Focus Probe FAQ

The Focus Probe uses Photon Control's patented Laser 2 Focus Velocimetry, an optical sensing technology that was designed specifically for gas flare applications. The following FAQs help introduce the Focus Probe, its technology and its advantages over other conventional meters.

How does the Focus Probe help oil and gas companies comply with environmental regulations?
The Focus Probe provides a highly accurate, low maintenance and cost-effective means of gas flare metering. The Focus Probe is specifically designed for gas flare applications, enabling oil and gas companies to accurately measure flow rates with levels of effectiveness unmatched by other technologies.

What is Laser 2 Focus Velocimetry?
Laser 2 Focus Velocimetry is Photon Control's proprietary technology and the key principle of operational the Focus Probe. Laser light is concentrated in two sheets inside the pipe. As particles flow through the pipe, they pass through the sheets, causing the laser light to scatter. The scattered light is detected by two photodetectors. By measuring time between signals from the photodetectors, the velocity of particles is determined from the known distance between the two laser sheets.

What is the long term reliability of the Focus Probe?
The Focus Probe is physically very stable with no moving parts. The Focus Probe is easily serviced, requiring minimal maintenance compared to other technologies. Focus Probe's laser is rated for an operational lifetime of five years (may be easily replaced if necessary) and delivers a highly repeatable measurement over the life of the product. Because distance between the two laser sheets does not change, Focus Probe does not require periodic calibration after its initial commissioning.

What are the main advantages of optical flow meters over ultrasonic flow meters?

Turn-down ratio: Optical laser technology measures flow from 0.1m/s to faster than 100m/s. This range, which has been verified through extensive testing and in-field applications, is substantially better than the range of conventional meters (including ultrasonic meters), which typically do not achieve their stated ranges unless under near-perfect environmental conditions.

Operating temperature: Optical gas flow meters can be applied to virtually to any process temperature while conventional ultrasonic meters cannot measure flare gases above temperatures of 150°C.

Resistance to pipe vibration and acoustic noise: Ultrasonic meters may produce inaccurate readings caused by interference from sound. Because Focus Probe uses optical technology, sound interference will not affect accuracy or any other aspect of performance.

Better performance in variable flow conditions: Ultrasonic meters are based on the speed of sound through a medium. However, the speed changes as the medium changes and this can produce errors and inaccuracies. The Focus Probe takes a direct measurement of the speed of the particles and is therefore less affected by variations in gas flow.

One installation point: The Focus Probe requires only one installation point, instead of the two installation points typically required by ultrasonic meters. A single installation point is simpler, requires less maintenance and is less prone to errors.

What are the main advantages of optical flow meters over thermal mass flow meters?

Immunity to gas composition: Thermal mass meters measure the flare gas thermal conductivity to determine flow. Therefore, accuracy is poor whenever the gas composition is not known precisely (such as in flares which contain a mixture of gases, flares with unknown moisture or CO2 content and flares that have been contaminated by even trace amounts of other substances). In contrast, optical laser technology measures the actual speed of particles, a property which is not dependant on thermal conductivity of flare gases. The different operating principle enables optical laser technology to deliver more accurate flow data compared to thermal mass.

Higher resistance to probe contamination: The Focus Probe is inherently more resistant to contamination and fouling than thermal mass meters. The Focus Probe also features a 'shroud" design that produces an even further resistance to probe contamination.

Immediate feedback: When thermal mass meters malfunction, they do not give any outward signal to indicate errors. The result is that thermal mass meters may be malfunctioning for some time before any problems are discovered. The Focus Probe is designed so that if the sensors become contaminated, no reading will be generated and the problem can will be discovered without delay.

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Why do some manufacturers omit accuracy specifications at low velocity ranges?
The accuracy is influenced by flow profiles of gases, which in turn are determined by models based on Reynolds' number. Flow profiles are most stable at higher velocities) and least stable at lower velocities. Generally speaking, lower velocity flows will result in lower accuracy, regardless of the instrumentation. Some manufacturers omit accuracy specifications at the low velocity ranges because performance is very poor, often with large margins of error exceeding 100%.

Are customized models of Focus Probe available for my specific application requirements?
Yes. Focus Probe has been successfully deployed in custom applications for various project parameters.

What are the main steps of a Focus Probe installation?
The Focus Probe installation is technically straightforward and is typically completed in approximately 2.5 hours, excluding step 1.

1. Create weldolet in side of pipe
2. attach valve and packing gland assembly
3. insert probe to required depth (usually 1/4 radius), orienting towards direction of flow
4. lock probe into position with packing gland
5. mount optical flow processor unit as close to probe as possible
6. connect fiber optic cable between probe and processor unit
7. connect power, etc
8. configure firmware

How often is calibration required for the Focus Probe?
After installation and commissioning, the Focus Probe does not require any further calibration.

What maintenance is required for the Focus Probe?
The most common maintenance is simply cleaning the windows on the probe. Cleaning is a quick and easy process that entails removing the probe, cleaning with alcohol and replacing the probe. The task is typically completed within 30 minutes.

What corrective procedures are required if the probes become contaminated or fouled?
The likelihood of probes becoming fouled is much reduced by the Focus Probe's innovative "shroud" feature that protects specifically from contamination. However, in particularly "dirty" flares, it is likely that any probe inside the pipes may become contaminated and require cleaning. In this case, cleaning of the Focus Probe is a quick and easy process that entails removing the probe, cleaning with alcohol and replacing the probe. The task is typically completed within 30 minutes.

Can the Focus Probe determine flow using only a single point of measurement?
Yes. The Focus Probe is designed to produce two sheets of laser light in a single unit. Such a design allows a single point of installation to suffice. A single installation point is simpler, requires less maintenance and is less prone to errors.

Can the Focus Probe measure bi-directional flow?
Yes. The Focus Probe will measure flow in either direction.

Can the Focus Probe be used at hazardous locations?
Yes. The Focus Probe is designed intrinsically safe and with options for explosion protected housings available.

Where has Focus Probe been applied?
A partial list of customers who have successfully applied the Focus Probe include ConocoPhillips, Blackrock Ventures, Petro-Canada, EOG Resources, Canetic Energy Trust, International Paper and Statoil.