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ASK THE EXPERT

Boost Efficiency and Reduce Emissions with Accurate Utility Flow Measurement

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In today's competitive industrial landscape, effective energy management has become more critical than ever. As industries strive to reduce operational costs and increase productivity, the efficient use of energy stands out as a key factor in achieving these goals. By implementing robust energy management strategies, industrial plants can enhance their bottom line and also contribute to a more sustainable future.

Steam and compressed air are very common industrial utilities; however, they can also be very energy-intensive and, therefore, expensive to produce. Eliminating waste and boosting efficiency in these energy streams can greatly impact a plant's operating budget and reduce emissions.

Any effective energy management system requires accurate, ongoing stream of data from all plant utilities. Measurement of these points generates a baseline for optimization, used to evaluate the impact of process efficiency and capacity improvement projects, as well as make data driven decisions.

The Rosemount™ Annubar™ Flow Meter addresses the many difficulties in measuring utilities — such as substantial line sizes, complex duct or piping geometries, and varying flow profiles — providing precise and reliable data to optimize plant performance.

Kassandra Ruggles, global product manager at Emerson, answers some of the questions pertaining to their uniquely designed flow meter and how it can increase a plant's efficiency.

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How can the Rosemount Annubar assist in energy management?

There are increasing demands to reduce energy usage both from a financial and environmental impact perspective. For effective energy management, it is vital to have accurate and reliable data from all plant utilities. Utilities are the lifeblood of any size plant; they are also a large portion of its operating and energy budget. For example, a necessary but challenging measurement is the combustion air flow to a boiler. This information is used to determine the boiler efficiency. Plants can increase energy efficiency and reduce NOx emissions by tightening the airflow control to operate with less excess air, reducing fuel consumption. However, the airflow is difficult to measure accurately and reliably due to large line sizes, duct geometry and internals, limited straight run, and variable flow profiles. The Rosemount Annubar Flow Meter is uniquely designed to provide an accurate measurement of airflow despite these challenges.

Could you explain the innovative measuring techniques employed in the Rosemount Annubar Flow Meter that contribute to its improved performance? How do these techniques ensure accurate and reliable flow measurements across a wide range?

The Rosemount Annubar Flow Meter is especially innovative because it is designed for optimal performance. The T-shape generates the maximum differential pressure but still minimizes permanent pressure loss in the system. The flat high-pressure side, with defined edges, creates a fixed separation point that improves performance over a wider flow range compared to other shapes. The slots also capture more of the flow profile, compared to pressure-sensing holes, to provide comprehensive averaging.

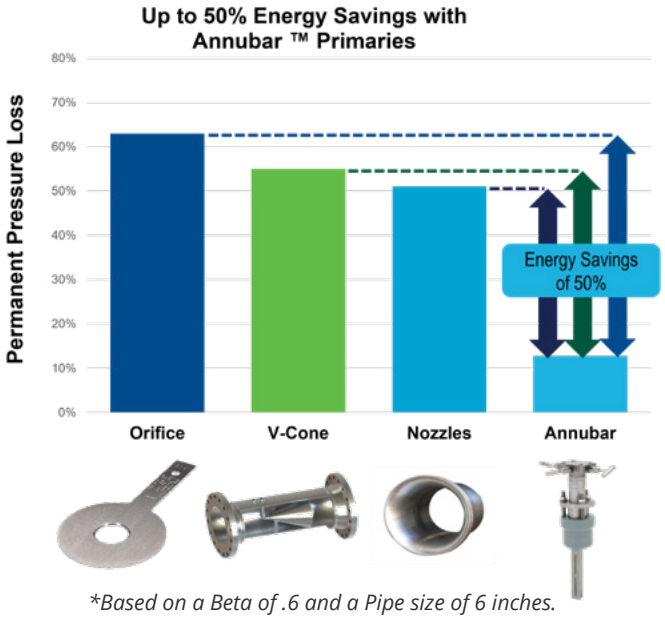
You mentioned that the Rosemount Annubar Flow Meter has a unique T-shaped design. Can you provide insights into its benefits?

The flat T-shape provides an impact pressure at the slots, directing particles away from where they could settle and form blockages. There are also stagnation zones behind the T-shape that deflect particulates away from the low side sensor ports. Without these design features, other shapes become plugged when there are particulates in the flow, potentially requiring the system to shut down to flush the instrument. This innovative Annubar design allows greater uptime and therefore plant efficiency.

How does the small profile of the T-shaped sensor in the pipe contribute to minimal permanent pressure loss and subsequent energy savings? How does this benefit plant uptime and operational efficiency?

Measurement points are crucial to providing information to plant operators about their plant efficiency. It is necessary to provide benchmarking to determine if efficiency is trending up or down. Also, it is extremely effective where troubleshooting is needed, or potential savings of improvement projects are required. However, when thinking about installing a measurement point, it is important to consider the total installed cost as well as the operating cost of the instrument. The Rosemount Annubar Flow Meter is a single pipe penetration — there are no additional materials such as impulse lines, orifice flanges, manifolds, etc. This reduces the labor and materials needed to install a flow measurement point.

When thinking about the operating cost of a flow measurement, consider the permanent pressure loss due to the measurement and the energy loss associated with it. Being strategic in your flow measurement choices can reduce energy consumption and operating costs — for example, in a compressed air system an orifice plate has a larger blockage in the pipe than an Annubar. This creates a high permanent pressure loss, resulting in increased electricity costs due to the energy required by the pump to overcome the loss in pressure to produce make-up air. This is an energy loss, waste, and operating cost that must be considered. Due to its low permanent pressure loss design, replacing this measurement point with an Annubar increases system efficiency, reduces energy costs, and can improve line pressure even at remote locations. Choosing the Rosemount Annubar Flow Meter over alternative methods can reduce fuel consumption, reduce pumping or compressor costs, increase plant capacity, and minimize compressor, pump, or boiler size.



Based on a Beta of .6 and a Pipe size of 6 inches.

To learn more about Rosemount Annubar Flow Meters, visit www.emerson.com/DPflow.

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