



FREQUENTLY ASKED QUESTIONS

In what industries are Fox Thermal Flow Meters used?

Fox Gas Mass Flow Meters measure gas flow rates in mass (KG/HR) or standardized volumetric units (SCFM). Fox meters can measure virtually any gas flow in a wide variety of applications. Today, almost any facility will have either a process or HVAC boiler – in many cases both. Depending on boiler capacity, Fox Flow Meters should be used on both the fuel and air intake lines.

Another common application for Fox meters is monitoring factory compressed air lines for losses. It is safe to say that there will always be leaks in a compressed air system, the question is just how severe the losses will be (many companies report losses in the hundreds of thousands of dollars annually). Ideally, a Fox Flow Meter should be installed on each compressor upon commissioning. This allows the factory manager to establish a baseline air usage for a given level of activity. Any deviation from this baseline -- without any corresponding change in the work load -- suggests a system leak.

For existing facilities, with a Fox meter installed, maintenance personnel can detect air leaks and determine baseline air usage when the system is functioning properly. Any subsequent spike in compressor output, indicates new system leaks.

Other Fox applications include emissions monitoring, process heating, vent gases, flare gases, laboratory gas metering, and biogas flows.

What types of gases do the meters measure?

Fox meters can be used to measure a wide range of pure gases and gas mixtures. These include:

Air	Compressed Air	Ammonia
Argon	Butane	Chlorine Gas
Carbon Monoxide	Carbon Dioxide	Digester Gas
Ethane	Flare Gas	Flash Gas
Fuel Gas	Helium	Hydrogen
Methane	Natural Gas	Nitrogen
Oxygen	Propane	Vent Gas
Mixed Gases		

How do I know which meter is right for me?

There are two types of Fox meters: insertion and inline. Insertion will work in the vast majority of applications, but when the pipe diameter is less than 1.5 inches (37mm), install an inline version. More details can be found on the Fox website.

Because the inline model includes flow conditioners to control the flow profile, less upstream and downstream straight pipe is required. Note that insertion meters require a straight pipe run that

is equivalent to 15 pipe diameters in length upstream from the meter -- and 10 diameters downstream. For an inline meter, the corresponding figures are 8 and 4 diameters respectively. Note that Model FT1 is not available in inline styles.

How accurate are the meters?

To ensure that all Fox meters meet specified performance parameters and provide accurate, repeatable measurements, all calibrations are performed to NIST-traceable flow standards. Furthermore, all calibration equipment is subject to a meticulous metrology program that includes the selection, control and maintenance of measurement standards.

Model FT1 Quick Specs (see datasheet for details):

Flow Accuracy:	Air: $\pm 1\%$ R $\pm 0.5\%$ FS Other gases: $\pm 1.5\%$ R $\pm 0.5\%$ FS
Flow Repeatability:	$\pm 0.2\%$ of full scale
Flow Response Time:	0.8 seconds (one time constant)
Temp. Accuracy:	$\pm 1^\circ$ F ($\pm 0.6^\circ$ C) Minimum velocity 15 SFPM.

Models FT2A and FT3 Quick Specs (see datasheets for details):

Flow Accuracy:	$\pm 1\%$ R $\pm 0.2\%$ FS
Flow Repeatability:	$\pm 0.2\%$ FS
Flow Response Time:	0.9 seconds (one time constant)
Temp. Accuracy:	$\pm 1.8^\circ$ F ($\pm 1.0^\circ$ C) over the range -40 to 250° F (-40 to 121° C); $\pm 3.6^\circ$ F ($\pm 2.0^\circ$ C) over the range 250 to 650° F (121 to 343° C); Minimum velocity 50 SFPM.

What conditions can the meter safely operate in?

The FT1 is FM and FMc, ATEX, IECEx, and CE approved. See FT1 Datasheet for detailed Agency Approval information.

The FT2A is FM and FMc approved for Class I, II, III, Division 2, Groups A, B, C, D, E, F, G, T4A hazardous locations.

The FT3 is FM and FMc, ATEX, IECEx, CE Approved. See FT3 Datasheet for detailed Agency Approval information.

