



FOX FLOWMETERS OFFER NUMEROUS ADVANTAGES IN GAS APPLICATIONS

FOX Thermal Mass Flowmeters offer numerous advantages over other flowmeter technologies in gas applications. These advantages include better accuracy, wide rangeability (turndown), reliability and very low pressure drop. Several volumetric flowmeter technologies are available to measure gas flow rate including orifice plate/differential pressure, vortex, turbine and variable area. Although these flowmeters can be applied to gas applications with pressure and temperature compensation techniques, their performance cannot match the FOX Thermal Mass Flow Technology. FOX provides these advantages:

1. **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 Flowmeter measures gas flow directly in mass units including Standard Cubic Feet per Minute (SCFM), Normal Cubic Meters per Hour (NM³/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 flowmeters. 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.

2. **Accuracy, Repeatability, Turndown**

The topic of turndown is combined with the discussion of accuracy and repeatability for an obvious reason. If a flowmeter is only accurate over part of the measurement range, the flowmeter is only giving you usable information part of the time. A flowmeter with wide turndown provides accurate and repeatable measurement over the entire range of interest. The high sensitivity of the Fox Flowmeter sensor provides accurate flow measurement at low and high flow rates. Turndown of 100:1 is typical. Volumetric flowmeters cannot provide this wide range of flow measurement. The Fox Platinum Sensor achieves long-term stability because platinum is one of the most stable materials on earth.

3. **Installation**

Although typically overlooked when assessing the cost versus performance benefits of one flow technology with another, the effort required to install a flowmeter can have a significant impact on the "total installed cost" of a device. Installation of most flowmeter technologies typically requires cutting out a section of pipe and installing flanges and possibly support brackets. Alternatively, use of a Fox insertion style flowmeter is easy and less costly. The insertion flowmeter is installed by drilling a hole in the pipe and welding on a $\frac{3}{4}$ " NPT coupling. The insertion flowmeter probe is inserted into the pipe and secured in place with a Fox supplied compression fitting. The pressure rating is 300 psig. Additionally, there are no moving parts and pressure drop is extremely low.

Another issue related to installation concerns upstream and downstream straight pipe requirements. Most technologies, including insertion flowmeters 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 offers an in-line flowmeter that provides a solution. The inline flowmeter contains flow-conditioning plates that eliminate the need for long upstream and downstream straight pipe runs.

4. **Reliability**

The Fox Flowmeter 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.

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5. **Safety**

The Model 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 Thermal Mass Flowmeter is FM and CSA approved for Class I, Division 1, Groups B, C and D, T3C hazardous areas. The stainless steel wetted parts can be cleaned for oxygen service.

6. **Pressure Drop**

There is virtually no pressure drop across the Fox sensor. Pressure drop across inline models is typically less than 0.2 PSI. See pressure drop charts in Fox Flowmeter Data Sheets.

Common gases: Air, ammonia, biogas, butane, chlorine, compressed air, carbon monoxide, carbon dioxide, digester gas, ethane, ethylene, helium, hydrogen, methane, natural gas, nitrogen, oxygen, propane, and many more.

The Fox Flowmeter – the right flowmeter for your gas applications!