- *Calculation Method* - The ***Fmc²*** may be configured to calculate the results of the prove's repeatable trips in one of the following methods:
  - 0 - *Average Meter Factor Method* – The resultant MF is the average of the meter factors of all repeatable trips. The trip meter factors are checked for repeatability.). Note: If "Dual Detect" is enabled, the *Average Meter Factor Method* is automatically utilized.
  - 1 - *Average Data Method* - The resultant MF is calculated from the average round trip pulses, temperatures, pressures, and density of all repeatable trips. The trip pulses are checked for repeatability.
- *MF Accept Mode* - The ***Fmc²*** can be configured to determine the acceptability of new meter factors based on certain criteria, and automatically implement the new MF (if configured to do so – see "*Automatically Accept MF?* below). Newly determined MF's will be referred to the meter's "Normal" flow rate before being checked. (See section 4.5.5.1.2 on page 95 for inputting a meter's Normal ('Base') Flow Rate.) The User selectable options are:
  - 0 - The new MF is always acceptable (not automatic test will be performed; the MF acceptability is based on User decision) (with the exception that the new MF must fall within 0.5000 to 2.0000).
  - 1 - The new MF must pass "Test 1". Test 1 passes if the new MF deviates from the current MF by less than the entry Test 1 percent deviation limit.
  - 2 - The new MF must pass "Test 2" to be acceptable. Test 2 passes if the new MF does not deviate from the average of historical MFs (2-12) by more than the entry for Test 2 percent deviation limit. (For setting the number of MFs in the historical average, see Section 4.8.2.1.2, "METER FACTORS - HISTORICAL", on page 129)
  - 3 - The new MF must pass "Test 1" and "Test 2" to be acceptable. See page 111 for additional details regarding Test 1 and Test 2.
  - 4 - The new MF must lie within the 80% confidence range around the average of the historical MFs in order to be acceptable.
  - 5 - The new MF must lie within the 90% confidence range around the average of the historical MFs in order to be acceptable.
  - 6 - The new MF must lie within the 95% confidence range around the average of the historical MFs in order to be acceptable.
  - 7 - The new MF must lie within the 99% confidence range around the average of the historical MFs in order to be acceptable.
  - 8 - The new MF is never acceptable.

    Notes:
    i. *The 80% confidence range is more stringent than the 99% confidence range.*
    ii. *If the MF Accept Mode is set to 1 – 7, and the new MF is passed the acceptance criteria, the 'Acceptable [ ]' box will be selected ('[X]') on the standard prove report template.*

- 4 – Estimate the batch average flow rate and 'look up' the meter factor; use this meter factor as the batch average meter factor. Prior batch totals will be recalculated using the new batch average meter factor.

