

# FOX APPLICATION GUIDE

## Fox Thermal Flow Meters Offer Numerous Advantages in Gas Applications

### TYPICAL APPLICATIONS INCLUDE:

- Furnaces
- Burners
- Ovens
- Heaters
- Kilns
- Smelters
- Dryers
- Heat-treating systems
- Natural gas back-up power systems
- Emission reduction systems

### Outstanding Performance

Fox Thermal mass flow meters offer numerous advantages over other flow meter technologies in gas applications. These advantages include better accuracy, wide rangeability (turndown), reliability, very low pressure drop, Calibration Validation, and the Gas-SelectX® gas selection feature. Several volumetric flow meter technologies are available to measure gas flow rate including orifice plate/differential pressure, vortex, turbine and variable area. Although these flow meters can be applied to gas applications with pressure and temperature compensation techniques, their performance cannot match the Fox Thermal mass flow technology.

### Direct Mass Measurement

Mass flow measurement is fundamentally more accurate than volumetric flow measurement because mass is not affected by changes in process pressure and temperature. The Fox Thermal flow meter measures gas flow directly in mass units including Standard Cubic Feet per Minute (SCFM), Normal Cubic Meters per Hour (NM<sup>3</sup>/ Hr), Pounds Per Hour (lbs/hr) or Kilograms per Hour (Kg/Hr). Pressure and temperature compensation is not required.

Changes in process pressure and temperature can cause significant measurement errors in volumetric flow meters. The rule of thumb is that a 10 PSI change in process pressure will result in a 10 percent measurement error. A direct mass measurement is your best solution.

### Accuracy, Repeatability, Turndown

The topic of turndown is combined with the discussion of accuracy and repeatability for an obvious reason. If a flow meter is only accurate over part of the measurement range, the flow meter is only giving you usable information part of the time. A flow meter with wide turndown provides accurate and repeatable measurement over the entire range of interest. The high sensitivity of the Fox Thermal flow meter sensor provides accurate flow measurement at low and high flow rates. Turndown is up to 1000:1; 100:1 is typical. Volumetric flow meters cannot provide this wide range of flow measurement. The Fox Thermal DDC-Sensor™ (Direct Digitally Controlled) offers the most stable and accurate flow

## PRODUCT CERTIFICATIONS

	ISO	FM	FMc	CRN	ASME IX	CE/EMC	LVD	PED	ATEX	IECEX	NAMUR	NACE	EPA	BSEE	MA Prod.	AB32
FT1	●	●	●	N/A	●	●	●	●	●	●	●	●	●		●	●
FT2A	●	●	●	●	●	●	●	●			●	●	●		●	●
FT3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FT4A	●	●	●	N/A	●	●	●	●	●	●	●	●	●			●
FT4X	●	●	●	N/A	●	●	●	●	●	●	●	●	●		●	●

Safety and Reliability - For more information on product approvals, please see the model datasheet.

measurement on the market.

### Installation

Although typically overlooked when assessing the cost versus performance benefits of one flow technology with another, the effort required to install a flow meter can have a significant impact on the “total installed cost” of a device. Installation of most flow meter technologies typically requires cutting out a section of pipe and installing flanges and possibly support brackets. Alternatively, use of a Fox Thermal insertion style flow meter is easy and less costly. The insertion flow meter is installed by drilling a hole in the pipe and welding on a ¾” NPT coupling. The insertion flow meter probe is inserted into the pipe and secured in place with a Fox Thermal supplied compression fitting. The pressure rating is 300-500 psig (depending on model). Additionally, there are no moving parts and pressure drop is extremely low. All Fox Thermal models available with insertion probes.

Another issue related to installation concerns upstream and downstream straight pipe requirements. Most technologies, including insertion flow meters require 10 to 15 diameters of straight pipe upstream of the sensor and 5 to 10 diameters downstream. However, for situations where long, straight pipe runs are not available, Fox Thermal offers inline styles with built-in flow conditioners to provide a solution. Flow conditioners eliminate the need for long upstream and downstream straight pipe runs.

### Reliability

The Fox Thermal flow meter has no moving parts. The all-welded, 316 stainless steel sensor construction was specifically designed for demanding industrial applications. The electronics housing is NEMA 4X for reliable operation indoors or outdoors.

### Pressure Drop

There is virtually no pressure drop across the Fox Thermal sensor. Pressure drop across inline models is typically less than 0.2 PSI.

### Gas Composition Variances

It’s important that a flow meter is calibrated to measure the actual gas composition found in the process. If the composition of the gas changes over time, but the calibration of the flow meter the errors in reading could be significant.

Fox Thermal has developed the Gas-SelectX® gas selection feature to allow the flexibility needed for these difficult applications. With Gas-SelectX®, the user can choose from a list of pure gases or program a custom gas mix in the field with the push of a button. Gas sampling done at regular intervals will show if changes in the gas composition have occurred and the flow meter can be updated with the new gas composition on the spot; no need to send it back to the factory for a re-calibration!

The Fox Thermal flow meter – the right flow meter for your gas applications!



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