
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	1/2 - 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	1 1/2 - 4	2,220 (15,318)	225 (107)	50 (7.9)	2,000 (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.
March 2019 - Branding and contact information has been updated.

USA Operation
 1602 Wagner Avenue
 Erie, Pennsylvania 16510 USA
 P: +1 814.898.5000

Germany Operation
 Smith Meter GmbH
 Regentstrasse 1
 25474 Ellerbek, Germany
 P: +49 4101 304.0