

Variable Area Flowmeters Ori-Flowrator™ Meters

10B4000

- Low installation cost
- Linear indication over 12-1/2 to 1 flow range
- Inexpensive method of measuring large flow rates in direct flow units
- Polycarbonate shield protects personnel from glass fragments in the event of accidental tube rupture.
- Rotatable end fittings
- Universal threaded process connections
- Metering tube can be removed for range change or cleaning with meter in line
- All stainless steel construction



Ori-Flowrator™ Meters
Series 10B4000

ORI-FLOWRATOR™ METERS

The ABB Series 10B4500 **Ori-Flowrator** Meter is a variable area flowmeter used to measure large flows of liquids or gases in conjunction with a primary orifice plate. This meter is mounted in a by-pass line around the primary orifice. A ranging orifice, integral with the meter, proportions the by-pass flow to the main line flow. A 1/2-inch size meter is used to measure flow regardless of the main line pipe size.

Since the float position in a variable-area flowmeter is linear with flow rate, the **Ori-Flowrator** meter can be used to indicate main line flow rate in direct flow units on a linear scale. Standard scales are graduated 8-100 percent full scale. A factor tag is permanently attached to each meter to convert scale reading to flow rate for primary elements with the same differential. Special scales graduated in direct flow units are available.

The **Ori-Flowrator** meter is available with nonadjustable differential ranges of 0-25, 0-50, 0-100, 0-150, 0-200, 0-300 and 0-400 inches of water. (6.25 0-12.5, 0-25, 0-37.5, 0-50, 0-75, 0-100 kPa).

Engineering Specifications

Differential Ranges: 0-25, 0-50, 0-100, 0-150, 0-200, 0-300 and 0-400 inches water column (0-6.25, 0-12.5, 0-25, 0-37.5, 0-50, 0-75, 0-100 kPa)

Performance Repeatability: 0.5% of full scale.

Accuracy: ±4 per cent full scale reading when main line orifice plate is sized and installed as recommended.

Range: 12-1/2 to 1 (7 to 1 for 25-inch differential meters).

Operational Limits:

| | |
|----------------------|---|
| Maximum Pressure: | 300 psig at 100°F (2070 kPa at 38°C) |
| Minimum Temperature: | 32 °F (0°C) |
| Maximum Temperature: | 250°F (121 °C) |

Materials of Construction

Tube: Beadguided™ Borosilicate Glass

Float and Range Orifice: 316 Stainless Steel

“0” rings: Standard—Buna N, Viton, EPR

Packing (10B4600 only): Standard - neoprene;
Optional - molded Teflon liner.

Fittings: Stainless steel.

Float Stops: Teflon

Tube Rest Gaskets: Standard—Klinger-Sil;
Optional—Teflon (10B4600 only)

Glands (10B4600 only): Stainless steel

Compression Screws (10B4600 only): stainless
steel

Meter Body: Type 304L stainless steel

Tube Retainer Spring: Armco 17-7 pH stainless
steel, external to fluid stream in “0” ring meters.

Shield: Polycarbonate

Scales Length: 10 inches (254 mm)

Type: Standard—Percentage on tube.
Optional—direct reading on external scale
with blank tube.

Mounting: Pipe line mounted is standard

Connections: 1/2-inch NPT internal threaded

Weight: 4 pounds (1,8 kg)

Service Limits: Glass tube meters are not recommended for continuous service on alkalis above 100°F (38°C) or more than 20% concentrations; nor for fluorine, hydrofluoric acid, water above 200°F (93°C), steam, slurries, or molten metal.

WARNING

These meters must not be operated without the shield in place. To do so could result in injury to personnel.

CAUTION

It is important that the “O” ring material be compatible with the process fluid. Meter tube breakage can occur if the wrong materials is used. For example VITON “O” RINGS MUST NEVER BE USED FOR AMMONIA SERVICE.

