

Applications Guide for Production and Transportation Meters

Step 1 – Information Gathering

Define the application requirements, system conditions, product characteristics, and experience/concerns with current meters. All the information is important, but the flow and viscosity range are key in determining the meter's performance.

Step 2 – Meter Selection

Determine which type of meters satisfy the operating conditions. This is basically a process of elimination. The easiest parameters to evaluate are size, pressure, temperature, and flow. In most cases two or even three meters will fully satisfy these conditions. The more subtle yet important criteria are viscosity, entrained wax, solids, gases, and corrosive chemicals. In some cases this may eliminate all but one choice, but in many cases there may be several alternatives.

Step 3 – Application Evaluation and Selection

Evaluate and make a choice if more than one meter meets the application requirements. This combines each specific meter's strengths, for the application and price.

Step 1 – Information Gathering

A. General Information

Company _____

Contact Name _____ Phone _____

Location _____

B. Application Requirements

Class I - Custody Transfer Measurement

- Production
- Crude Oil Transportation
- Refined Products Transportation
- Other

Accuracy Required +/- _____ %

Regulatory Requirement No Yes (Specify) _____

Class II - High Accuracy Meters

- Allocation
- Leak Detection
- Inventory
- Other

C. System Conditions

Flow Range (Min.) _____ (Max.) _____

Temperature (Min.) _____ (Max.) _____

Pressure Flange Rating _____ Max. Operating _____

D. Product Characteristics – Refined or Crude Oils

Name and/or API Gravity	Viscosity (cSt)		List any contaminants such as sediment & water (S&W), wax & gas in the product
	Min.	Max.	

E. Preferences and Concerns

Meters Currently in Service

Manufacturer	Size	Type	Qty.	Details

Step 2 – Meter Selection Criteria

Application Requirements by Meter Class:

- **Class I - Custody Transfer Meters** – Class I meters designed and tested for custody transfer accuracy. Custody transfer meters should be proven on-site under actual operating conditions to insure accurate measurement.
- **Class II - High Accuracy Meters** - Class I meters are often used for Class II applications because of their high accuracy. In many of these applications the requirements for field proving are relaxed, and in some cases the proving is done off-site.

General Meter Specifications

Meter Type	Size (Inches)	Pressure PSI (kPa)	Temp. °F (°C)	Flow BPH (m ³ /h)		Viscosity (cSt)	Entrained (1 Excellent – 5 Poor)			Corrosive Chemicals Compatible with	Pressure Drop Low - 1 High - 5
				Min.	Max.		Wax	S&W	Gas (1)		
PD Meters	2 - 16	1,440 (9,936)	500 (260)	25 (4.0)	12,500 (1,984)	2,000 +	1 - 2	Sand – 5 Other – 2 - 5	Damaged from bulk gas	Steel and Aluminum	1 - 2
Mass Meters	½ - 6	2,000 (13,790)	600 (316)	170 (27.0)	3,400 (540)	100 + Acceptable Differential Pressure	1	1 - 5	1 - 5	Stainless Steel	4 - 5
G Series TM	1½ - 4	2,220 (15,318)	225 (107)	50 (7.9)	2000 (317)	< 2 x D	5	3 - 5	Normally not damaged with bulk gas	Stainless Steel	2 - 3
Sentry TM	4 - 20	1,480 (10,212)	225 (107)	400 (63)	42,000 (6,667)	< 2 x D	5	3 - 5		Stainless Steel	2 - 3
MVTM	3 - 16	1,480 (10,212)	225 (107)	200 (32)	27,000 (4,286)	< 10 x D	2 - 5	2 - 1		Stainless Steel/Titanium	1 - 2
Ultra ⁶	6 – 12	720 (4,968)	158 (70)	1,000 (159)	19,000 (1,016)	< 10 x D	2 - 1	1 < 1% - no ≥ 5%	no ≥ 1%	Stainless Steel/Titanium	1

Notes:

1. Any gas in a product will cause a measurement error. Since a liquid has 800 times the density of an equal volume of gas, even small amounts can cause a large error in measurement. Mass meters should theoretically compensate for entrained gas, but there may be other factors that reduce the measurement accuracy.

Step 3 – Application Evaluation and Recommendations

1. Determine from Step 2 which type of meter meets the basic requirements.
2. Assign a “Rating” for each class of meter in the application.
3. Sum the “Total Rating” for each class of meter.
4. Price each meter type that meets the application requirements.

Yes No

1 Excellent to 5 Poor

Sum of Scores for each Selection Factor

Basic Requirements	PD Meter		TM-Conventional		TM-Helical		Coriolis Mass		Ultra ⁶	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Selection Factors	Rating		Rating		Rating		Rating		Rating	
1. Accuracy										
2. Wax										
3. S & W										
4. Gas										
5. Pressure Drop										
Total Score										

	PD Meter	TM-Conventional	TM-Helical	Coriolis Mass	Ultra ⁶
Price					

Revisions included in AB0A006 Issue/Rev. 0.2 (10/07)
 Page 3: Revised the General Meter Specifications chart.
 Page 4: Revised the Step 3.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Headquarters:
 1803 Gears Road, Houston, TX 77067 USA, Phone: 281/260-2190, Fax: 281/260-2191

Gas Measurement Products:
 Houston, TX USA +1 (281) 260-2190
 Thetford, England +44 (1842) 82-2900
 Kongsberg, Norway +47 (32) 286-700
 Buenos Aires, Argentina +54 (11) 4312-4736

Integrated Measurement Systems:
 Corpus Christi, TX USA +1 (361) 289-3400
 Kongsberg, Norway +47 (32) 286-700
 San Juan, Puerto Rico +1809 (787) 274-3760
 United Arab Emirates, Dubai +971 (4) 331-3646

Liquid Measurement Products:
 Erie, PA USA +1 (814) 898-5000
 Los Angeles, CA USA +1 (310) 328-1236
 Slough, England +44 (1753) 57-1515
 Ellerbek, Germany +49 (4101) 304-0
 Barcelona, Spain +34 (93) 201-0989
 Moscow, Russia +7 (495) 564-8705
 Melbourne, Australia +61(3) 9807-2818

Beijing, China +86 (10) 6500-2251
 Singapore +65 6861-3011
 Chennai, India +91 (44) 450-4400

Visit our website at www.fmctechnologies.com/measurementsolutions