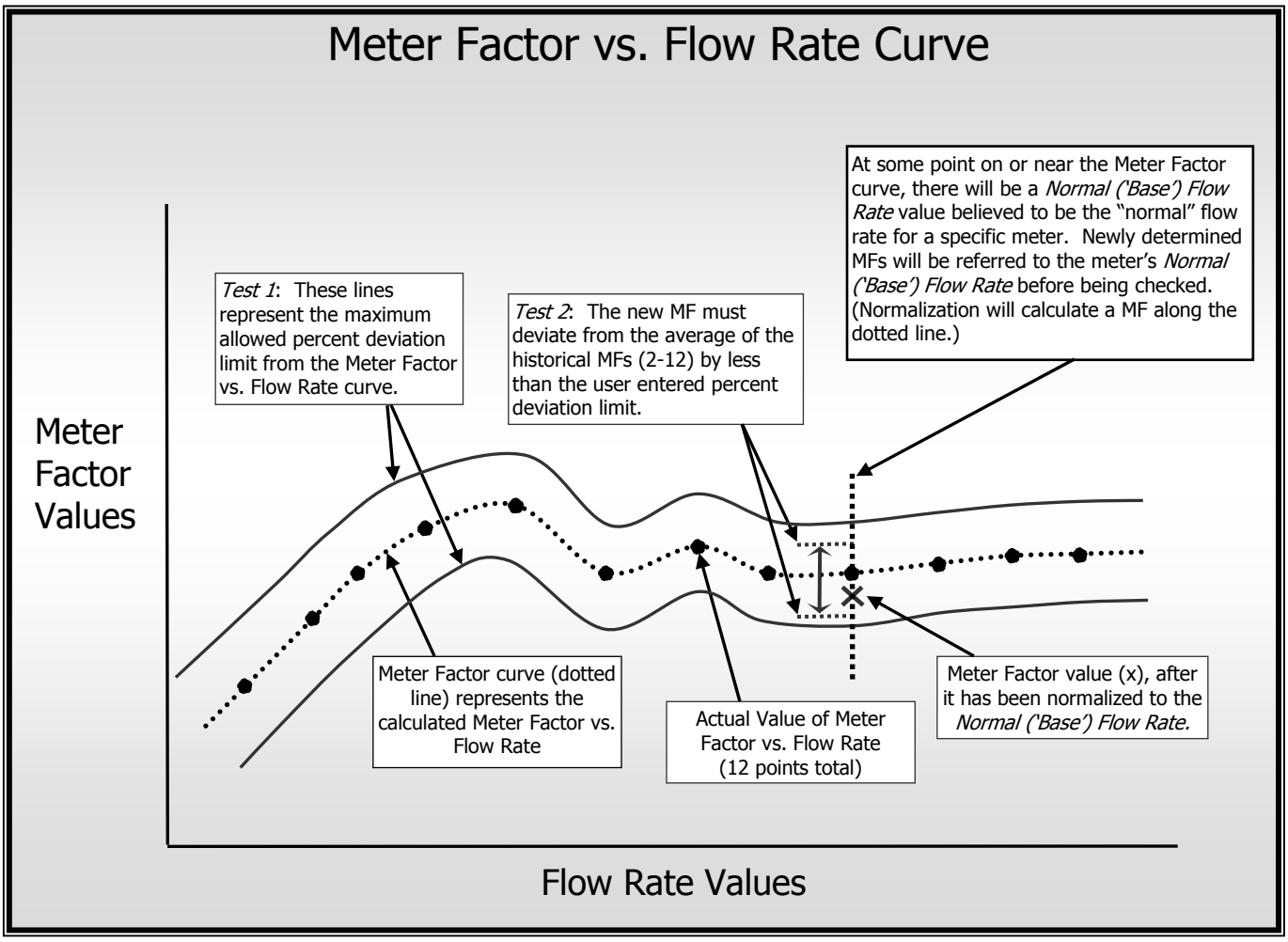

Figure 65 - Meter Factor vs. Flow Rate Curve

The above figure shows twelve points representing a Meter Factor vs. Flow Rate curve. A meter factor curve (dotted line) is calculated between the points using the point-slope formula:

$m = (y_2 - y_1) \div (x_2 - x_1)$

Where:

y_2 and y_1 represent known meter factor values (y_2 is the lower flow rate; y_1 is higher);

x_2 and x_1 represent the known corresponding flow rates of meter factors y_2 and y_1;

m is the unknown slope between the two points.

Once the slope has been calculated, any meter factor value between the flow rates utilized in the point-slope formula can be calculated using the formula:

$y = m(x - x_1) + y_1$,

Where:

y_1 is the known meter factor corresponding to known flow rate x_1 from the point-slope formula;

m is the calculated slope from the point-slope formula;

y represents the unknown meter factor corresponding to the present flow rate x.

4.9.1.5. Prove Report

The Prove default report template provides information associated with the displacement prove of a liquid meter.

