

Breakthrough in Flare Gas Measurement

Accuracy Now Updates Automatically when Composition Changes

APPLICATION CHALLENGES

Accurately measuring the flow of gas mixtures in oil & gas applications, including distribution systems, flare gas produced in oil & gas applications, such as hydraulic fracturing, is often complicated by changes in gas composition over time.

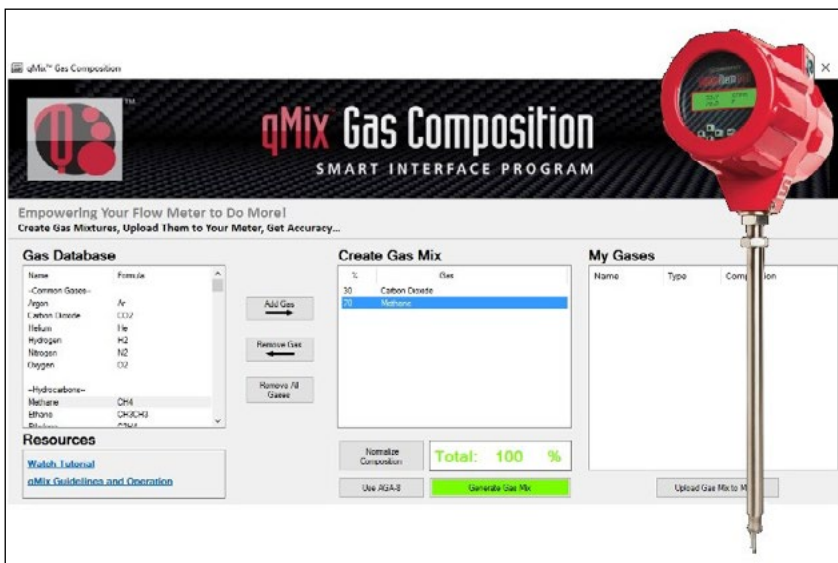
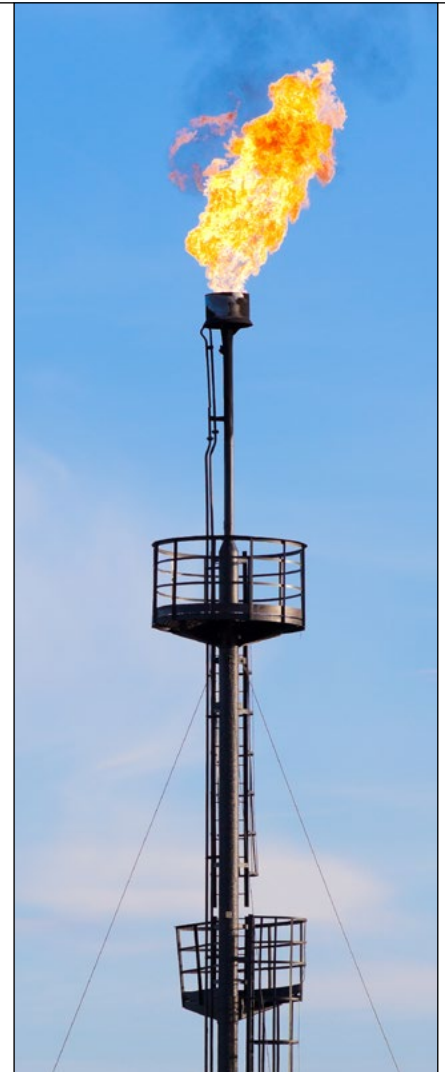
Over the last five years, multi-path ultrasonic meters have been an ideal technology for applications with changing gas compositions. Even though ultrasonic meters can handle changes in gas composition, they cannot measure down to the required low flows rates as low as 0.1 fps (0.03 mps) for EPA compliance. Gas users and producers need an alternative technology to comply with EPA regulations like 40 CFR Part 60 Subpart OOOO (also known as Quad O) as well as the new RSR MACT rule for refineries. Now, for the first time in history, oil & gas engineers have a viable **alternative to ultrasonic technology** to comply with these EPA regulations for ultra low flows.

[BREAKTHROUGH] THERMAL FLOW METERS ACCURATELY MEASURE ULTRA-LOW FLOWS WITH CHANGING GAS COMPOSITION

Oil & Gas engineers can use one QuadraTherm® thermal mass flow meter with qMix™ software to manage changes in flare gas composition for ultra low flows down to 0.1 sfps (0.03 smps).

Because flare gas composition and density vary over the lifetime of the flare, a typical total flow measurement error could be as high as 20% in applications with widely varying compositions. To account for these errors, the EPA requires oil & gas engineers to update their flare gas composition every 3-6 months.

QuadraTherm thermal flow meters with qMix™ gas mixing software can manage changes in flare gas composition in as little as 10 minutes with very little downtime. While the insertion QuadraTherm flow meter is installed in the flare, use the on board qMix gas mixing software to create your new flare gas composition, upload the new gas composition into your meter, and within seconds your meter will accurately measure your updated flare gas composition — no recalibration (See Figure 1). To take this a step further, by integrating with a compositional sampling device like a gas chromatograph, QuadraTherm with qMix-RealTime™ can adjust flare gas mixtures and percentages within seconds to match real-time readings from your GC.



