

## CEMFlow™

### COMPLIANCE GAS FLOW MONITORING SYSTEM

**CEMFlow™** S-Type pitot tube gas flow monitoring systems offer the ultimate in reliability and maintainability for measuring gas flow in a stack or duct. Pitot tube gas flow monitoring systems offer the lowest installation and maintenance costs of any flow system on the market today.

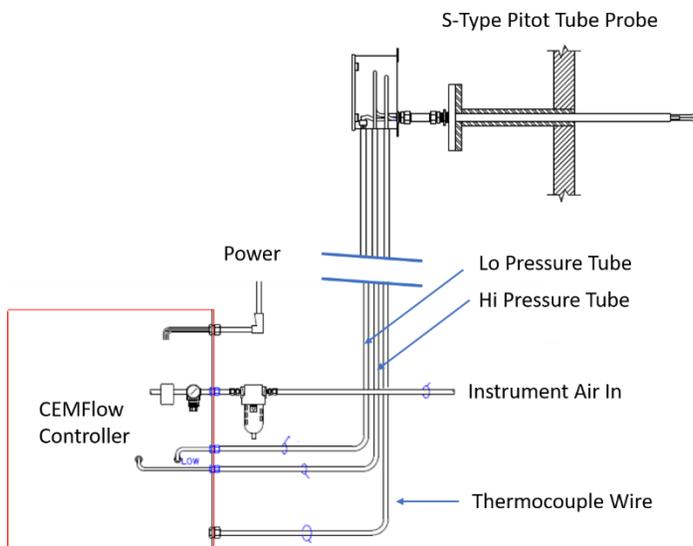
#### Principle of Operation

A simple pitot tube flow sensor is utilized to measure differential pressure as gas flows up a stack. High and low pressure is measured, then utilized to calculate stack velocity (using the Bernoulli equation). Multiplying by the stack diameter converts this velocity to flow.

This technology is capable of accurately measuring gas flow from ~5 to 900 ft./sec, at temperatures up to 1220°F. **CEMFlow™** sensors utilize a variety of designs and materials (appropriate metallurgy/ceramic, etc.) to accommodate many flow applications.

Several other components are provided and located off-stack allowing for ease of maintenance and control. These include:

- > Pressure Signal Conditioning Interface
- > Differential Pressure Transducer
- > Temperature Measurement System
- > Primary Reference and Pressure Auto-Calibration System



#### COMPLIANCE S-TYPE PITOT STACK FLOW MONITORING SYSTEM

- > Meets EPA Parts 60 & 75 Requirements
- > Simple
- > Reliable
- > Easy to Install
- > Easy to Use
- > Easy to Maintain
- > Cost Effective Solution
- > Made in the USA

#### APPLICATIONS

- > Coal and Fuel Oil Plants
- > Wood Fired Plan
- > Pulp & Paper Plants
- > Processing Plants
- > Asphalt Plants
- > Cement Plants
- > Any other plant or process requiring flow monitoring

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**Expandability and Flexibility:** CEMFlow's design lends itself to easily accepting different types of differential pressure measuring devices. This is useful for difficult flow locations where averaging pitot tubes are needed. The range of the system can also be easily modified for different maximum full scales. This is important where users have inaccurate data regarding the expected full-scale flow rate.

**The largest advantages lie in the features of CEMFlow™** designed to increase the reliability of the system:

**Constant Purge of Pitot Tubes:** CEMFlow™ includes a constant low velocity purge through the pitot tubes. This prevents moisture interference and helps to prevent probe plugging problems.

**Built-in Probe Check:** CEMFlow™ has a built-in continuous check for probe plugging and an automatically initiated probe purge to clean the probe in the event of a blockage.

**+99.99% uptime:** with no moving parts or electronics exposed to the elements up on the stack, CEMFlow™ offers unparalleled performance and reliability.

**Low Installation and Initial Cost:** the pitot sensor requires one sample port at one given level on the stack compared to other systems that require two sample ports at different levels. There are also no utilities necessary at the sample location.

**Ease of Maintenance:** there are no blower assemblies or filters at the sample location. The unit may be serviced with nothing more than a test meter and lower-level technical support (compare to other flow technologies that require oscilloscopes and/or laptops up on the stack to troubleshoot problems).

**Low Maintenance Costs:** pitot tube technology utilizes solenoids, a simple power supply, DP cell, commonly used pressure switches and regulators, manometer, and an easily interchangeable control unit – all relatively inexpensive. The thermocouple used to monitor temperature at the sample point is a common standard type.

*Compare this to other technologies, which utilize consumables to maintain a blower motor, and expensive spares to maintain the system due to sensors being exposed to hot corrosive stack gases at the sample location. Potential circuit board failures of these systems can require expensive parts replacement and service visits for installation and recalibration of the system.*

**No Utilities at the Stack or Duct:** only the sensor is mounted on the stack or duct therefore CEMFlow™ can be operated in hazardous environments.

**Fully Automated Calibration and Constant Purge:** this offers complete unattended operation. Plugging is avoided by constant purging. In the event of a purge or calibration failure, an alarm is provided to notify an operator.

**Robust In-Situ Sensors:** sensors are available in a wide range of desired materials designed to allow them to stand up to corrosion, high temperatures, and other hostile environments.

**Onboard Primary Reference Manual Calibration Capability:** the signal output is easily verified against standard EPA#2 methods via an onboard manometer. There is no need to ever send a system back to the factory for adjustment or re-calibration.

**Accurate Determination of Gas Flow above 5 ft./sec.:** this allows sources with high levels of static variation to be monitored with a minimum of interference. Very hostile conditions can also be monitored without endangering the instrument package.

**Simple Certification:** other flow device technology typically requires preliminary RATA testing in the field and then a curve fit prior to running the actual RATA. The S-Type pitot tube gas flow monitoring system is the standard used to perform RATA testing.

**Cost:** All this simplicity and reliability comes together in a lower cost instrument – typically several thousand dollars less than instruments utilizing other technologies.



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**Simple but Sophisticated Controller:**

CEMFlow™ utilizes a sophisticated controller that provides a user with many useful features. Everyday functions can be accessed and performed without the need to reprogram the controller including:

- > Purge Frequency
- > Calibration Time
- > Calibration Frequency

The controller offers extended functions including:

- > Built-in RATA Function: easily turn off calibrations and purges during a RATA test. This is accessible via the keypad or external contact closures.
- > Password Protected Menus: prevents unauthorized changes in calibration times and durations.
- > Built-in HELP Feature: allows an operator to view parameters without gaining access to change them.
- > Wet Basis Calculations: the controller calculates the volumetric flow rate to standard conditions on a wet basis.
- > External Calibration Control: calibrations can be controlled from an external source (i.e. PLC).



**SPECIFICATIONS**

Measurement Range	From 5 to 900 ft./sec
Sensitivity	~2 feet/sec
Response Time	~1-2 seconds to 100% of final reading (typ.) Packaged to fit customer's needs. Can be plate mounted vertically or horizontally, or packaged in NEMA 12 J-box
Size	8 scfm
Purge Air Requirements	4-20mA standard for ΔP, Temp. and Flow
Output Signal	Up to 4800/1220°F (melting point of probe material)
Stack Temperature Range	32° - 85°F (J-box heater and A/C available for outdoor mounting)
Controller Temperature Range	120 AC, 60Hz to Controller
Power Supply	200 watts
Power Consumption	~ 65 lbs. (plate mounted) ~150 lbs. (J-Box mounted)
Weight	

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