FMC Technologies

Displacement Prover Report
Page 1 of 2

Report No: 40

Flow Computer ID: FQIT-100
Location: CC, TX USA

Prove Completed Date/Time: 08/10/14 16:46:38
Report Date/Time: 08/10/14 16:46:38

Meter Info
Tag : Meter #1
S/N :
Model :
Size :
K factor: 1000.00 Pls/bbl

Fluid Info
Tag : Crude
Group : 5
Density : 25.0 API
CTL Table : API 2004
CPL Table : API 2004

Prover Info
Tag : Bidi
S/N : 1468
Vol.1: 94.9233 bbls
Vol.2: 94.9272 bbls
Vol.2 Used : [X]
Dual Detect: [ ]
ID : 35.250 in.
WT : 0.375 in.
CoE : 0.0000186/deg.F
Elas: 30000000/psig

Prove Data

Run	Time Sec(s)	Flow b/h	Temp deg.F Pvr	Temp deg.F Mtr	Press psig Pvr	Press psig Mtr	Fwd Pulses	Total Pulses	MF	Used
1	114.532	2983.8	75.7	75.6	150	151	10011.272	20027.447	4.74326	[X]
2	114.515	2984.2	75.8	75.6	150	151	10009.597	20027.517	4.74304	[X]
3	114.463	2985.6	76.0	75.3	151	151	10014.932	20032.111	4.74100	[X]
4	114.501	2984.6	75.8	75.5	151	152	10010.271	20010.570	4.74676	[X]
5	114.566	2982.9	75.8	75.7	150	151	10007.289	20010.607	4.74724	[X]
6	114.503	2984.5	75.6	75.6	151	152	10008.914	20009.007	4.74777	[X]
7	114.502	2984.6	75.8	75.7	150	152	10007.558	20018.981	4.74519	[X]
8	114.531	2983.8	75.8	75.3	150	151	10012.143	20025.404	4.74290	[X]
9	114.511	2984.3	75.8	75.5	150	151	10007.042	20019.196	4.74476	[X]
10	114.506	2984.4	75.7	75.6	151	151	10016.052	20022.091	4.74450	[X]
11	114.517	2984.2	75.8	75.2	150	151	10014.534	20033.048	4.74093	[X]
12	114.524	2984.0	76.0	75.6	150	151	10002.847	20007.553	4.74741	[X]
13	114.506	2984.4	75.6	75.4	150	152	10004.192	20021.065	4.74445	[X]
14	114.477	2985.2	75.8	75.5	150	151	10019.994	20027.843	4.74274	[X]
15	114.466	2985.5	75.8	75.5	151	151	10005.946	20006.420	4.74779	[X]
16	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
17	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
18	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
19	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
20	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
21	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
22	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
23	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
24	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
25	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
26	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
27	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
28	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
29	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
30	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
31	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
32	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
33	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
34	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
35	0.000	0.0	0.0	0.0	0	0	0.000	0.000	0.00000	[ ]
AVG	114.508	2984.0	75.8	75.5	150	151	10010.1721	20019.9240	4.7446	

Prove Result: PROVE COMPLETED
Calc. Method = 1 (0 = Avg. Meter Factor, 1 = Avg. Data)
Range = 26.6280 Standard Deviation = 9.1185
Repeatability = 0.1331% Max => 15 runs in 35 within 0.1700%

New Meter Factor = 4.7446 at => 2984.0 b/h
Old Meter Factor = 4.7446 75.50 deg.
Deviation (Test 1) +0.00 % 151.00 psig

Normalized MF = 4.7446 at => 1000.0 b/h High Limit 2.0000
Avg Meter Factor = 4.7446 (last 1 HMFs) Low Limit 0.5000
Hist. Dev (Test 2) +0.00 %.....Acceptable [ ]

HMF	Date	MF	Deviation	HMF	Date	MF	Deviation
1	08/10/14	4.7446	+374.46 %	6		0.0000	+0.00 %
2		0.0000	+0.00 %	7		0.0000	+0.00 %
3		0.0000	+0.00 %	8		0.0000	+0.00 %
4		0.0000	+0.00 %	9		0.0000	+0.00 %
5		0.0000	+0.00 %	10		0.0000	+0.00 %

Signature:_____ Date:_____