What are the probes constructed of?

The standard probe is made of 316 stainless steel. For extremely corrosive environments, Hastelloy C-276 is the preferred option (available on Models FT2A and FT3).

What is the minimum flow rate that your sensors can measure accurately?

Minimum and maximum flow rates are 15 - 60,000 SFPM (FT2A & FT3) and 15 - 15,000 SFPM (FT1).



What size pipes can your meters measure in?

One quarter inch (6.5mm) is the smallest Fox inline meter and can measure as low as 0.035 SCFM (0.055 NM³/H). Special length probes are available for measuring exhaust gases in large ducts.

What are the advantages of a remote unit?

A remote unit separates the sensor from the meter electronics. One advantage is that the electronics enclosure can be mounted such that the display is easy to read and the configuration buttons are easy to operate. Additionally, the probe junction box can be mounted in an area where the ambient temperature is in a range of -40° to 212°F (-40° to 100°C). Remote options are available for Models FT2A and FT3.

What advantages do Fox meters offer over competitors?

The Fox PowerPro™ sensor, available on Models FT2A and FT3, offers higher accuracy and a wide turndown ratio of up to 1000:1 (100:1 typical). It can operate in velocities up to 60,000 SFPM – almost twice that of many competitive units – while still performing accurately in very low flow applications, as well.

The Fox DDC-Sensor™, available on Model FT1, is a Direct Digitally Controlled sensor that interfaces directly with the microprocessor to allow more speed and programmability. It also provides a technology platform for calculating accurate gas correlations.

The Gas-SelectX® gas selection menu available on Model FT1 uses a correlation algorithm from one calibration to allow the meter to measure multiple gases.

Models FT1 and FT3 offer an in-situ Calibration Validation feature. This feature allows the operator to confirm that the meter is running accurately in the field, without the need to send the meter back for annual factory calibrations. Calibration Validation Certificates can be printed if the free software is used to initiate the tests. This feature is of particular value in environmental applications such as flare and vents where periodic calibration validation is mandated.

Can Fox meters be used to measure flow of liquids or steam?

No, Fox meters operate in all types of gases, but a thermal mass flow meter is not designed to measure liquid or steam flows. The gas can be “wet” -- so long as it is non-condensing. Droplets forming on the sensor element will affect its reading and may cause the meter to display an error code.

To lessen the chance of moisture forming on the tip, the meter can be installed from underneath the pipe. This allows any moisture to flow downwards, away from the tip, due to gravity.

How often is calibration required?

In the case of monitoring emissions for EPA regulation

requirements, the EPA states that calibration for Thermal Mass Flow Meters must be performed per manufacturer specifications. For most industrial applications, Fox recommends calibration every two years.

If using the Calibration Validation, it is recommended that these tests be performed annually.

Is it portable?

Yes. Many users will move the meter around the plant when conducting compressed air surveys or energy audits.

Can we connect it to a SCADA system?

Yes. A 4 to 20mA, pulse output, and a USB port are standard on all Fox models.

Communication options available:

- Model FT1 - RS485 Modbus RTU and BACnet MS/TP (pulse output is not available when communication option has been ordered); HART communication option
- Model FT2A - RS485 Modbus RTU, BACnet MS/TP, Profibus-DP, DeviceNet and Ethernet Modbus TCP
- Model FT3 - RS485 Modbus RTU and HART

Can it help us with reporting emissions to the EPA on a monthly or quarterly basis?

Yes. All Fox meters are EPA compliant for emissions monitoring applications.

In addition, the Calibration Validation feature is of particular value in environmental applications such as flare and vents where periodic calibration validation is mandated. The test allows operators to validate the calibration and accuracy of the meter in the field without the need to send the meter back for annual factory calibrations. These tests also allow the operator to print out Calibration Validation Certificates for each of the tests if the free software is used to initiate the tests. These tests can be performed as often as needed to comply with local, regional, or national emissions reporting requirements.

Can the meter handle pulsations?

Yes. With a 0.8 - 0.9 second response time, Fox meters can quickly react to fluctuations in the gas stream.

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