Comments on Draft Landfill Project Protocol Version 4.0

Thursday, May 26, 2011

BACKGROUND

Sage Metering, Inc. is as well established Manufacturer of Thermal Mass Flow Meters for Landfill Gas (and other gases). We are the only Flow Meter supplier on the Climate Pages. We have worked very hard over the years to provide a Flow Meter that is accurate and reproducible, and have the only Thermal Mass Flow Meter commercially marketed in the Industry with a digital method of driving the sensors. As such, we can provide unique features, such as the ability to conduct an In-Situ calibration verification (see the notes following my signature as well as the pdf attachment from page 46 of our Manual). Our products are widely sold for Landfill and Digester Gas applications through Blower and Engine Manufacturers, Brokers, Project Developers, Municipalities and other Stakeholders for compliance with the Greenhouse Gas Emission Rules and related Protocols.

COMMENTS

In reviewing the current Draft for the Landfill Project Protocol (Public Draft Version 4.0, Dated May 6, 2011), I was taken aback by the proposed changes in Section 6.2 Instrument QA/QC. In particular, striking out language that previously required Cleaning and Inspection on a Quarterly Basis (see bullet number 1: "Cleaned and inspected…." On page 31) can be extremely deleterious to the scope of the Landfill Protocol. The reason is that contamination of the sensor can occur over time, and contamination will definitely effect the reporting accuracy, and hence the validity of the tons of methane that are reported to be destroyed. This is a dangerous change, in that, there is no way to be aware of this potential contamination, unless the flow meter is removed and inspected on a regular basis, or in the case of our digital Thermal Mass Flow Meter, an In-Situ Sensor Functionality and Calibration Check could easily be performed in lieu of inspection. A realistic time period for such inspection or In-Situ validation is 3 months, which is the current requirement for Instrument QA/QC under Section 6 (Project Monitoring).

I understand that the 2nd bullet of 6.2 is intended to discourage false reporting, requiring a check within 2 months of the reporting period, but the drift described above could occur for months and months, yet not be detected if someone were to simply remove and clean the sensor prior to the required check. In this scenario, if the sensor were cleaned without performing an "as left/as found" report of inaccuracy or drift, and shortly thereafter, the official required check were conducted, it may appear that the meter has been accurate for the full reporting period, masking a possible over-reporting for many months.

I also understand that Paragraph 2 on page 32 ("2. For calibrations that indicate over-reporting...") also is intended to discourage false reporting due to the retroactive penalty described in the subsequent paragraph. However, as noted earlier, contamination could be corrected (by an actual sensor removal and cleaning) before the calibration is conducted. In fact, in theory, buildup on the sensor could be somewhat erratic: if there were an upset condition such as a slab of water passing through the pipe, it may actually partially clean off the buildup of a contaminated sensor – and that too would mask previous errors.

I have a great deal of respect for the Climate Action Reserve, and your organization has been devoted to responsible monitoring and controls for the various Protocols associated with

reducing Greenhouse Gas emissions reduction for many years. In my opinion, it would be a significant setback if there were to be a change in the regulations that could create untold errors in the reporting process, and hence in the true reduction of GHG emissions. I thus make the following suggestions:

1) Restore the Quarterly Cleaning and Inspection wording in the first bullet of Section 6.2 (page 31).
2) Restore the wording beneath the 3rd bullet of Section 6.2 (page 31)
3) Restore footnote 28 on page 31
4) Insist on cleaning practices that are Quarterly, unless the manufacturer has a method to conduct an In-Situ verification of cleanliness (for example, see methodology described below [after my signature] as an example of a suitable method).

Respectfully,

Bob Steinberg
President
Sage Metering, Inc.
http://sagemetering.com

BRIEF DESCRIPTION OF IN-SITU SENSOR FUNCTIONALITY AND ZERO CALIBRATION SELF-CHECK

Sage has a convenient “Sensor Functionality and Zero Calibration Self-Check” serving as an important diagnostic. In the SIP/SRP (Sage Prime), the raw milliwatts [mw] is on the display, featuring continuous diagnostics. This "Sensor Functionality and Zero Calibration Self-Check" feature checks the sensor performance and the "live zero" calibration point, and also verifies that the sensor is clean, and that the Flow Meter hasn't drifted, shifted or changed since the original NIST Traceable Calibration. Since we are a digitally-driven Thermal Mass Flow Meter, this check is essentially a way to verify a point on the calibration curve. The curve itself is linearized via coefficients which are stored within the EEPROM. Please see the attached PDFs which includes page 46 from the Sage Prime Instruction Manual (Rev 09).