Capacity

The following capacities are offered as a guide only. The values shown are the maximum flow obtainable through a square edge concentric orifice. Span of maximum values shown are those obtainable by varying the main line orifice diameter ratio between 0.3 and 0.7. Range is 12-1/2:1 in all cases except for 25-inch (6.25 kPa) Differential which is 7:1.

| Nominal Main Line Pipe Size Inches (mm) | Capacity Guide – Maximum GPM Water | | | | | | |
|--|---|------------|------------|------------|------------|------------|------------|
| | Maximum Differential Pressure Inches water kPa | | | | | | |
| | 25 (6.25) | 50 (12.5) | 100 (25) | 150 (37.5) | 200 (50) | 300 (75) | 400 (100) |
| 2 (50) | 18 – 42 | 25 – 60 | 25 – 85 | 25 – 100 | 30 – 120 | 30 – 150 | 30 – 170 |
| 3 (76) | 20 – 92 | 25 – 130 | 30 – 180 | 35 – 220 | 40 – 260 | 50 – 320 | 60 – 370 |
| 4 (102) | 25 – 157 | 35 – 200 | 50 – 310 | 62 – 380 | 70 – 450 | 85 – 550 | 100 – 620 |
| 6 (152) | 56 – 360 | 80 – 500 | 115 – 720 | 140 – 860 | 160 – 1000 | 200 – 1200 | 260 – 1400 |
| 8 (203) | 100 – 615 | 140 – 870 | 200 – 1250 | 240 – 1500 | 280 – 1750 | 340 – 2100 | 400 – 2500 |
| 10 (254) | 168 – 1000 | 230 – 1400 | 300 – 1950 | 380 – 2400 | 420 – 2800 | 510 – 3400 | 600 – 4000 |
| 12 (305) | 225 – 1400 | 310 – 2000 | 390 – 2800 | 550 – 3400 | 630 – 4000 | 770 – 4960 | 800 - 5500 |

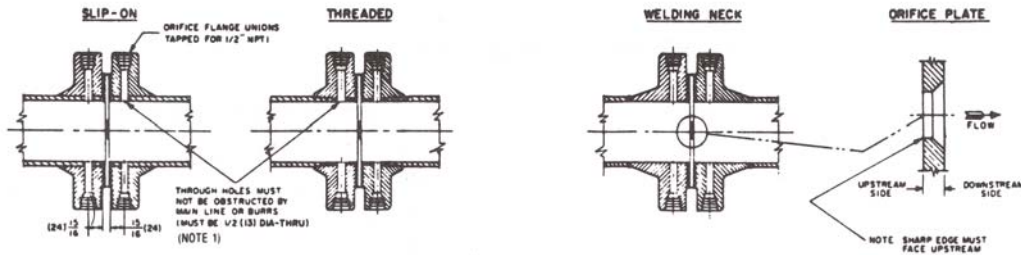
To obtain flow in scfm of air at 14.7 psia & 70°F multiply values in table by 4.12.

To obtain flow in m³/hr of air 101.4 kPa abs and 21°C multiply values in table by 7.0.

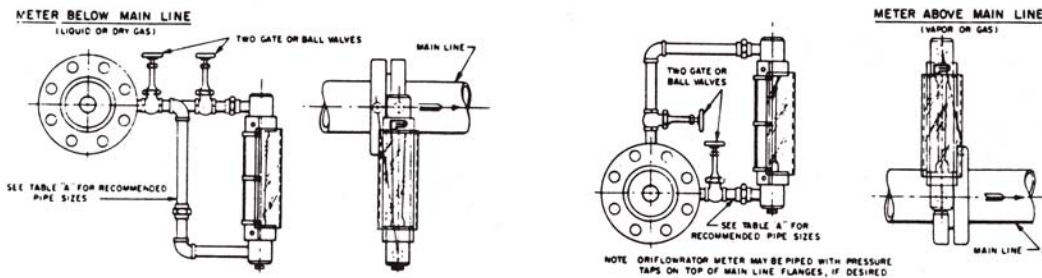
To obtain flow liters/min. of water multiply values in table by 3.785.

Typical Installations

Typical Orifice Flange Unions (A.G.A. STD)



Recommended Installation for Flange Taps



Recommended Installation for VENA Contracta Taps (Main Line 4" (DN100) or Larger)

Notes:

1. Use flange or Vena Contracta Taps. Pipe Taps are not recommended.
2. Measure pressure at the downstream tap when required measure temperature 3-5 diameters downstream or 10-15 diameters upstream.
3. When metering liquids, provide air vents at the high points.
4. Lag Oriflowrator meter piping when necessary.
5. All dimensions are in inches; dimensions in parentheses () are in millimeters, unless otherwise specified.

