

METHANE FROM FLARING TOOLKIT



Flow: Thermal Mass Flow Meter

How do I measure flow? > Flow: Thermal Mass Flow Meter

Thermal mass flow meters, also known as thermal dispersion or immersible mass flow meters, are for the measurement of the total mass flow rate of a fluid, primarily gases, flowing through closed conduits.

How it Works

Thermal mass flow meters determine the flowing fluid mass flow rate by measuring the heat convected from a heated surface to the flowing fluid.

In the case of the thermal dispersion, or immersible, type of flow meter, the heat is transferred to the boundary layer of the fluid flowing over the heated surface.

In the case of the capillary-tube type, the heat is transferred to the bulk of the fluid flowing through a small, heated capillary tube.

The principles of operation of the two types are both thermal in nature but are substantially different that two separate international standards are required.

Additionally, their applications are much different. Thermal dispersion flow meters are commonly used for general industrial gas flow applications in pipes and ducts, whereas capillary types are primarily used for smaller flows of clean gases or liquids in tubes.

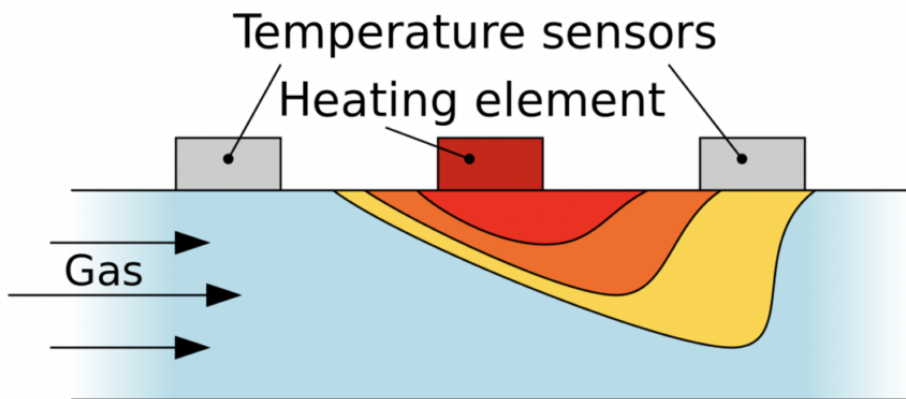


Figure 1: Principles of a thermal mass flow meter














Figure 2: Thermal Mass meters installed on a gas facility in Trinidad.

Advantages



Thermal flow meters have no moving parts, reducing maintenance and permitting

the use in demanding application areas, including saturated gas

	Thermal mass meters calculate mass flow rather than volumetric flow		Requires calibration on specific composition of gas being measured
	Usually present no restriction to flow in the flare line		Cannot tolerate liquids particularly water vapour
	They do not require temperature or pressure correction		Presence of hydrogen will affect the accuracy
	Low cost		Turndown ratio up to 1000:1
	Can be calibrated in situ		Insertion type meters can be damaged by wake induced vibration at high gas velocities
	No requirements to be installed with upstream or downstream straight lengths of pipe		

Go Deeper

- [SageMetering.com](https://www.sagemetering.com)
- [Foxthermal.com](https://www.foxthermal.com)
- [Sierrainstruments.com](https://www.sierrainstruments.com)

Case study

No case study available at this time.

How do I measure flow?



Flow: Ultrasonic & Sonar Clamp-on Flow Meters



Vortex Flow Meter



Flow: Coriolis Flow Meter



Flow: Ultrasonic Flow Meter



L2F Optical Flow Meter