

Keilty Answers: Comments on LPG-15.1 and MFM-15.1
Seraphin Test Measure

- The stated purpose for Items LPG-15.1 and MFM-15.1 is to allow the use of field standard meters as field standards. The proposed changes in Items LPG-15.1 and MFM-15.1 suggest changes to the *test draft criteria* for devices covered under these codes. The original intent of these proposals was to recognize the use of Coriolis meters as field standards. The proposals have no effect on whether or not Coriolis meters are accepted as field standards nor does it prove that field standard meters meet the Fundamental Considerations as field standards.

Keilty: The proposals do not make any reference to Coriolis Mass Flowmeters although this technology is most capable of satisfying the expected performance for use as Field Standard Meters.

- If the changes to the test procedures in the LPG and MFM Codes are adopted, then must H44 be changed every time a new field standard is proposed to be recognized?

Keilty: It is most appropriate to revise and amend Handbook 44 when requirements change, technology advances, or differentiation becomes necessary.

- If these changes are adopted, does that mean that every meter is acceptable for use as a field standard?

Keilty: Likely not. Refer to Handbook 44 Appendix A Fundamental Considerations section 3 Testing Apparatus.

How do you know which meters are acceptable as standards and which ones are not acceptable?

Keilty: Evaluation of traceability documentation by the director for compliance to Handbook 44 Appendix A Fundamental Considerations section 3 Testing Apparatus.

For example, if a meter is brought into the United States from another country, can it be used as a field standard?

Keilty: Evaluation of traceability documentation by the director for compliance to Handbook 44 Appendix A Fundamental Considerations section 3 Testing Apparatus.

The NIST Handbook 105 series of handbooks specify the design characteristics to which the artifact standards must be built. The Seraphin neck-type standards are built to meet these documentary standards. There are no specific design or performance requirements specified for dynamic field standards. How do you know which meters perform at acceptable levels to be used as field standards?

Keilty: Mr Murnane is promoting his technology in his challenge for Field Standard Meter technology. Evaluation of traceability documentation by the director for

compliance to Handbook 44 Appendix A Fundamental Considerations section 3 Testing Apparatus.

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- The current paragraph N.3. of the LPG code already specifies the size of the test draft when using a field standard as one minute at the normal discharge rate. What are the reasons to change the size of the test draft when field standard meters are used? No analysis has been provided regarding the uncertainties associated with field standard meters and the sizes of the test drafts.

Existing Requirement (italics added): **N.3. Test Drafts.** – Test drafts should be equal to at least the amount delivered by the device in one minute *at its normal discharge rate.*

Proposed Requirement (italics added): **N.3.2. Field Reference Standard Meter Test.** – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute *at the flow rate being tested.*

Keilty: The test using a Field Standard meter does not need an accumulated quantity equal to one minute at the normal discharge rate. The amount of accumulated quantity from one minute of flow at the test flow rate is sufficient and a good practice. Flow testing at the minimum flow rate of the meter can be accomplished in much shorter time.

- Several NTEP CCs for MFMs were found with one or more flow rates for which the MMQs are less than the quantities delivered for one minute of flow at the minimum flow rate. For MFM-15.1, the proposed changes would prevent W&M officials from testing the accuracy of meters at the MMQ when the MMQ is less than 1 minute of flow at the minimum rated flow rate of the meter. W&M officials should be able to test any delivered quantities at or above the MMQ. W&M officials should not be prohibited from testing meters at quantities that are legal for trade.

Keilty: The concept of Minimum Measured Quantity (MMQ) was introduced to Handbook 44 by NIST back when the Mass Flow Meter Code was developed. No other device code section makes mention of the nor requires an MMQ test. MMQ testing is sometimes done during type evaluation at the discretion of the evaluator. MMQ test is not done at normal installations at either initial placement into service nor during subsequent verification testing.

- OWM commented that some CNG test drafts for the amount of 1/3 of the capacity of the test cylinder (as specified in the EPO) take less than 1 minute to complete. The proposed change to the size of the test draft could prevent W&M officials from conducting some or all of these tests.

Keilty: The CNG EPO does make that recommendation. That EPO is outdated. At the time the EPO was written, the common steel CNG cylinders were small and heavy. These cylinders were replaced with much larger ones constructed with composite materials. When speaking with Scott Warren of the State of Colorado, he informed me that no-one performs a MMQ test on CNG dispensers in the field.