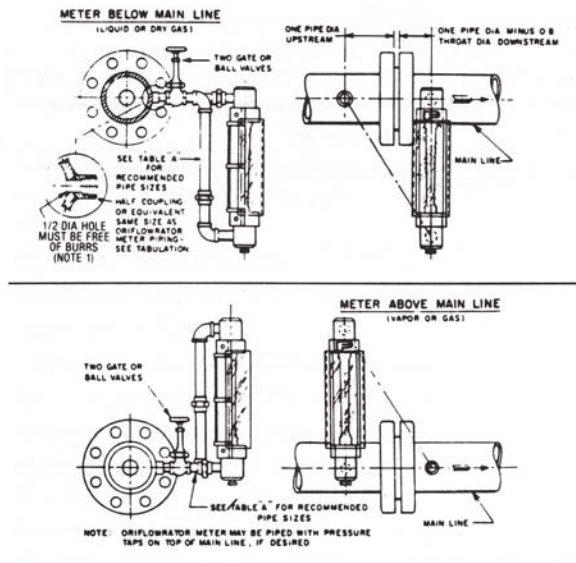
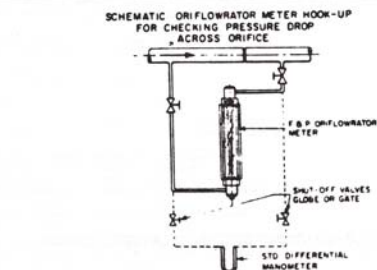


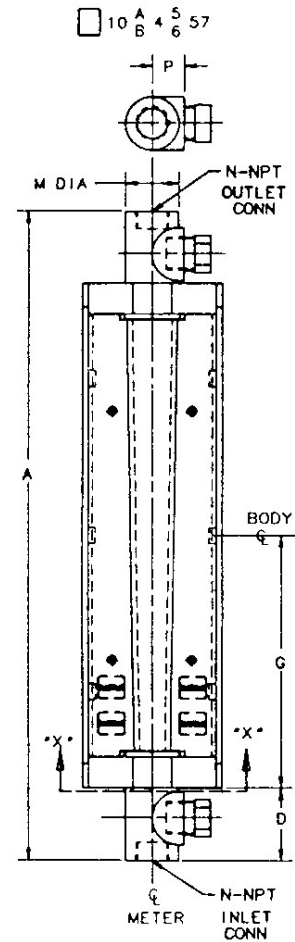
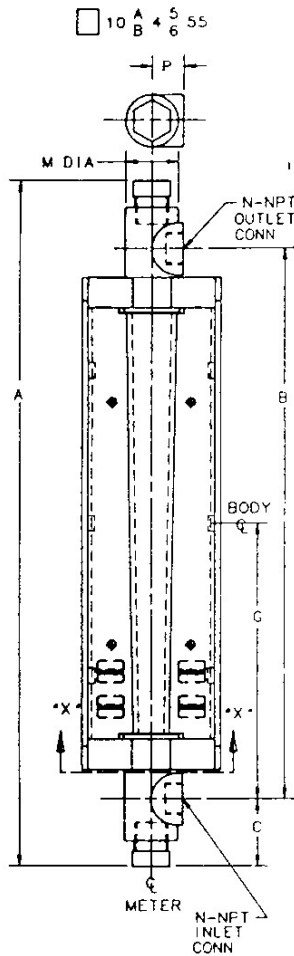
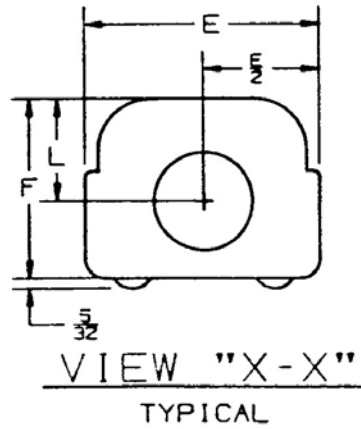
TABLE A

| Pipe Size | | Allowable Equiv. Length of Oriflowrator Piping | Equiv. Pipe Length of Fittings, ft. | | | |
|-----------|-----|--|-------------------------------------|--------|-------|-------|
| ANSI | DIN | | 90° EL | 45° EL | Valve | Union |
| 1/2 | 15 | Up to 10 feet (3m) | 1.5 | 0.8 | 0.35 | 0.17 |
| 3/4 | 20 | Up to 20 feet (6m) | 2.0 | 1.0 | 0.45 | 0.19 |
| 1 | 25 | Up to 60 feet (20m) | 2.5 | 1.2 | 0.60 | 0.21 |

Notes:
Keep number of fittings to a minimum.
Use necessary reducing fittings at orifice conns. and meter. Pipe to be free of burrs, friction losses based on schedule 40 pipe.



