

Proven, Economical V-Cone Flow Meter Reduces LNG Installation And Operating Costs

With its unique self-conditioning flow technology, the versatile V-Cone® Flow Meter from McCrometer offers a lowest-installed cost, low-maintenance and highly reliable measurement solution for challenging hazardous applications in liquefied natural gas (LNG) processing, transportation, storage and distribution.



With global energy demand on the rise in the next decade, LNG is rapidly becoming a vital asset in meeting the worldwide demand for natural gas. Liquefying natural gas reduces the volume of space it occupies by 600 percent, making transport by ship feasible for export and distribution.

The natural gas liquefaction process requires accurate flow measurement as the natural gas is first cooled to -260°F (-162.2°C), which condenses the fluid into the liquefied state. Flow is then measured again several times during transportation, storage, regasification and distribution through pipelines to the end users.

With its self-conditioning, no-moving parts differential pressure (dP) sensing technology, McCrometer's V-Cone Flow Meter is now installed in a wide variety of LNG applications all over the world. Hundreds of V-Cone Flow Meters have been installed to measure gas as it flows into liquefaction trains and then from the trains into storage tanks. It has even been used in specialized cryogenic applications where flow was never before measured.

The advanced V-Cone Flow Meter offers significant installed and operational cost savings in LNG facilities with complex or crowded equipment layouts, where the options for upstream and downstream piping are limited. This meter requires only 0-3 straight pipe diameters upstream and only 0-1 straight pipe diameters downstream for accurate flow measurement, using up to 70-percent less pipe than other dP flow meters.

The V-Cone Flow Meter dramatically reduces installed and operational costs. The cost savings is especially common at both liquefaction and regasification facilities where large lines enter and exit the plant. Beyond the initial savings by installing much shorter pipe runs, there is an additional energy cost savings

that accrues from maintaining the extreme cryogenic temperatures necessary over a much shorter distance. The need for costly pipe insulation also is reduced for the same reasons.

With its rugged design, there is virtually no maintenance required with the V-Cone Flow Meter and life is typically 25-years of service. The V-Cone Flow Meter is inherently more accurate than traditional dP instruments because the flow conditioning function is built directly into its unique sensor design. A centrally located cone interacts with the fluid stream, reshaping the velocity profile to provide a stable signal that increases measurement accuracy.

The pressure difference exhibited between the static line pressure and the low pressure created downstream of the cone is measured via two pressure sensing taps, one placed slightly upstream of the cone and the other located in the downstream face of the cone itself. The pressure difference is then incorporated into a derivation of the Bernoulli equation to determine the fluid flow rate.

The versatile V-Cone Flow Meter is available in line sizes from 0.5 to greater than 120 inches in materials and with flanges compatible with any application. It operates over a wide flow range of 10:1, is accurate to $\pm 0.5\%$ and offers repeatability to $\pm 0.1\%$. It features standard beta ratios of 0.45 to 0.85 with custom betas available. It is constructed of rugged 304/L or 316/L stainless steel, Carbon Steels, Chrome Moly, Hastelloy C-276, 22Cr and 25Cr Duplex, 6Mo, Inconel, and Incolloy with other materials and testing available on request.

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