



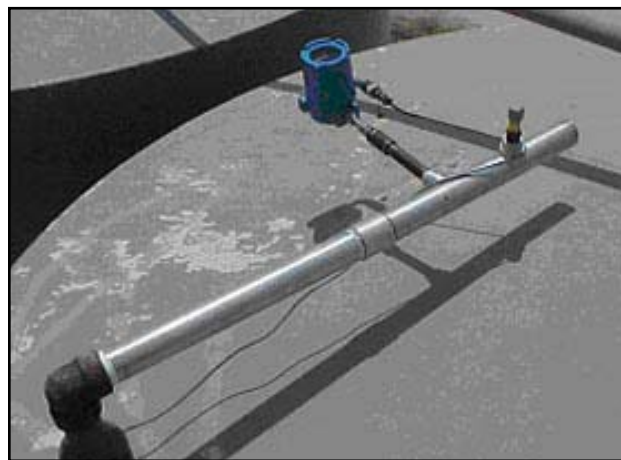
FOX THERMAL'S FLOWMETERS PROVIDE THESE ADVANTAGES IN EMISSIONS MONITORING APPLICATIONS:

- Exceptional low-flow sensitivity provides accurate measurement over a wide range of venting and flaring operations
- Heated stainless steel sensor is suitable for corrosive, particulate-laden gas streams
- No temperature and pressure compensation required
- Built-in alarms, totalizers and a wide variety of communications protocols available for easy interfacing with emissions management systems.

DIRECT MASS MEASUREMENT OF FLARE GAS AND VENT GAS FLOW RATES

Rising levels of volatile organic compounds (VOCs) in the atmosphere are a subject of general concern and increasing environmental regulation. In order to monitor and quantify emissions, VOC concentrations as well as **VOC flow rates** must be measured to evaluate mass emission rate. The major reason for monitoring VOC emissions is to provide information for environmental audits. However, VOC monitoring can also help you:

- Identify opportunities to reduce emissions
- Evaluate performance of existing abatement equipment
- Identify and correct sources of fugitive emissions
- Demonstrate continual improvement in environmental performance
- Meet health and safety requirements and improve working conditions
- Optimize process flows throughout the plant or storage facility



FOX Model 10A flow meter is used to measure the mass flow rate of vent gas from storage tanks.

NOTE: All industry standards and practices should be observed when installing a powered metering device on a tank battery.

The thermal mass flow meter's ability to provide a direct reading of mass flow rate without additional pressure and temperature instrumentation makes it ideal for measuring flow rates in **flare stacks, ducts and tank vents (Flash Gas)**.

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DIRECT MASS MEASUREMENT OF FLARE GAS AND VENT GAS FLOW RATES (CONTINUED)

Case Study: Monitoring VOC Emissions from Oil and Condensate Storage Tanks

A recent study conducted for the Texas Environmental Research Commission (TERC) to support the Texas Commission on Environmental Quality (TCEQ) evaluated emission factors and regional emissions of speciated VOCs from oil and condensate storage tanks at wellhead and gathering sites in East Texas. Thirty-three tank batteries in the Dallas and Houston areas were used to sample vent gas emissions.

Storage tank emissions (Flash Gas) were measured by determining vent gas flow rates and sampling the vent gas for chemical composition. Tank batteries having multiple tanks were sampled through common vent gas gathering pipes located at the tops of the tanks. All **vent gas measurements** and sampling was conducted at atmospheric pressure and all potential sources of fugitive emissions were sealed before making measurements.

Flow rates were measured using a FOX Model 10A thermal mass flowmeter. The monitoring system consisted of an "instrumentation tube", a two-inch diameter four-foot long pipe into which all vent gas was routed so as to flow across the thermal mass flow sensor. The instrument probe of the flowmeter was inserted horizontally at ninety degrees into the instrumentation probe.

Vent gas samples were collected from within the instrumentation tube with flowing vent gas. Vent gas composition was measured using gas chromatography with flame ionization and thermal conductivity detectors. Emission factors for vent gas were derived from these field measurements and used to estimate regional emissions.



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