

Thermal Power Plant Reduces Installation Costs with Conditioning Orifice Plates

RESULTS

- Reduced potential leak points by 70% or greater
- Reduced installation time
- Reduced commissioning time and costs



APPLICATION

Caustic solution flow on the water treatment plant

CUSTOMER

Thermal Power Plant

CHALLENGE

Engineers at a thermal power station in New Zealand needed to measure caustic solution flow on their water treatment plant. DP flow metering technology was the preferred choice of the engineers, due to the critical requirements of handling caustic solutions.

The accuracy in supplying the correct amount of caustic solution is critical to assure adequate treatment in the water treatment plant. Because of the limited straight lengths of pipe available, the requirements of conventional orifice plate standards were not met.

In order to achieve an accurate measurement specified in ISO 5167 (the international standard commonly used to calculate orifice plate outputs), the pipeline immediately upstream of the primary element must be straight and of constant internal diameter for a distance not less than that indicated in the standard. For example, ISO standards require 16 diameters upstream of an orifice plate (0.4 beta ratio) installation after a 90-degree single elbow in the pipe. In addition, 6 diameters are required downstream, resulting in a total length of pipe straight-run of 22 diameters. The location of where the measurement was needed did not have the required adequate pipe straight run, which ultimately was the challenge for accurate flow measurement.

SOLUTION

The engineer at the power station was not only concerned with having the required straight lengths of pipe for accurate measurement, but also the costs required for the installation. Emerson Process Management was able to provide a solution with the Rosemount 3051SFCDC Compact Orifice flowmeter.

Rosemount 3051SFC Conditioning Orifice Flowmeter significantly reduces straight pipe requirements in DP flow measurements.

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The 3051SFDC is a fully integrated flowmeter. It combines the Rosemount 3051S Differential Pressure transmitter with the conditioning plate version of the Rosemount 405 Compact Orifice Series resulting in a flowmeter that is robust, inexpensive and easy-to-install with an accuracy of $\pm 0.85\%$ of volumetric flow in liquids.

The direct-mount flowmeter was designed so it can be installed with only two diameters up and two diameters down from most upstream flow disturbances and still achieve an accurate and reliable measurement. This 3051SFDC flowmeter solved the power plant's problem, installing in the limited space available, while providing an accurate and consistent output.

In addition, the compact orifice flowmeter is designed to lower the total overall installation costs and when compared to the installation costs of a traditional orifice, the time and cost savings are substantial. Based on an innovative wafer design that facilitates direct mounting to coplanar transmitters, these systems can be installed between existing flanges. Also, with the direct-mount integral three-valve manifold incorporated into the flowmeter, the long and troublesome impulse lines are now eliminated and reduce the potential leak points by 70% or greater. These features are important when dealing with caustic solutions.

With the familiarity of the DP Flow technology along with not having to substantially increase the installation project scope, the engineer at the Power Station is looking for other applications in the plant that could benefit from the Rosemount 3051SFDC Compact Orifice flowmeter.

RESOURCES

Emerson Process Management Water & Wastewater Industry

<http://www.emersonprocess.com/solutions/water/>

Rosemount Compact Orifice Flowmeter Series

<http://www.emersonprocess.com/rosemount/products/flow/m405p.html>

Compact orifice flowmeters are designed to lower the installed cost of traditional orifice installations. Based on an innovative wafer design that facilitates direct mounting to coplanar transmitters, these systems can be installed between existing flanges.



The Rosemount 3051SFDC Compact Orifice Flowmeter with 405 Conditioning Orifice Plate and 3051S DP Transmitter

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