November 2017

Flare Gas Measurement in B.C., Alberta, and Saskatchewan Using GE Ultrasonic Metering Technology

Blaine Barnes
Tundra Process Solutions

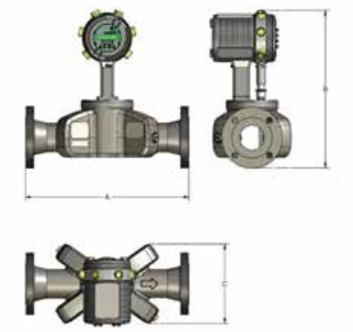
www.TundraSolutions.ca

MEASUREMENT REGULATIONS

With the creation of Directive PNG017 by the Ministry of Economy, Saskatchewan has become the latest province to mandate measurement and compliance requirements for oil and gas production companies. Alongside Alberta and British Columbia, Saskatchewan now ensures that oil and gas producers measure and report hydrocarbon production and associated vent and flare gas volumes within specified uncertainty limits.

ULTRASONIC TRANSIT-TIME TECHNOLOGY VS. OTHERS

Flare gas measurement is a challenge and few metering technologies offer a viable solution. A variety of technologies have been utilized, but few meet the requirements of the measurement guidelines over a broad flow range and through changing process conditions. See industry standard API 14.10 Measurement of Flow to Flares for technical details.



Panaflow Z1G
Gas Ultrasonic Volumetric Flowmeter

Differential pressure technologies do not offer the turndown required by intermittent flares, and are subject to gas composition changes affecting uncertainty. Thermal mass metering was also once widely implemented due to low pressure drop and increased turndown, but changing compositions (and heat transfer coefficients) of flare gas result in uncertainties that may exceed measurement directive requirements. Optical technologies have been tested but with fouling of the optical apertures due to in-line contaminants and entrained liquid, the risk of measurement error and the increased maintenance costs make the technology prohibitive. As a result, ultrasonic metering technologies offer the most robust and reliable flare gas measurement.

GE PANAMETRICS ULTRASONIC METERING TECHNOLOGY

In 2002, GE acquired Panametrics Inc., the world leader in ultrasonic metering technology. To-date, GE Panametrics DigitalFlow GF868 ultrasonic flare meters enjoy the largest installation base of any flare meter in the world. The GF868 meters are offered in a range of line sizes, and can accommodate 2" through 120" line sizes. With an unparalleled turndown of up to 3940:1, and accuracy at velocities from 0.03 m/s to 120 m/s, GE DigitalFlow flare meters ensure that purge gas as well as flare volumes are captured.

> "Flare gas measurement is a challenge and few metering technologies offer a viable solution. A variety of technologies have been utilized, but few meet the requirement..."

Unlike other technologies, GE ultrasonic metering technology is considered a velocity (transit-time) based technology. The result is accurate measurement regardless of gas composition. GE ultrasonic meters can accurately capture nitrogen purge gas at low flow rates, and should a facility require flaring due to an unexpected shutdown, GE meters remain accurate as velocities approach 120 m/s and with significant compositional changes to the gas (e.g. nitrogen purge is replaced with produced hydrocarbon gas mixtures).

APPROVAL CONSIDERATIONS

With a variety of installation options available and complete Canadian agency hazardous area ratings, GE DigitalFlow models and the associated transducer options can be used in a variety of Division (Zone) 1 applications. Additionally, GE's ultrasonic meters can be used in registered pressure piping systems. Despite the fact that flare metering technology often operates at low pressures, many piping systems are registered with regulatory bodies overseeing pressure equipment directives (e.g. ABSA in Alberta). Registered piping systems require the use of equipment with a valid Canadian Registration Number (CRN), and GE DigitalFlow products ensure compliance.

INCREASED PERFORMANCE IN ADVERSE INSTALLATIONS

GE DigitalFlow metering technology remains accurate over a variety of changing process parameters, gas compositions, and more, but installation-effects exist in systems where space, obstructions and poorly developed flow profiles exist. To mitigate potential uncertainties, GE Measurement & Control offers additional Computational Fluid Dynamics (CFD) modelling services to ensure unparalleled accuracy in adverse installations.

COMPACT ULTRASONIC METERING EVOLUTION; ECONOMICAL OPTIONS AVAILABLE FOR 3", 4" AND 6" LINES:

GE Measurement & Control has released the latest product in ultrasonic gas metering technology – the PanaFlow™ Z1G Gas Ultrasonic Volumetric Flowmeter. The PanaFlow™ Z1G offers flexibility to producers with continuous flare applications. The PanaFlow™ Z1G meter is available in 3", 4", and 6" line sizes, ANSI 150# and 300# connections, and was designed to accommodate an underserved market suffering from measurement uncertainty due to changing gas compositions, increased maintenance requirements, and low operating pressure effect on traditional technologies.

Facilities with continuous flare measurement on smaller lines can take advantage of accurate, non-intrusive ultrasonic metering via the PanaFlow™ Z1G in single channel or dual channel configurations. Designed with vent gas, vapour recovery and natural gas production in mind, the Z1G offers a cost effective alternative to maintenance intensive metering technologies more commonly used in small-line continuous flare applications.

GE PANAMETRICS ULTRASONIC FLARE METERING

Regardless of flare gas line size or gas composition, GE offers producers and facility operators the most comprehensive line of flare meters available to meet provincial requirements for monitoring, reporting and compliance.

TUNDRA
Process Solutions Ltd.

COMPLIANCE

For more information on compliance requirements, visit the following websites, or contact Tundra Process Solutions:

- British Columbia, Oil and Gas Commission (OGC), "Measurement Guideline for Upstream Oil and Gas Operations": www.bcogc.ca
- Alberta, Alberta Energy Regulator (AER), "Directive 17: Measurement Requirements for Oil & Gas Operations": www.aer.ca
- Saskatchewan, Ministry of Economy, "Directive PNG017: Measurement Requirements for Oil and Gas Operations": www.economy.gov.sk.ca/
- Tundra Process Solutions Ltd.: http://www.tundrasolutions.ca

Questions?

Please feel free to contact us at info@tundrasolutions.ca

For more information on the use of GE ultrasonic metering technology for flare gas measurement requirements in B.C., AB, and SK, and services offered by Tundra Process Solutions Ltd., visit www.tundrasolutions.ca

Blaine Barnes is the Vice President, Marketing & Strategic Initiatives for Tundra Process Solutions