

The **Smith Meter® Model F4 Meter** is a 4", double-case, straight-through (S1 through S7) or angle-type (A1 and A3), rotary vane, positive displacement meter. Applications include: blending, batching, dispensing, inventory control, and custody transfer of oils, solvents, chemicals, paints, fats, and fertilizers.

Features

- **Superior Accuracy** – The Smith Meter® Rotary Vane Meter principle, combined with the meter's uniquely designed (offset) inlet and outlet nozzles, minimizes pressure drop across the measuring chamber, which reduces flow through meter clearances (slippage), to maximize accuracy.
- **Low Pressure Drop** – Streamlined flow path provides low pressure drop.
- **Positive and Accurate Registration** – High torque drive calibrator with adjustment in 0.05% increments ensures accurate registration.
- **Long Service Life** – Low friction ball bearings, fixed cam-type timing, and rugged construction give sustained accuracy and long service life.

Options

- **High Viscosity Meter Clearances** – To extend operation at maximum flow rate from 400 mPa•s to 2,000 mPa•s.
- **High Temperature Clearances** – To extend operating temperatures from 150°F to 200°F (65°C to 93°C).
- **All Iron Trim** – For operating temperatures above 200°F (93°C).
- **LPG Trim** – For low lubricity liquids such as LPG.
- **NACE Construction** – Special components available to meet requirements of NACE Standard MR-01-75.

Operating Specifications

Maximum Flow Rate

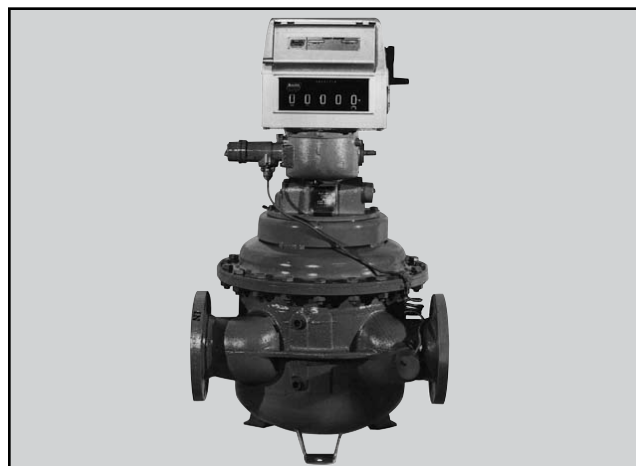
	USGPM	L/min
Continuous Rating – Standard Trim	600	2,250
Intermittent Rating ¹ – Standard Trim	720	2,725
Continuous/Intermittent Rating – All Iron or LPG Trim	450	1,700

¹ Intermittent rating applies to service on clean, refined products where continuous operation is not required (e.g., truck loading, rail loading, and other batching applications).

² Linearity based on a maximum flow rate of 600 USGPM (2,250 L/min) unless otherwise stated.

³ Linearity based on a maximum of 500 USGPM (1,875 L/min).

⁴ 1,000 mPa•s = 1,000 cP = 1 Pa•s.



Model F4-S1

Minimum Flow Rate – Typical Performance

Linearity ²	Units	Viscosity (mPa•s)					
		0.5	1	5	20	100	400
±0.15%	USGPM	100 ³	60	25	6	1.25	0.30
	L/min	375 ³	227	95	23	4.75	1.14
±0.25%	USGPM	75	45	18	4	1.00	0.25
	L/min	284	170	68	15	3.80	0.95
±0.50%	USGPM	50	30	12	3	0.60	0.15
	L/min	190	114	45	11	2.25	0.57

Repeatability

±0.02%

Viscosity

Standard: 400 mPa•s⁴ (2,000 SSU) maximum.

Optional: 2 Pa•s (10,000 SSU) maximum – specify “High Viscosity Meter Clearances.”

Over 2 Pa•s – specify “High Viscosity Meter Clearances” and derate maximum flow rate in direct proportion to viscosity over 2 Pa•s (e.g., at 4 Pa•s, derate Maximum Flow Rate to 50% of Normal Continuous Rating – 300 USGPM).

Temperature

Standard Meter Clearances With:

Buna N/EPR/Teflon: -20°F to 150°F (-29°C to 65°C).

Viton: 10°F to 150°F (-12°C to 65°C).

High Temperature Meter Clearances With:

Buna N/EPR/Teflon: -20°F to 200°F (-29°C to 93°C).

Viton: 10°F to 200°F (-12°C to 93°C).

