



FREQUENTLY ASKED QUESTIONS

In what industries are Fox Thermal Flow Meters used?

Fox Gas Mass Flow Meters measure the mass or weight of gas molecules flowing through a pipe. 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. Note that the EPA is currently finalizing rules to cut boiler emissions -- measuring the gas intake for larger capacity boilers will become mandatory.

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, maintenance personnel can detect air leaks using a portable ultrasonic device. With the Fox meters installed, maintenance personnel can then 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.

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.

Flow Accuracy:	$\pm 1\%$ of reading $\pm 0.2\%$ of full scale
FT3 Insertion only:	$\pm 1\%$ of reading $\pm 0.4\%$ of full scale
Flow Repeatability:	$\pm 0.2\%$ of full scale
Flow Response Time:	0.9 seconds (one time constant)
Temp. Accuracy:	$\pm 1.8^\circ\text{F}$ ($\pm 1.0^\circ\text{C}$) over -40 to 250°F
(FT3 & FT2 Model only)	$(-40$ to $121^\circ\text{C})$; $\pm 3.6^\circ\text{F}$ ($\pm 2.0^\circ\text{C}$) over 250 to 650°F
	$(121$ to $343^\circ\text{C})$; Minimum velocity 50 SFPM.

What conditions can the meter safely operate in?

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

The FT2 is FM and FMc approved for Class I, II, III, Division 2, Groups A, B, C, D, E, F, G, T4A hazardous locations.

The Fox 10A meter is FM and CSA approved for Class I, Division 1, Groups B, C, and D hazardous areas.

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.

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

Minimum and maximum flow rates are 50 and 60,000 SFPM.

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.

(continued next page)



FREQUENTLY ASKED QUESTIONS (CONTINUED)

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 158°F (-40° to 70°C).

What advantages do Fox meters offer over competitors?

The Fox PowerPro™ sensor offers higher accuracy and a wide turndown ratio of 100:1. It can operate in velocities up to 60,000 SFPM – almost twice that of competitors units – while still performing accurately in very low flow applications, as well.

The Model FT3 offers an in-situ Calibration Validation feature using two tests: CAL-V™ and Zero CAL-CHECK™. These tests allow 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. These tests also allow the operator to print out Calibration Validation Certificates for each of the tests if the free FT3 View™ 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.

How do liquids, oil, or “wet gas” in the stream affect the meter?

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 biennially.

If using the FT3 meter equipped with the CAL-V™ and Zero CAL-CHECK™ Calibration Validation tests, it is recommended that CAL-V™ and Zero CAL-CHECK™ be performed annually.

The Fox calibration lab maintains a database on every meter. Calibration files include details on process conditions, calibration

fluid, line size and other relevant information. All NIST-traceable equipment utilized for the calibration procedure is identified, as is the calibration history of all reference equipment.

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. RS232 is standard in the FT2 model. In addition, RS422/RS485 Modbus, Profibus-DP, DeviceNet and Ethernet Modbus TCP are available communication interface options.

The 10A model comes with a single mA output for flow and an alarm relay.

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 Model FT3's in-situ Calibration Validation feature is of particular value in environmental applications such as flare and vents where periodic calibration validation is mandated. Using the CAL-V™ and Zero CAL-CHECK™ tests 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 FT3 View™ 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 0.9 second response time, the Fox meter can quickly react to fluctuations in the gas stream.

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