PRODUCT QUALITY CERTIFICATE OF CONFORMANCE

Product Inspection & Quality Statement

All individual parts and components which make up the product being provided have been inspected and approved for manufacture. In addition, subassemblies have been inspected, tested, and accepted for final assembly. Each completed assembly has been final tested and approved for shipment.

Conformance Statement

SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. SAGE Metering, Inc. calibration services are derived from MIL-STD-45662A. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.

CUSTOMER:	**ABC COMPANY**	
PURCHASE ORDER:	**123456**	
SAGE SALES ORDER:	**10072**	
MODEL:	**SRP-200-S150FLG200-DC24-NG-PLUS**	
POWER REQUIREMENT:	**DC24**	
OPTIONAL OUTPUT:	**Flow, 4 - 20mA**	**100 SCF/PULSE**
SAGE UNIT/SENSOR SERIAL NUMBERS:	**55412-32653**	**Mod Bus Address = 30**
TAG:	**TAG: TAG: FURNACE # 5701**	
PRIME BAUD RATE / PRIME PARITY	**19200.00**	**EVEN**
SUGGESTED CALIB/VALIDATION INTERVAL:	**12 months after Installation**	
CALIBRATION DATE:	**7/6/2010**	
OPERATING PRESSURE RANGE:	**(14.7 PSIA + PSIG) ± 20%**	
MAXIMUM PRESSURE RATING:	**500 PSIG**	
SENSOR TEMPERATURE RANGE:	**STD: -40 to 200 F**	
ELECTRONICS TEMPERATURE RANGE:	**0° to +150°F (-18° to +65.56°C)**	
ACCURACY REFERENCED TO 70°F (21°C):	**+/- 1% Rdg + 0.5% FS**	
CALIBRATION REFERENCE CONDITIONS:	**70°F and 29.92" Hg**	
PROCESS GAS:	**NG**	
PROCESS FLOW (FS, 4-20 mA)/LowFlowCutoff	**0 - 7000 SCFH**	**0 SCFH**
CALIBRATED FLOW (Incl Over Rg)	**116.67**	**SCFM**
PROCESS LINE SIZE	**2 in sch 40**	
PROCESS TEMPERATURE:	**75 F**	
PROCESS PRESSURE:	**10 PSIG**	
CALIBRATION TECHNICIANS:	**MV/RP**	
TURBINES	**1" SN:98489 2" SN:98490 0**	
DMM's	**DMM #1 & #2**	
FLOW CALIBRATION PROCEDURE USED:	**PRO-FCL-090103**	
TEMP CALIBRATION PROCEDURE USED:	**1403 (09/22/03)**	

SPECIAL NOTES:

GAS FLOW ZERO in mw/SOFTWARE REV#	**84**	**2.05**
AMBIENT AIR ZERO in mW	**70**	

INSERTION STYLE SENSORS TO BE PLACED AT CENTER OF PROCESS PIPE

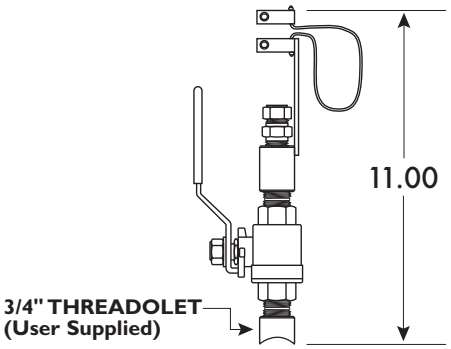
Authorization: _____ **Date:** **July 6, 2010**

Mounting Hardware[3]

SVA05 SERIES ISOLATION VALVE ASSEMBLY FOR INSERTION METERS[4]

(for Low Pressure SVA05 see page 39)

Used for pressures to 650 psig[1] (shown for use with 1/2" diameter insertion meters). 150# or 300# flanged mounting is optionally available. Available sizes are 1/2" x 3/4" NPT (SVA05 shown), and 3/4" x 1" NPT for use with 3/4" diameter insertion meters (SVA07).

