



MASS FLOW METERS FOR FLARE/VENT GAS MEASUREMENT



FLARE/VENT GAS MEASUREMENT

Offshore Lease Operators are now required to account for flare and vent gas volumes from deepwater offshore facilities processing more than 2000 bpd. Federal Regulation- Title 30 Part 250, Subpart K defines these requirements and the time line for implementation. Accuracy is required to be 5%.

Accurate measurement of flare and vent gas flows is important from the perspective of regulatory compliance, energy conservation and emission accounting. Unlike conventional flow measurement requirements, flare/vent gas measurements present unique challenges in terms of rangeability and response to changing flow extremes. During normal platform operations, flows are usually low. Depending on header size, discharge velocities are usually under 1 f/s (60 SFPM). In upset conditions these flow rates can flare up to over 300 f/s (18,000 SFPM) Flow meters used in custody transfer or process control are not capable of handling these flow extremes and maintaining the accuracies required. The flare/vent measurements are associated with safety systems, and swings in flow rate are both unpredictable and extreme.

MEASUREMENT SOLUTIONS

The flow meter of choice to address this challenging measurement is the Sage Metering Thermal Mass Flow Meter. It utilizes technology that does not require external pressure and temperature compensation and only requires a single penetration of an insertable flow element.

Sage Metering's PRIME™ Series NIST Traceable Digital Thermal Mass Flow Meter is unique in making flare/vent gas measurements. A single meter can handle the extremely wide flow ranges both in normal operations and upset conditions, while operating within the prescribed accuracy requirements.

Considering these meters are typically required to be retrofitted into existing piping galleries, installation costs can be a significant factor in choosing flow meter technologies. With Sage, there is no requirement to break the existing piping or to even take the lines out of service. Using an insertion measuring probe installed through a small isolation valve assembly makes this possible. The Sage meters have a high resistance to gas contaminants and virtually no annual maintenance, making them reliable and very easy to own and operate. In addition, the Flow Meter has negligible pressure drop which is an important feature in lower gas flows.

INTEGRAL



SIP Series

REMOTE



SRP Series



FLARE/VENT GAS MEASUREMENT

INSTALLED COST

Using the Sage Prime™ remote electronics configuration (Model SRP), only a probe mounted explosion-proof junction box is installed on the flare/vent piping. The electronics module can be conveniently located remotely up 1000 feet where power and access to your data acquisition system is available.

Only a single insertion point is required. This eliminates complicated multiple flow elements, where rangeability would be addressed by switching between several flow meters. This approach also eliminates the need to install more equipment requiring more calibration, and also eliminates the need to switch between flow systems where the possibility of lost measurement data could occur.

SAGE PRIME™ MASS FLOW METERS

Sage Prime™ is a thermal dispersion type of flow meter, utilizing the fast responding, constant temperature difference method of measuring gas mass flow rate. It contains two reference grade platinum RTD sensors clad in a protective 316 SS sheath. It features direct Mass Flow for gases, wide rangeability, low pressure drop and no moving parts.

The Sage Prime™ is microprocessor based, has digital drive circuit, and has Modbus RS485 RTU communications. It is powered by 24 VDC (12 VDC optional), or 115/230 VAC. The power dissipation is under 2.5 watts (e.g. under 100 ma at 24 VDC) for the DC version. The power and output terminals are in a separate sealed compartment for ease of installation.

The Sage Prime™ display is a high contrast photoemissive OLED display, and it displays mass flow rate, totalized flow, and temperature, as well as a bargraph representation of flow rate. In addition, the calibration milliwatts (mw) is continuously displayed, providing ongoing diagnostics. Outputs include a 4-20 mA signal proportional to mass flow rate, and pulsed outputs of totalized flow (24VDC solid state [sourcing] transistor drive), as well as Modbus compliant RS485 RTU communications.

Calibration is NIST traceable, and covers a wide variety of gas calibrations. Sage Prime™ can measure gas flow up to 500°F at pressures up to 1000 PSIG.

The zero gas flow rate can be verified in real time by monitoring the mW value recorded during initial calibration with the mW value after installation. This provides continuing calibration verification eliminating frequent calibration required by other technologies.

Standard accuracy is 0.5% of full scale +/- 1% of reading at standard turndown, with an optional turndown of over 1000 to 1 and repeatability of 0.2%. Special calibration available for extended range applications. The flow meter is Sage Metering, Inc. SIP Series (Integral Style) or SRP (Remote Style), with the trade name Sage Prime™.

For further information on Sage Prime™ or the many other Sage Metering products offering advanced meter functions including multiple ranging, ask for the Sage 12 page brochure or go to www.sagemetering.com.



Dual - Sided Industrial Enclosure, with large, easy-to-access terminals in rear compartment.

Features a very high contrast display of Gas Flow Rate, Total and Temperature, visible even in bright sunlight.

SAGE THERMAL MASS FLOW METER BENEFITS:

- High Accuracy and Repeatability – Precision measurement of your Flare Gas, Vent Gas, Methane or Natural Gas Flows
- Direct Mass Flow – No Need for Temperature and Pressure Corrections
- Rangeable over at least 100 to 1 and as high as 1200 to 1
- Negligible pressure Drop – Will not impede the flow coming off of the Scrubber
- No Moving Parts – Eliminates costly maintenance such as replenishing oil, or bearing replacements
- Dirt Insensitive – Provides sustained performance
- East-of-Installation, and convenient mounting hardware
- Low Power dissipation (Sage Prime™ draws under 2.5 Watts)
- High contrast graphical display, with Flow Rate, Total and Temperature
- Rugged, user friendly packaging with easy to access terminals
- Ongoing diagnostics
- Easy to configure for low flow or variable gas production