THROUGH THE ON BOARD QMIX™ GAS MIXING APP

- Select gas, customize gas composition percentages, and create new gas mixture in-the-field
- Upload new gas composition to the meter in the field — only takes 3 seconds
- Retain accuracy without sending the meter back to the factory for recalibration
- Use “My Gases” Library to store unlimited new qMix gas compositions
- Gain access to all AGA compliant gas properties needed to make the algorithmic gas mass flow rate calculations.
- Use qMix-RealTime™ software to connect, read, and automatically update new gas compositions from a gas chromatograph — real time

Figure 1: QuadraTherm® Thermal Mass Flow Meter with qMix™ App in Smart Interface Program

OTHER BENEFITS OF THERMAL MASS FLOW METERS

- **WIDE 100:1 TURNDOWN DURING UPSET CONDITIONS** Upset conditions make it difficult to maintain accuracy in flare gas measurement due to ultra low flows and sudden surges in flow. QuadraTherm can handle ultra low flows with a full-scale of 100 standard feet per minute and operate accurately at very high velocity flows up to 1000 sfps (305 smps).
- **HIGH ACCURACY** With four-sensor thermal sensor technology and the on board Raptor II operating system, accuracy specifications are +/- 0.75% of reading, comparable to four-path ultrasonic meters at a much more economical price and accuracy at low flows. Eliminate drift with patented DrySense™ sensor with lifetime warranty.
- **VERY LOW PRESSURE WITH VARIABLE TEMPERATURES** The multivariable 640i VT measures very low pressure gas with no pressure loss.
- **UNIFORM FLOW PROFILE** Flare stacks generally have asymmetric and swirling flow. The 640i has a Reynolds' number correction built in to smooth the Flow Profile.
- **EASY-TO-INSTALL — NO PROCESS SHUTDOWN** Roaring flames, difficult access and regulatory requirements make flares tough to service. Insertion thermal flow meters come with hot tap option for no process shutdown, and Dial-A-Pipe™ to use one flow meter for varying pipe sizes—without factory recalibration.

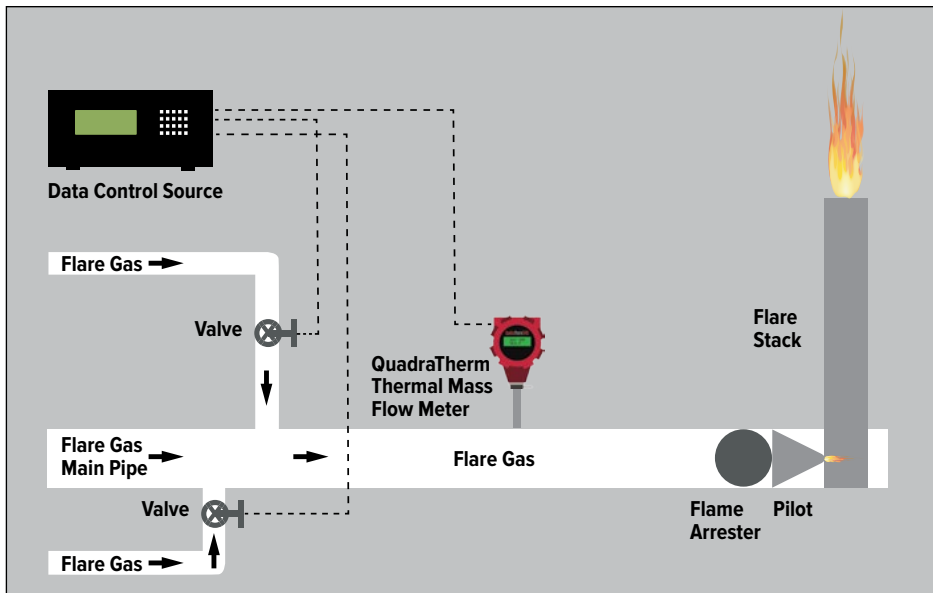


Figure 2: QuadraTherm® 640i Insertion Thermal Mass Flow Meter in Flare Gas Applications

— LEARN MORE —

sierrainstruments.com/products/upgrades/qmix.html

— WATCH VIDEO —

sierrainstruments.com/library/videos/breakthrough-flare-gas

— READ WHITE PAPERS —

sierrainstruments.com/library/whitepapers/flare-gas-mass-flow-metering

sierrainstruments.com/whitepapers/in-field-gas-compensation



QuadraTherm® 640i Insertion Thermal Mass Flow Meter

- Achieve high accuracy +/- 0.75% of reading (+/- 0.5% for 780i inline with built in flow plates); Multivariable outputs
- Wide flow range of 0.1 to 1000 sfps (0.03 to 305 smps); 100:1 turndown
- Eliminate drift with patented DrySense™ technology-Lifetime sensor warranty
- qMix™ Gas Mixing App manages changes in gas composition in the field at ultra low flows
- Qmix-RealTime™ connects, reads, and automatically updates new gas composition from GC
- In-situ ValidCal™ Diagnostics, Dial-A-Gas™ & Dial-A-Pipe™ for easy operation
- Low and high pressure hot tap
- Digital communications
- 40 CFR Part 60 (Quad 0), Boiler MACT Greenhouse Gas (GHG) certified
- cFMus, ATEX, IECEx approvals

— LEARN MORE —

sierrainstruments.com/products/quadratherm/640i.html