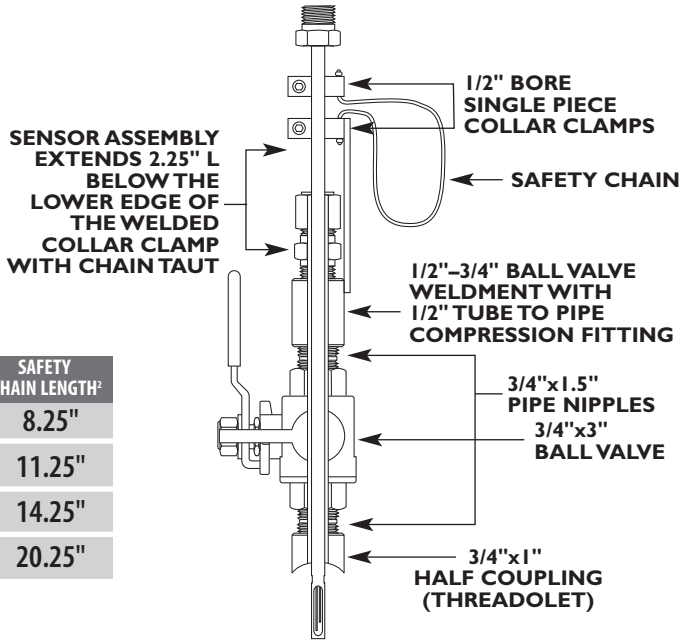


PROBE LENGTH (with sensor)	SAFETY CHAIN LENGTH[2]
12"	8.25"
15"	11.25"
18"	14.25"
24"	20.25"

NOTE: User needs to weld a 3/4" female threadolet (of appropriate radius) to mate with existing pipe after a 3/4" hole has been drilled in pipe. The 3/4" Male Coupling of the Sage Isolation Valve Assembly will thread into the user's 3/4" threadolet.

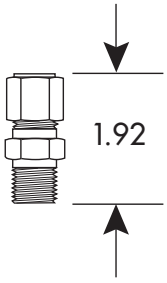
SVA05 SERIES ISOLATION VALVE ASSEMBLY DETAIL[5,6]

Cut away view of probe inserted through isolation ball valve assembly.

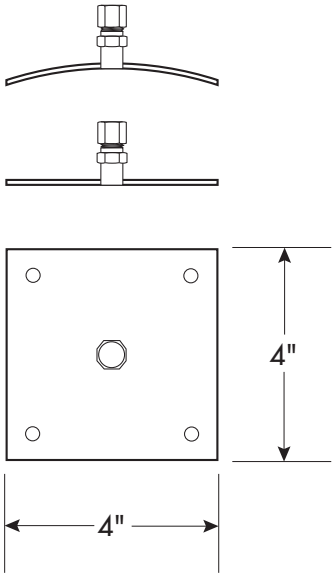


STCF SERIES TEFLON FERRULE COMPRESSION FITTING

1/2" tube x 1/2" pipe fitting (shown, not to scale), is used for low pressure insertion applications to 125 psig (Stainless Steel Ferrule optional for higher pressure applications – up to 225 psig). Also available in 3/4" tube x 3/4" pipe size.



MOUNTING PLATE FOR THIN WALLED DUCTS (INCLUDES STCF05 COMPRESSION FITTING)



1 At 650 psig, force exerted on 1/2" diameter probe is approx. 125 lbs
2 Safety chain is designed to prevent probe from accidentally escaping from assembly during removal from pressurized pipe
3 Insertion meters can have optional flanged mounting (generally used for high pressure or very hot gases). This adaptation is not shown. Consult factory for details.
4 Maximum gas temperature, 200F, unless high temperature models ordered.
5 Hot Tapping is feasible by removing Weldment (upper portion of assembly temporarily removed)
6 See page 46. SVA05 can be utilized for Sensor Functionality and Zero Self Check.

