

University Solves Short Piping Problem with Compact Orifice Mass Flowmeter

RESULTS

- Reduced welding and installation
- Improved flexibility, accuracy, and reliability
- Improved productivity and bottom line results

APPLICATION

Steam supply for various university campus facilities

CUSTOMER

A major northeastern U.S. university

CHALLENGE

Operating as a separate business unit, the university's physical plant is responsible, not only for supplying steam to various campus facilities, but for generating operating revenue by billing the facilities for steam consumption.

An assessment of the performance, efficiency, and steam consumption of the university's boiler system revealed inadequate straight runs of piping which made it difficult to develop necessary flow profiles for an accurate flow measurement.

Originally, the university tried V-cone technology for applications where the required straight piping was not available. However, it failed to provide adequate results and had difficulty dealing with the varying swings of seasonal loads, only adding to the complexity of each measurement point.

The existing piping configuration consisting of two pipe diameters downstream from two out-of-plane 90-degree elbows was giving previous results of +5% or worse, making it difficult to get an accurate flow measurement.

SOLUTION

Emerson recommended the new Rosemount Compact Conditioning Orifice Mass Flowmeter. This technology allows installation within two diameters of upstream flow disturbances.



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Figure 1. 3095MFC Conditioning Orifice Mass Flowmeter installed two pipe diameters after two out-of-plane 90 deg elbows.

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POWER

The 3095MFC Compact Orifice Mass Flowmeter combines the Rosemount 405 Compact Orifice with the Rosemount 3095MV MultiVariable™ Transmitter into an integrated DP flowmeter. This fully integrated flowmeter eliminated the need for fittings, tubing, adapters, manifolds, and mounting brackets, thereby reducing welding and installation. The 3095MFC offered the advantage of mass flow measurement for this steam application and provided true compensated mass flow measurement. The advanced electronics of the 3095MV multivariable transmitter dynamically compensates for any density changes due to pressure and temperature variations.

The 405 Compact Orifice is a wafer-style primary that is machined from a single-cast part, integrating the primary element, impulse lines and manifold to facilitate direct mounting of the Rosemount transmitter. Coupling these two components provides a flexible, accurate and reliable process measurement solution, while also improving productivity and the bottom line.

To verify that the Compact Orifice Flowmeter was reading accurately, it was compared to a compensated orifice plate located 60 diameters downstream. The results showed the 3095MFC tracked within 1% of the orifice meter, thus illustrating excellent accuracy and repeatability in this difficult piping configuration.

In addition to being extremely satisfied, the University is looking to standardize on the 3095MFC Compact Orifice Mass Flow meter in applications where short piping configuration is involved. They now realize that Emerson Process Management is capable of meeting almost any measurement need due to its wide offering of Rosemount DP primaries and DP flow solutions.

RESOURCES

Emerson Process Management Power Industry

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

Rosemount Compact Orifice Flowmeter Series

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



Figure 2. 1495 Orifice Plate (check meter) installed downstream of the 3095MFC Compact Orifice Mass Flowmeter

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