

Bureau of Safety & Environmental Enforcement (BSEE) Compliance Certificate

The following content originated from an email sent to Fox Thermal from BSEE, Division of the U.S. Department of the Interior dated October 4, 2012:

"During our meeting of September 5, 2012, we discussed a feature available with the Fox model FT3 thermal mass flow meter which provides for in situ validation of the factory calibration. The goal of this feature is to provide operators with the ability to verify that the meter is accurate in lieu of sending the meter back to the factory for recalibration. You explained that the calibration validation function consists of a primary test (CAL-V) and a secondary test (Zero CAL-CHECK). Our understanding of these tests is as follows:

The primary test verifies the functionality of the sensor and the processing circuitry. During this test, which may be conducted under process conditions, a signal is sent from the microprocessor to the sensor elements to determine a ratio (CAL-V value) that is based on the actual ratio of the elements' resistance values. If the CAL-V value is within $\pm 2.5\%$ of the CAL-V value initially determined at the factory, then the validation certificate will indicate a "pass" result; otherwise, a fail result will be displayed. The CAL-V certificate also provides the calibration table stored in the meter which can be checked against the factory calibration certificate.

The secondary test (Zero CAL-CHECK) checks the existence of buildup on the sensor, the zero stability of the meter, and the thermal conductivity repeatability. This test must be performed at zero flow but may be conducted in situ or out of pipe. During the test, the bridge circuit generates a zero-flow voltage which is compared with a producer-set zero flow baseline (for in situ tests) or with the factory value (for out of pipe tests). If the Zero CAL-CHECK value is within $\pm 2.5\%$ of either the base line value (for an in-situ test) or the factory value (for an out of pipe test), then the validation certificate will indicate a "pass" result; otherwise, a "fail" result will be shown.

In consideration of the above-mentioned validation functionality, we will accept successful completion of the calibration validation tests available for the model FT3 thermal mass meter in satisfaction of the meter calibration requirements prescribed by 30 CFR 250.1163(a)(3).

For each calibration validation of the FT3 flow meter, this acceptance is predicated upon the following:

- 1. Both the CAL-V and Zero CAL-CHECK tests must be performed and both certificates must indicate a test result of "pass".*
- 2. The meter serial number, date, and a signature must appear on both calibration certificates and the serial numbers and dates on the CAL-V and Zero CAL-CHECK certificates must match.*
- 3. The meter serial number should be clearly visible or available on the meter display to facilitate comparison with the serial number shown on the validation certificates.*

Please note that 5 CFR 2635.702(c) prohibits (with certain exceptions) the endorsement of any product, service, or enterprise by Federal employees. Consequently, our acceptance of the validation routines available with the Fox model FT3 thermal mass flow meter in satisfaction of the meter calibration prescribed by 30 CFR 250.1163(a)(3) should not be construed as an endorsement of this or any other Fox meter."