12 May 2012

Subject: Rosemount Recommended Calibration Practices for Pressure Transmitters and DP Flowmeters used to comply with EPA 40 CFR Part 98, Greenhouse Gas Mandatory Reporting Requirements

Purpose:

This document defines the official Emerson “manufacturer recommended practice” for calibration of pressure transmitters and differential pressure Flowmeters (See Appendix A for a list of devices) to assist users in their compliance with EPA regulations governing Greenhouse Gas measurement points. It is suggested that users retain a copy of this document in their compliance files.

Overview:

There are three calibration practices to consider when applying pressure transmitters and differential pressure flowmeters.

- Baseline factory calibration performed by Emerson as part of our standard manufacturing practice
- Installation “Zero Trim” of the transmitter or flowmeter to eliminate installation and / or line pressure effects.
- In–use calibration frequency completed by the user

Recommended Calibration Practices:

1. **Baseline Emerson Factory Calibration:**

   All Rosemount Differential (DP), Gage, Absolute and MultiVariable™ Pressure Transmitters are factory calibrated with measurement and test equipment traceable to national or international standards (example: National Institute of Standards and Technology – NIST). All calibration processes conform to Emerson Metrology Laboratory requirements and are completed by trained approved technicians. Equipment metrology records are maintained by Emerson and are available for audit or review if required. Emerson also recommends ordering transmitters and flowmeters with the Q4 calibration data sheet option. A formal Calibration Certification of Conformance will be supplied with each
2. **Installation “Zero Trim” :**

   After the DP transmitter or flowmeters are installed, a zero trim procedure should be performed. Zero Trim eliminates any effect on transmitter performance due to the mounting orientation of the instrument. The user may also choose to complete the Zero Trim at line pressure to further eliminate any zero errors due to process static line pressure.

3. **In-use Calibration :**

   **Pressure or MultiVariable™ Transmitters:**

   Emerson offers two options of transmitters to measure flow – DP and MultiVariable. Emerson recommends the purchase and installation of a Rosemount MultiVariable Mass Flowmeter that provides full dynamic compensation to improve flow accuracy. These MultiVariable devices are also available with the Ultra for Flow performance option that provides the tightest stability specifications to extend the frequency of calibration and offer the widest flow rangeability.

   The following steps should be followed to verify the calibration of the transmitter. To comply with EPA stated accuracy specifications, Emerson recommends that calibration occur once every 3 years. Our industry leading 5 and 10 year stability specifications allow for a significant safety factor that will ensure these measurement points meet the EPA guidelines. Specific procedures can be found in the Reference Manuals for each model. These Reference Manuals are located on our website at www.rosemount.com under the Documentation and Drawings link.

   1. Perform a Zero trim procedure. This should be performed on the differential pressure sensor as well as the static pressure sensor if a MultiVariable transmitter is being used.

   2. Verify the calibration of the sensor at the upper and lower trim points using an external pressure source or decade box for temperature sensor verification. This verification should be performed on the differential pressure sensor, static pressure and process temperature sensors. If the sensors are within published specifications, no sensor trim procedures are required. If any of the sensors are outside of published specifications, perform a sensor trim on that sensor.

   3. If using the analog signal from the device, it may be necessary to trim the analog output. Verify the analog output of the transmitter by performing a loop test. If the analog output of the transmitter corresponds to the correct
value, no analog output trim procedures are required. If the analog output of the transmitter does not correspond with the correct value, perform an analog output trim.

Primary Flow Elements:

The primary element portion of the DP Flowmeter can impact the performance of the flowmeter if not sized correctly or manufactured to required tolerances. Emerson recommends the purchase of the QC1 visual and dimensional inspection certificate. This report documents the actual manufactured dimensions of the primary element and physical dimensions that need to be verified to ensure accuracy.

Consistent with EPA 40 CFR 98, Emerson recommends that Rosemount orifice plate technologies should be inspected once every 3 years. This inspection interval can be used for Annubar® Flowmeters, but is not necessary as these primary elements have no sharp edges. This inspection should verify the dimensions and tolerances outlined in the QC1 report in order to ensure that the accuracy of the measurement. If the primary element was ordered without a QC1 report, inspect using the nominal values found in the instruction manuals.

For more information, or copies of instruction manuals for Emerson DP transmitters and flowmeters, please visit www.rosemount.com. If you require assistance, or need to discuss with a technical support specialist, please contact your local Rosemount Sales Representative or Rosemount Customer Central at 1-800-999-9307.

Sincerely,

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Appendix A: List of Devices

Rosemount 3051S Series of Instrumentation
Rosemount 3051SMV MultiVariable Transmitter
Rosemount 3051SF DP Flowmeters
Rosemount 3051 Pressure Transmitter
Rosemount 3051CF DP Flowmeters
Rosemount 2051 Pressure Transmitter
Rosemount 2051CF DP Flowmeters
Rosemount 2088 Pressure Transmitter
Rosemount 3095 MultiVariable Pressure Transmitter
Rosemount 3095MF DP Flowmeters