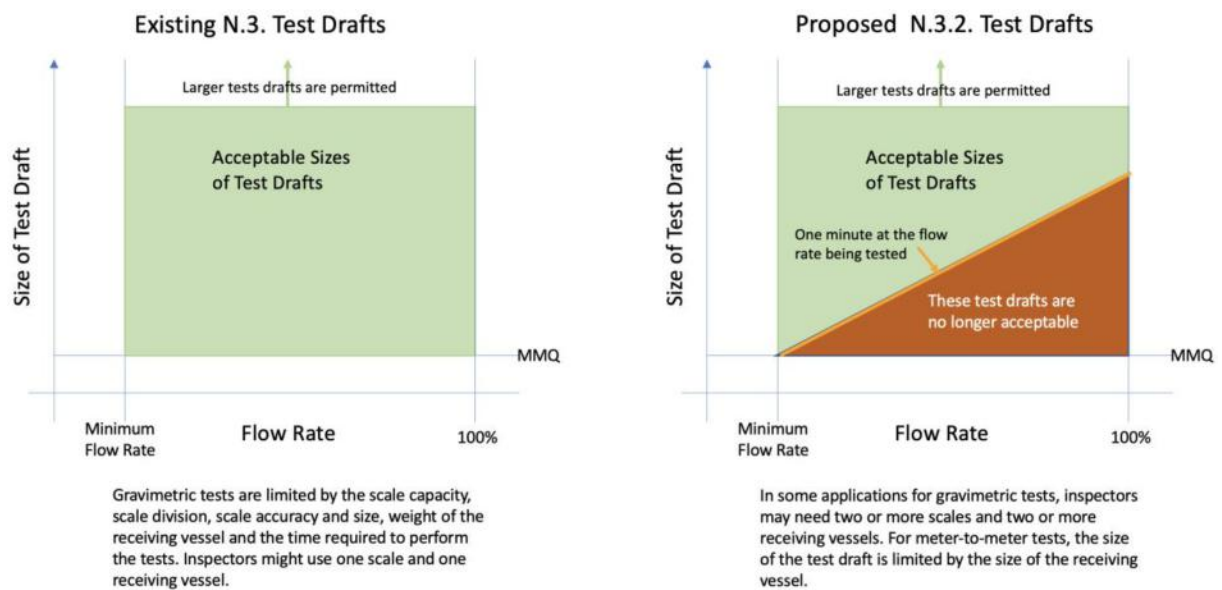


Keilty Answers: Comments on S&T Item MFM-15.1. Seraphin Test Measure

The impact of the proposed MFM-15.1. ultimately depends upon the language used in the proposed N.3.2. The latest proposed N.3.2. is intended to apply to the minimum test drafts for dynamic volume (meter) tests (now called “Field Standard Meter Tests”). An earlier proposal applied to both gravimetric and dynamic volume (meter) tests. The language proposed for MFM-15.1. has



changed from year to year and even meeting to meeting. The charts below illustrate the impact of the proposed change. The actual sizes of test drafts will vary with the measurement application and the equipment available to conduct the field tests.

This proposal would impose constraints on the capability of W&M officials to test mass flow meters. Under the current paragraph N.3., W&M officials can conduct tests at any flow rate for any quantity that is equal to or greater than the minimum measured quantity (MMQ) specified by the manufacturer of the meter. Under the proposed N.3.2., the minimum size of the test drafts must be greater than or equal to the quantity delivered in one minute at the flow rate at which the test is conducted. Depending upon the measurement application and the test equipment available, this could substantially increase the size of the required test drafts for almost all flow rates for mass flow meters.

W&M officials should be able to test mass flow meters using any test draft size equal to or greater than the MMQ over the range of flow rates. Some tests should be conducted near the MMQ to verify the performance of the mass flow meter used commercially. The capability of W&M officials should not be limited as proposed in MFM-15.1. Consequently, Seraphin Test Measure Company and Weights and Measures Consulting oppose item MFM-15.1. and recommend that it be withdrawn.

