

# METHANE FROM FLARING TOOLKIT



## Flow: Ultrasonic Flow Meter

How do I measure flow? > Flow: Ultrasonic Flow Meter

An [ultrasonic flow meter](#) measures the velocity of a fluid with ultrasound to calculate volumetric flow.

Using ultrasonic [transducers](#), the flow meter can measure the average velocity along the path of an emitted beam of ultrasound, by averaging the difference in measured transit time between the pulses of ultrasound propagating into and against the direction of the flow or by measuring the frequency shift from the [Doppler effect](#).

Ultrasonic flow meters are affected by the acoustic properties of the fluid and can be impacted by temperature, density, viscosity, and suspended particulates depending on the exact flow meter.

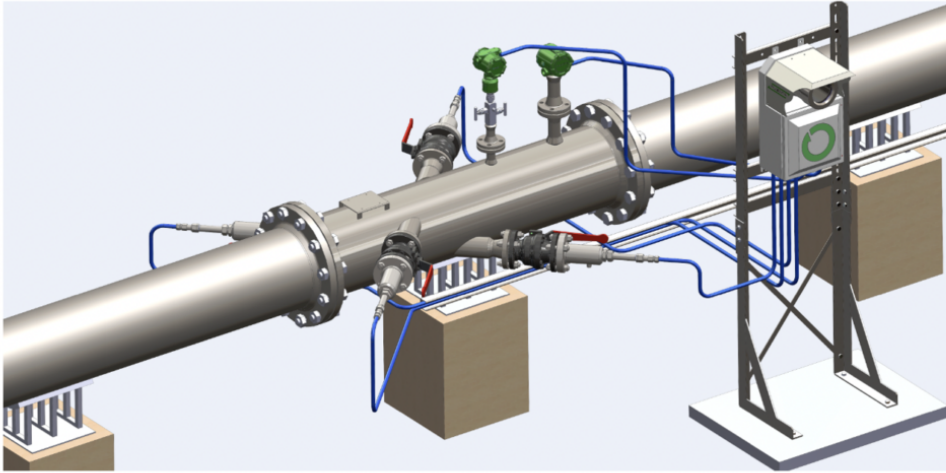
They vary greatly in purchase price but are often inexpensive to operate and maintain because they do not use [moving parts](#), unlike mechanical flow meters.

### How it Works

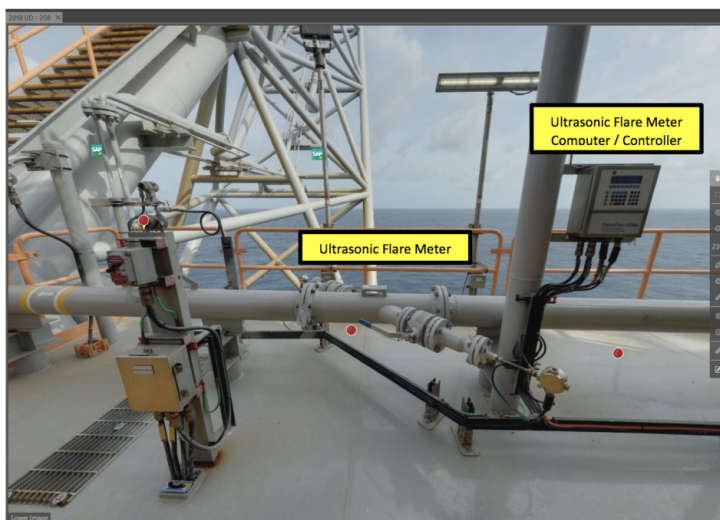
Ultrasonic flow meters measure the average velocity along the path of an emitted beam of ultrasound, by averaging the difference in measured transit time between the pulses of ultrasound propagating into and against the direction of the flow.

#### IMAGE TO FOLLOW

Ultrasonic flow meters can either be single or dual path dependent on installation requirements and operating conditions.



**Figure 2: Example Installation of a dual path ultrasonic flare meter and computer / controller**



**Figure 3: Installation of a single path ultrasonic meter in on a gas facility in Trinidad**

#### Advantages



No restriction to flow in the flare system

<div>✔</div> <p>Operates reliably even with an unsteady flow, pulsating pressure, varying composition and temperature, and harsh environments</p>	
<div>✔</div> <p>Large velocity and turndown range: 0.1 to 400 ft/sec (0.03 to 120 m/s), high turndown ratio of 4000:1</p>	
<div>✔</div> <p>Available in large line sizes up to 120 in (3 m) in diameter</p>	
<div>✔</div> <p>Predictive maintenance capability by utilising instrument diagnostics to check meter's health and performance</p>	
<div>✔</div> <p>Primary measurement independent of pressure and temperature</p>	
<div>✔</div> <p>No moving parts or orifices, nothing to clog or wear out</p>	
<div>✔</div> <p>No regular maintenance required (flow measurement is independent of gas properties)</p>	
	<p>Limitations</p> <div>✘</div> <p>Flow meter requires straight lengths of pipe upstream and downstream when being installed</p> <div>✘</div> <p>Swirl can have an effect on the ultrasonic flow meter measurement, if the system is not designed to comply with the operating conditions of the facility</p>

#### Go Deeper

- [Baker Hughes](#)
- [Fluenta](#)
- [Sick](#)

- [Industry standards](#)
- [Energy Institute](#)

Case study

No case study available at this time.

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## How do I measure flow?



[Flow: Ultrasonic & Sonar Clamp-on Flow Meters](#)



[Vortex Flow Meter](#)



[Flow: Coriolis Flow Meter](#)



[L2F Optical Flow Meter](#)



[Flow: Scintillation Optical Flow Meter](#)