Sensor Functionality and Zero Calibration Self Check

Sage Prime has continuous diagnostics. The raw calibration milliwatts (mw) is always displayed in the upper left hand corner of the meter's display. At any time, you can check this reading at a "no flow" condition and compare the reading to the original reported "zero flow" value noted on the last few lines of your meter's Certificate of Conformance or the flow meter's data tag. This diagnostic procedure not only checks the sensor performance and the "live zero" calibration point, but it verifies that the sensor is clean. It essentially provides a means to validate that the meter is operating properly, verifies that there is no shift or drift, and eliminates the need for annual factory calibrations. This simple field diagnostic procedure also verifies that the sensor is free from contamination, even without inspection.

1. Verify that meter has no gas flow[1]
   Close appropriate valves in the process to have a "no flow" condition so you can check the "live zero" mw output of the actual gas (it should be checked at the same pressure as noted on Certificate of Conformance).
   If it is not possible to close valves in the process (e.g. natural gas supply must be kept flowing), a user with a Sage SVA05 or SVA07 Isolation Valve Assembly can check "zero" of the actual gas and pressure without shutting off the gas supply. Refer to SVA SERIES ISOLATION VALVE ASSEMBLY DETAILS ON PAGE 38.
   a) Loosen Lower Collar Clamp completely
   b) Slightly loosen compression fitting until Probe can be lifted
   c) Lift Probe until Safety Chain is taut
   d) Tighten compression fitting
   e) Close Valve
   f) Check zero mw as per "2" below
   Optionally, do an ambient air check by removing probe and covering up sensor by capping the sensor with a plastic bag, empty plastic water bottle or other means of preventing flow (see 8).
2. Observe the raw milliwatts (mw) on the top of the meter's display. Check the observed reading (after a few minutes of "no flow" stabilization) against the last line(s) of your Meter's Certificate of Conformance.
3. A value within 5 milliwatts of the original Factory value (assuming the same gas is checked at same pressure) indicates that the meter is still in calibration.
4. A value greater than 5 milliwatts, but less than or equal to 10 milliwatts, also indicates that the meter is still in calibration, but this reading may have been influenced by one or more of the following factors: gas composition, pressure, dirt, non-zero conditions, and sensor orientation. Any of these factors can have an effect on mWo. It is a very sensitive data point and that is why it is such a good check.
5. Note, if all of the above factors were remedied, it would be expected that the mW zero would report less than or equal to 5 milliwatts.
6. Note, in some cases, contamination of the sensor is the only cause of the additional heat transfer during the "no flow" test. Remove the probe, and clean the sensor (use an appropriate non-corrosive solvent to remove the build up). A soft brush can be used to gently clean the sensing surface, using caution to avoid damaging the sensor elements (the RTD's).
7. In summary, if a technician in the field were able to simulate Sage calibration conditions, he too would find that the mWo would be within one mW or very close to that. Since this is not always possible, we are finding that after considering all of the field variables, a mWo in the field that is within 10 mW is an acceptable value (see 9). This would allow for a check to be done in the pipe under application conditions.
8. Note, if desired, a second check can be conducted as well but using ambient air: This validation method requires that the sensor be removed from the pipe and inserted in a container such as an empty plastic water bottle. We would recommend this second check if there is any question at all about the first check (while in the pipe) or if it's mWo value is anywhere around 10 mW. The sensor should be removed from the pipe, cleaned, and inserted vertically into a clean dry container such as a water bottle. This would allow a field check very similar to the air mWo check that is done at Sage, and more than likely will give the same results that we recorded here at Sage.
9. For CAR[2] compliance for the quarterly QA/QC, maximum allowable drift is 5%. Percent drift can be determined by multiplying the mW change from factory value (see 2) by 1.0% (i.e. each mW change equals 1% drift).

1 Sage "zeros" the meter in a horizontal pipe. If you have a vertical pipe, mW will be slightly lower at zero (also see note 4).

2 CAR is the Climate Action Reserve. The Climate Action Reserve is a national offsets program working to ensure integrity, transparency and financial value in the U.S. carbon market. It does this by establishing regulatory-quality standards for the development, quantification and verification of greenhouse gas (GHG) emissions reduction projects in North America. The Climate Action Reserve operates alongside its sister program, the California Climate Action Registry (California Registry), which was created by the State of California in 2001 to address climate change through voluntary calculation and public reporting of emissions.