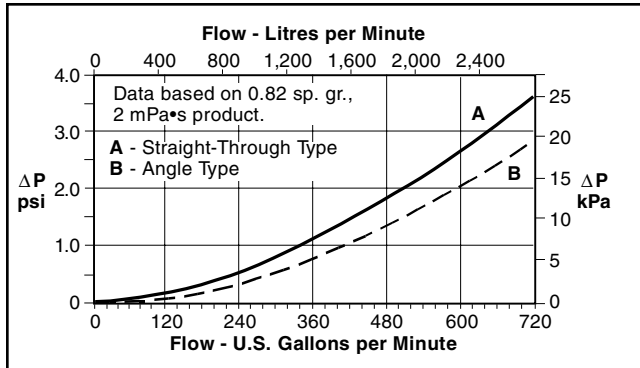
All Iron Trim With:

- Buna N: -20°F to 225°F (-29°C to 108°C).
- EPR: -20°F to 300°F (-29°C to 149°C).
- Teflon: -20°F to 400°F (-29°C to 205°C).
- Viton: 10°F to 400°F (-12°C to 205°C).

Meter Gearing

Five U.S. gallons or one dekalitre (S1 and A1) and one barrel or five dekalitres (S3, A3 through S7) per revolution of meter calibrator output shaft.

Pressure Drop (ΔP)



Maximum Working Pressure

Model	Flange	PSI ⁵	kPa ⁵
F4-S1, A1	150	150	1,034
F4-S3	150	285 ⁵	1,965 ⁵
F4-A3	150	285 ⁵	1,965 ⁵
F4-S5	300	300	2,069
F4-S6	300	720 ⁵	4,964 ⁵
F4-S7	600	1,440 ⁵	9,929 ⁵

Flange Class per ANSI B16.5 Raised Face Flange.

Materials of Construction

Trim	Housing	Internals	Seals ⁶
Standard	Steel	Iron, Steel, Stainless Steel, Aluminum	Buna N ⁷ , Viton Teflon, or EPR
LPG	Steel	Add Rulon and Nylon	Buna N ⁷ , Viton Teflon, or EPR
All Iron	Steel	Delete Aluminum	Buna N ⁷ , Viton Teflon, or EPR

Installation

It is recommended that the meter be protected with a suitable mesh strainer.

Catalog Code

The following guide defines the correct PD meter for a given application and the respective catalog code. This code is part of the ordering information and should be included on the purchase order.

1	2	3	4	5	6	7	8	9	10
K	F	4	S	1	G	B	S	0	0

Position 1: Code

K – Catalog Code

Positions 2 and 3: Model/Flange Size

F4 – 4" (F4)

Position 4: Flow Path

- S – Straight
- A – 90° Angle
- V – Vertical

Position 5: Pressure Class and End Connections

Standard (Raised Face Flanges)

- 1 – Class 150, 150 psig/1,034 kPa
- 3 – Class 150, 275 psig/1,896 kPa
- 5 – Class 300, 300 psig/2,068 kPa
- 6 – Class 300, 720 psig/4,964 kPa
- 7 – Class 600, 1,480 psig/9,928 kPa

PED (Raised Face Flanges)

- 1 – Class 150, Not Available
- 3 – Class 150, 285 psig/1,965 kPa
- 5 – Class 300, Not Available
- 6 – Class 300, Consult Factory
- 7 – Class 600, 1,480 psig/10,204 kPa

All Flanges designed to ANSI B16.5, Pressure Ratings Maximum Working Pressure at 100°F

Position 6: Meter Gearing

- G – Gallons (5:1 - S1)
- B – Barrels (1:1 - S3 through S7)
- D – Dekaliters (1:1 - S1) (5:1 - S3 through S7)
- I – Imperial Gallons⁹
- P – Pound⁹

Position 7: Seals

- B – Buna-N
- V – Viton
- T – Teflon

Position 8: Trim

- S – Standard
- A – All Iron
- L – LPG

Position 9: Temperature Compensation

- 0 – None
- A – ATC
- B – ATG

Position 10: Special Requirements

- 0 – Standard
- P – PED

⁵ Maximum W.P. at 100°F (38°C).

⁶ All S3 through S7 meters with Viton trim will have Teflon packing gland seals.

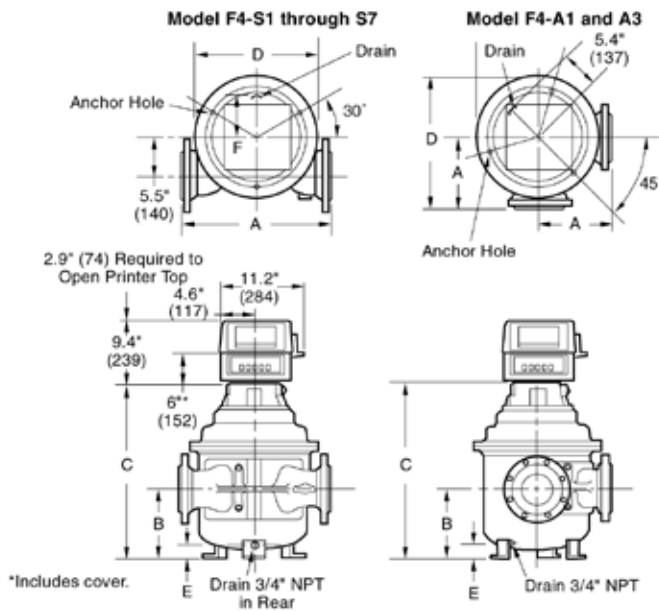
⁷ Standard.

