A LEADING INDUSTRIAL GASES PROVIDER DELIVERS IMPROVED ACCURACY AND RELIABILITY WITH DP FLOW METERS

Customer

A multinational company which supplies industrial gases and services to various industries including medical, chemical, and electronic manufacturers with operations in over eighty countries.

Application

Gas Plant situated in the Utilities of Semiconductor Plant

Challenge

The company supplies a range of customized onsite gas generation solutions that supply bulk volumes of industrial gases like nitrogen, oxygen, and hydrogen to meet the diverse needs of many industries. This includes the option to install, operate and maintain onsite supply system of these gases.

The end user was running gases via pipes into the production area. The gases flowed through the pipe at different flow rates. The customer required a high accuracy flow meter that provides accurate readings in both high and low flow conditions.

The main customer requirements for the flow instrumentation was to provide guaranteed high accuracy measurement, work towards reduced shutdown time and increase production uptime in the gas plant. There was also a requirement to use a reliable and consistent flow meter type throughout their production line.

The existing plant used diaphragm gas meters and thermal mass flow meters. Both these technologies resulted in poor flow accuracy and required audit calibration every year.

Thermal mass flow meters require specific calibration based on the gas mixture and accuracy decreases if the gas composition changes. It is suitable for clean, non-abrasive media and thermal properties must be known ahead of time. Additionally, initial CAPEX costs can be quite high for users.

Results

- Improved accuracy in high and low flow conditions
- Improved mass flow rate accuracy of up to +/- 1.0% which helps customer's pay meter application and online annual audit calibration.
- Downtime prevention through best-in-class data accuracy and sensor stability.

Image 1. *An exterior view of a gas plant like the customer's site that would supply gases to the main plant from the utilities wing of the plant.*

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On the other hand, diaphragm gas meters come with moving parts which explains why they demand periodic maintenance. It is also important to consider gas cleanliness when using them. The gas meters are typically used in smaller pipes and low flow rates at low pressures.

With limited range and variability, the customer was required to shutdown the process line for annual calibration and audit every year. There was tremendous downtime and no path towards predictive maintenance.

Solution

Emerson provided a Rosemount™ 3051S MultiVariable™ Transmitter coupled with a Rosemount 1595 Conditioning Orifice Plate. This flow meter solution has better flow accuracies including temperature compensated flow. The performance offers greater accuracy than conventional gas meters and moves away from periodic maintenance with expensive annual gas audits towards a more predictive maintenance pathway. Built with either a compact orifice plate, a patented 4-hole conditioning plate, or averaging pitot tube, this flow meter provides measurements for closed loop control, general purpose monitoring and custody transfer applications.

This solution is optimized for variable flow applications in both high and low flow conditions as well as removing any requirements to physically stack transmitters at the site. The customer used the multivariable flow meter as a pay-meter for billing transactions between the gas plant and the end user. It is a cost-effective mass flow meter and can be calibrated online every year (differential pressure, pressure and temperature module calibration is performed online every year), which will not affect or interrupt the use of process gas.

The Rosemount 3051S MultiVariable Transmitter measures multiple variables and standardizes on a single model number for streamline process and cost efficiency. It reduces costs by eliminating the need for stacked transmitters and additional wiring. The multivariable design reduces pipe penetrations, impulse piping and connection systems for additional cost savings.

The end user of the utilities, one of the largest semiconductor factories, triggered a full-scale replacement of the conventional technologies to Emerson's industry leading Conditioning Orifice Plate technology coupled with the best-in-class Rosemount 3051S MultiVariable Transmitter replacing 40 to 60 sets over two to three years following the success of the initial installation.

> *The Rosemount™ 3051S MultiVariable™ Transmitter fully assembled with the Rosemount 1595 Conditioning Orifice Plate offered a solution that helped improve Operational Certainty parameters such as safety and reliability while getting the site to move towards predictive maintenance.*
>
> ***A large Semiconductor Plant in Taiwan***

Image 2. *Rosemount™ 3051S MultiVariable™ Transmitter (left) fully assembled with the Rosemount 1595 Conditioning Orifice Plate (right)*

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