Attachment

minimum measured quantity (MMQ). - The smallest quantity delivered for which the measurement is to [be] within the applicable tolerances for that system. [3.37, 3.39]

 * Indicates values for compressed liquids

Cells shaded green when one minute test draft is greater than MMQ. In these cases, weights and measures inspectors would not be permitted to conduct tests at the MMQ at the minimum flow rate.



Cells shaded orange when one minute test draft is less than the MMQ. In these cases, a test draft equal to one minute at the minimum flow rate is not a valid test.

NTEP CC	Size (inch)	Flow Rate (lb/min)		MMQ (lb)	Flow Rate (gal/min)		MMQ (gal)
		Min (lb)	Max (lb)		Min (gal)	Max (gal)	
03-019A3	0.5				6*	30*	1.5*
	1				12*	60*	3*
	2				24*	120*	6*
	0.5	25	600	12.5	3	72	1.5
	1	50	1200	25	6	144	3
	2	100	2400	50	12	288	6
09-033A4	1	100	1500	100	12	180	12
	2	200	3000	200	24	360	24
	3	400	6000	400	48	720	48
	4	800	12000	800	96	1439	96
16-007A2	0.5	12.6	225	4	1.5	40	0.48
	1	40	560	40	4.8	99	4.8
	2	162	1950	160	19.4	334	19.2
	3	205	7500	200	24.6	1322	24.0
16-058A3	1	75	750	75	20	200	20
	1.5	220	2200	500	58	581	60
	2	440	4400	500	116	1162	60
	0.3	36	367	145	10	100	38
	1	73	730	145	19	199	38
	2	145	1450	145	38	383	38
	3	250	2900	500	66	766	60
	4	500	5800	500	132	1532	60
16-061A4	1	191*	989*	200*	45*	230*	50*
	1.5	383*	1973*	400*	89*	460*	100*
	2	765*	3956*	800*	178*	920*	200*
	1	75	750	75	20	200	20
	1.5	220	2200	500	58	581	60
	2	440	4400	500	116	1162	60
21-019	1	75	750	75	20	200	20
	1.5	220	2200	500	58	581	60
	2	440	4400	500	116	1162	60
	0.5	30	367	145	8	100	38

	1	73	730	38	19	199	38
	2	145	1450	145	38	383	38
	3	250	2900	500	66	766	60
	4	500	5800	500	132	1532	60
21-026		kg/min	kg/min	kg			
	0.5	3	61	3			
	1	6	120	6			
	1.5	45	500	45			
	2	95	1005	95			
	3	130	2410	131			
	4	260	2820	260			
	6	820	8200	820			
	8	1600	16400	1600			
21-069A1	P25	3.8	38	3.8			
	P40	10	100	10			
	P50	48	480	48			
	P80	100	1000	100			
	P1	200	2000	200			

Keilty: The concept of Minimum Measured Quantity (MMQ) was introduced to Handbook 44 by NIST back when the Mass Flow Meter Code was developed. The MMQ value is determined and stated by the manufacturer. Generally, manufacturer set the Minimum Measured Quantity at that of the numerical value of the Minimum Flow Rate with quantity captured in one minute of flow. I agree that some manufacturers have set that Minimum Measured Quantity value at less than that of the Minimum Flow Rate numerical value.

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.

Mr Oppermann bases his argument on Minimum Measured Quantity testing. He provides a colorful drawing that is scaled to dramatize the impact of the proposed amended language for Field Standard Meter testing. Performing MMQ tests at the Maximum Flow Rate of a flowmeter is not practical and leads to great errors and could be damaging to systems and be a safety concern. Mr Oppermann also states that to include the Minimum Measured Quantity test, two or more scales and two or more vessels might be necessary. This is also impractical in both Type Evaluation and especially in Field Testing.

An audit of the certificates listed above revealed some interesting information. Three of the 8 certificates are exactly the same meter, produced by one company and private labeled by two other companies. For those three certificates, some of the specifications are the same but some differ. I take it that this is based upon the specific needs and the testing manager of the companies. Under the section describing Test Conditions, not one of the certificates mentions Type Evaluation Testing for the Minimum Measured Quantity.

End of comments