⁸ See catalog code for more options.

⁹ Consult factory for Model number when selecting Imperial or Pound Gearing.

Dimensions

Inches (mm)



Meter Anchor Bolt Holes

3 - 0.8" (20) Bolt Holes on a
13.5" (343) Diameter Bolt Circle

Note: Dimensions – inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

Model	A	B	C	D	E	F	Weight - lb (kg)
F4-S1	20.0" (508)	9.3" (235)	23.4" (594)	17.8" (452)	1.3" (33)	5.4" (137)	295 (134)
F4-S3	20.0" (508)	9.3" (235)	24.7" (627)	17.6" (447)	1.3" (33)	5.4" (137)	300 (136)
F4-S5	21.1" (536)	9.3" (235)	24.7" (627)	17.6" (447)	1.3" (33)	5.4" (137)	340 (154)
F4-S6	24.9" (632)	9.4" (239)	25.6" (650)	19.8" (503)	1.6" (41)	6.0" (152)	540 (245)
F4-S7	26.6" (676)	9.8" (249)	27.8" (706)	21.0" (533)	1.7" (43)	6.3" (160)	830 (376)
F4-A1	10.0" (254)	9.3" (235)	23.4" (594)	18.9" (480)	1.3" (33)	5.4" (137)	327 (148)
F4-A3	10.0" (254)	9.3" (235)	24.7" (627)	18.9" (480)	1.3" (33)	5.4" (137)	333 (151)

Ordering Information

Application	Batching, Loading, Blending, Inventory Process Control, etc.
Operating Conditions	Liquid — Name, Specific Gravity or API Gravity, Flow Range ¹⁰ , Temperature Range ¹⁰ , Viscosity Range ¹⁰ , Maximum Working Pressure.
Seals	Buna N ¹¹ , Viton, Teflon, or EPR.
Units of Registration	Gallons, Litres, Pounds, Kilograms, Dekalitres, Barrels, Tons, etc.
Direction of Flow	Left to right (as viewed above) is standard and will be supplied unless right to left flow is specified.
Style	Straight through or angle type.
Options and Accessories	As required.

Accessories

Strainer

4" steel, R.F. flanged, 4 mesh or finer screen.

Mechanical Preset Valves

4" straight-through type, steel, flanged, 300 psi maximum working pressure.

Hydraulic Valves

4" globe-type, steel, R.F. flanged, 300 psi maximum working pressure.

Air Eliminator

4" steel, R.F. flanged, 300 psi maximum working pressure.

¹⁰ Specify: minimum/normal/maximum.

¹¹ Standard seals supplied unless optional material specified.

Counters

200 Series – Accumulative, 9-digit, non-reset type.
600 Series – 5 large digit reset, 8 small digit non-reset.

Printer

Seven-digit accumulative.
Optional six-digit zero start.

Preset Counter

300C Series – four-digit (five-digit optional) mechanical pushbutton preset with valve linkage. Microswitch package for hydraulic valve, pump control, or other interlock optional.

Pulse Transmitters

Type E – SPDT Mercury Wetted Switch.
LNC Pulse Transmitter (adapts to 600 Series Counters).
 Low-Resolution – 1 to 10 pulses¹².
 High-Resolution (HR) – 50 or 100 pulses¹².
UPT – Quad-channel, infrared, security pulse transmitter in an explosion-proof housing (up to 1,000 pulses/rev.).

¹² Per revolution of LNC Right-Hand Wheel.

Flow Rate Indicator

Direct Mount Mechanical.
Remote Electronic.

Remote Registration

Electro-Mechanical Counters.
Electronic Totalizers.

Automatic Temperature Compensation

Model ATC – Factory-set for a given product.
Model ATG – Field-adjustable for different products.

Revisions included in SS01012 Issue/Rev. 0.8 (2/08):
Page 1 Intermittent Rating – Standard Trim – L/min changed to 2,725

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:

500 North Sam Houston Parkway West, Suite 100, Houston, TX 77067 USA, Phone: +1 (281) 260-2190, Fax: +1 (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