Monitoring|Solutions

Leaders in Environmental Monitoring Systems & Services

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.

Applications include:

- Coal and Fuel-oil Fired Plants
- Wood Fired Plants
- Converter Plants
- Pulp & Paper Plants
- Processing Plants
- Asphalt Plants
- Cement Plants
- Any other plant requiring flow monitoring

Principle of Operation

A simple pitot tube flow sensor is utilized in-situ 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 1800°F. CEMFlow sensors utilize a variety of designs and materials (appropriate metallurgy/ceramic, etc.) to accommodate a large number of 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

Features…

The largest advantages lie in the features of CEMFlow:

- **+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**:

  A pitot sensor normally requires only one sample port at one given level on the stack compared to other systems that require two sample ports at different levels.

- **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 entry 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.

- **No Utilities at the Stack or Duct**:

  With only the sensor mounted on the stack or duct, CEMFlow can be operated in hazardous environments.

Features (cont.)…

- **Fully Automated Calibration and Constant Purge**:

  CEMFlow 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.

- **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.

- **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.

- **Accurate Determination of Gas Flow above 5 ft./sec.**:

  Sources with high levels of static variation can 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 come together in a lower cost instrument – typically several thousand dollars less than instruments utilizing other technologies.

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Designed with built-in reliability:

Monitoring Solutions CEMFlow incorporates features 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 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.

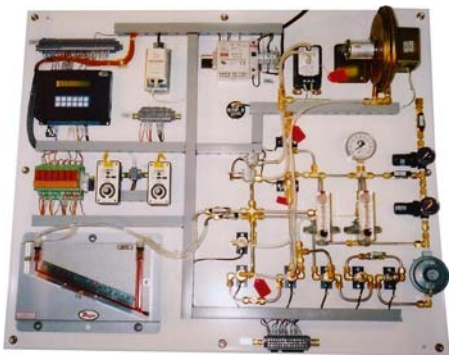
Simple but Sophisticated Controller:

CEMFlow utilizes a sophisticated controller that provides a user with many programmable features including:

- Purge Frequency
- Calibration Time
- Calibration Frequency

Extended functions include:

- Built-in RATA Function: easily turn off calibrations and purges during a RATA test. This is accessible via the key pad 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).



Typical Controller Layout

Specifications

Measure Range	From 5 to 900 ft./sec
Sensitivity	~2 feet/sec
Response Time	~1-2 seconds to 100% of final reading (typ. – varies with length of umbilical run)
Size	Packaged to fit customers needs. Can be plate mounted vertically or horizontally, or packaged in NEMA 12 J-box
Purge Air Requirements	8 scfm
Output Signal	4-20mA standard for ΔP, Temp. and Flow,
Stack Temperature	Up to 1800°F (melting point of probe material)
Controller Temperature Range	32° - 85°F (J-box heater and A/C available for outdoor mounting)
Power Supply	120 AC, 60Hz to Controller
Power Consumption	200 watts
Weight	~100 lbs. (plate mounted) ~250 lbs. (J-Box mounted)

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 with regard to the expected full scale flow rate.

Monitoring Solutions is a complete source for all your Continuous Emissions Monitoring (CEMS) Needs.

- Both Dilution and Extractive type systems
- Oxygen Monitoring Systems
- Opacity Monitoring
- Data Acquisition Systems (DAS)
- Process Monitoring Systems
- Ambient & Meteorological Monitoring
- Complete Service and Support of all CEMS including:
  - ❖ Quarterly Preventative Maintenance
  - ❖ Quarterly Audits
  - ❖ Opacity Performance Audits
  - ❖ RATA Support
  - ❖ Training
  - ❖ Spare Parts
  - ❖ Repairs
  - ❖ Annual Support Contracts

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