

Reduced Bore for Steam Measurement

Vortex Flowmeters VY Series

Accurate Steam Measurement from Start-up to Full Operation; Steam flow varies widely from start-up to full load. This note highlights how multivariable vortex technology ensures accurate, reliable measurement across all conditions.

Application

Steam is often described as the 'lifeblood' of industry. One of the most popular means of providing energy to a process and its associated operations, heat from a boiler converts into an easily transportable form.

Whether it is for office heating or providing mechanical energy to turbine generators, steam is a powerful power source that plants and refineries require to maintain a smooth operation.



Vortex flowmeter example in use at Power Plant

Measuring energy consumption is paramount in improving energy efficiency; efficient and accurate metering will not only determine excess use and illustrate where the steam is used but will also positively affect bottom-line profitability.

Challenges

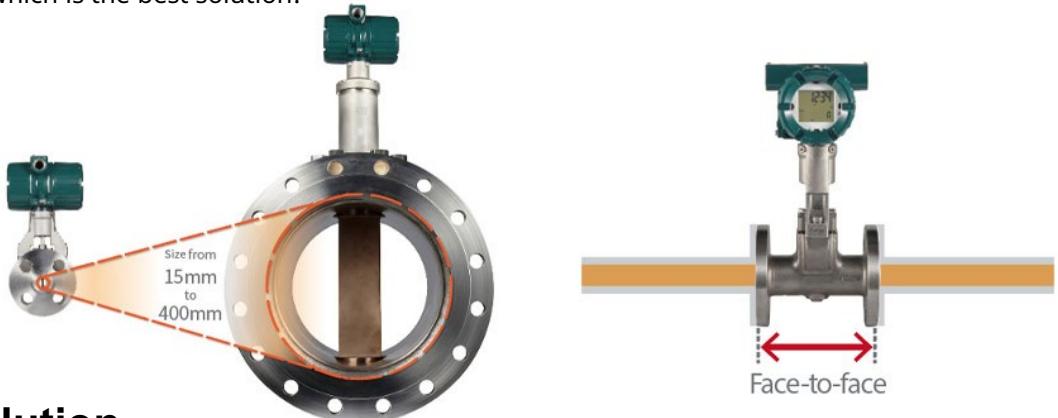
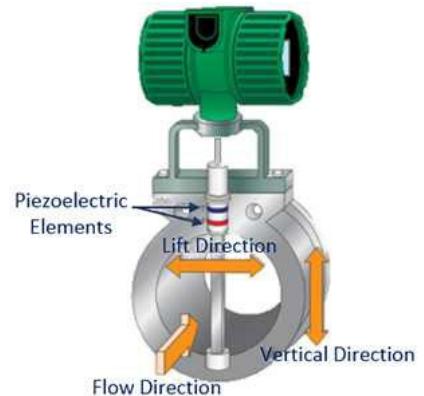
Infinitely scalable, most boiler systems can be ramped up or down depending on facility needs. This can include low flows during startups to higher flows during full operation, and then back to low flows for downtime and/or maintenance. Steam systems are only as good as their processes. Accurate steam measurement controls boiler efficiency, safety, and provides the data to best inform cost and product quality decisions. Selecting the correct flow meter for the application that is cost effective and scalable to these changing conditions is a challenge.

Traditional orifice flow meter is not suitable for low flow measurement and accessory equipment (impulse line, condensation tank, etc.) is required to realize steam flow rate measurement.

In order to maintain the turn downs with an orifice, the plate must be replaced periodically to avoid deterioration accuracy by abrasion. Furthermore, maintenance such as zero-span adjustment is required.

Vortex meters are known to be superior devices for steam flow measurement due to their inherent linear measurement, large turndown, low-pressure drop, and high accuracy. When sizing a common to have to reduce the line size vortex meter, it is using concentric reducers to increase the velocity through the meter for optimum performance. Unfortunately, piping changes need to be made, and this can increase the installation costs.

So, which is the best solution?



Solution

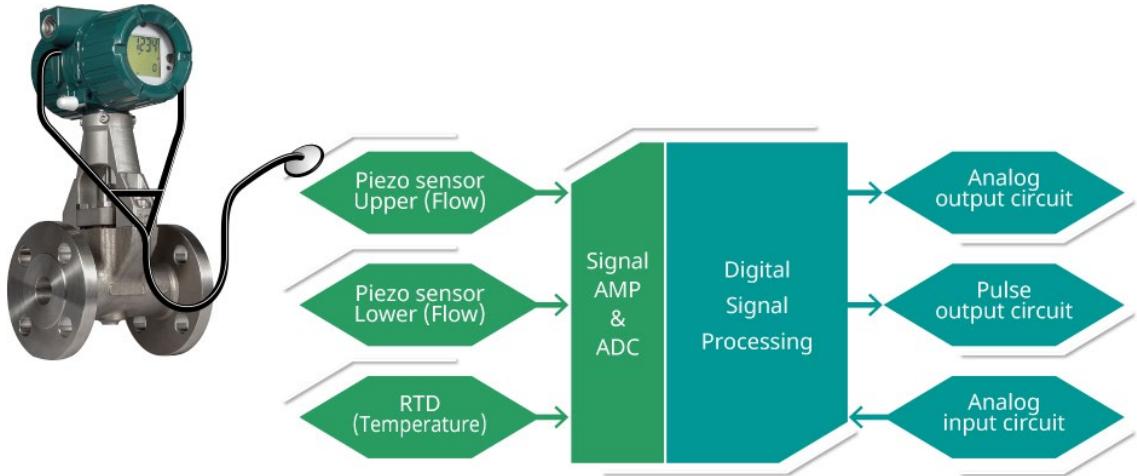
Yokogawa's VY series vortex shedding flow meter offers a number of inherent advantages over the orifice plate technology and is becoming the application standard. To provide a cost-effective and scalable solution, Yokogawa suggested the VY series Reduced Bore Type Vortex Flow Meter. This meter features both a cast stainless steel body as well as a concentric reducer and expander that enables stable flow rate measurements in low-flow conditions. This ensures a stable and accurate flow rate output and extends the range of measurements that can make to a lower flow span.

The total cost of ownership is greatly reduced from an orifice solution since there is no need to maintain the pressure transmitter, impulse lines, manifolds, and isolation valves.

This flow meter is available with a single reduction or a double reduction in bore size, while still keeping the same face-to-face dimension of a standard full-bore vortex, simplifying installations on new projects. There is no need for additional reducers or piping, replacing existing full-bore vortex units is simple. Reduced bore VY series vortex meters are flow tested with the reducers; ensuring unit accuracy is uncompromised by reductions in the line. Manual reductions in piping cannot guarantee this same level of accuracy.

Yokogawa vortex flowmeters are also well-suited to high-temperature applications, and the quality of flow management can be improved even further via using anti-vibrating efficiency and self-diagnostic functions that rely on the VY series integrated Spectral Signal Processing system, providing optimum and stable measurement.

When choosing the multivariable option, a built-in integral temperature sensor allows the meter to take a true mass flow measurement of saturated steam by referring to steam tables embedded in the software. This eliminates the need for separate pressure and temperature sensors and a flow computer.



Key Benefits

- Minimum measurable flow up to five times lower than conventional vortex flow meter
- Integrated construction with reducers built into the flow meter body
- The same face-to-face dimensions ease the task of installing other sizes or types of VY series flow meters
- Does not require costly piping modifications such as reducers/expanders or short pipes to achieve the required straight pipe length



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