DIMENSIONS



| METER TUBE SIZE | 1/2 | |
|-----------------|---------|-----|
| DIM | INCH | mm |
| A | 19-5/16 | 490 |
| B | 16-1/2 | 419 |
| C | 1-13/32 | 37 |
| D | 3-1/2 | 89 |
| E | 3-3/8 | 86 |
| F | 2-5/8 | 67 |
| G | 8-1/4 | 210 |
| L | 1-1/2 | 38 |
| M | 1-1/4 | 32 |
| N | 1/2 | 13 |
| P | 3/4 | 19 |
| Q | 1/2 | 13 |

| METER TUBE SIZE | 1/2 | |
|-----------------|---------|-----|
| DIM | INCH | mm |
| A | 18-9/16 | 471 |
| B | 20-5/8 | 524 |
| C | 2-21/32 | 68 |
| D | 1-5/8 | 41 |
| E | 3-3/8 | 86 |
| F | 2-5/8 | 67 |
| G | 7-21/32 | 194 |
| L | 1-1/2 | 38 |
| M | 1-1/4 | 32 |
| N | 1/2 | 13 |
| P | 3/4 | 19 |
| Q | 1/2 | 13 |

For Detailed specifications, refer to Product Specification D-FV-10B4000 Product Code A

Base Price includes fittings of material shown, 316 SST float and Range Orifice, percent on Metal Scale, factor tag, Buna "N" O-rings or Neoprene packing with 303 SST packing glands.

ALARMS: Price adder includes bracket assembled to meter body, alarm float, amplifying relay and minimum and/or maximum switches with 5.5 feet of lead wire.

(Only available for 200 inches of water differential).

| | Code |
|---|-------------|
| Variable Area Master Ori-Flowmeter Model 10B4000 | 10B4 |
| For quantity greater than 5 call | |
| 1 : Seals | |
| O-Ring Pressure | 55 |
| Packing Gland Type Pressure | 65 |
| 2 : Connection Designation | |
| 1/2 in. NPT Horizontal | 5 |
| 1/2 in. NPT Vertical | 7 |
| 3 : Scale Type | |
| Percent on Tube | X |
| Direct Reading on Tube | Y |
| Direct Reading Metal Scale and Percent on Tube | E |
| Percent on Metal Scale | P |
| Direct Reading Metal Scale | S |
| Dual Direct Reading Metal Scales | D |
| 4 : Panel Mounting | |
| Line Mounted | X |
| Front Panel Mounted | Y |
| Rear (Flush) Panel Mounted | Z |
| 5 : Design Level | |
| B | B |
| 6 : Connection Size | |
| Connector, Size 1/2 In. Tube Size 1/2 In. | H |
| 7 : Fitting Material | |
| AISI 316 SST (1.4401) | C |
| 8 : Seal Material | |
| Packing Gland Design Neoprene | (Note: 1) E |
| Packing Gland Design Teflon | (Note: 1) D |
| O-Ring Design Buna-N | (Note: 2) F |
| O-Ring Design Viton (Not used with Ammonia) | (Note: 2) H |
| 9 : Connection Type | |
| 1/2 in. NPT | B |
| 10 : Alarms | |
| Not Required | X |
| 11 : Orifice Differential | |
| 25 Inches | B |
| 50 Inches | C |
| 100 Inches | D |
| 150 Inches | E |
| 200 Inches | F |
| 300 Inches | G |
| 400 Inches | H |

10B4

Code

12: Inlet Connection Orientation

| | | |
|-----------------|-----------|---|
| Front | (Note: 3) | 1 |
| Back | (Note: 3) | 2 |
| Right | (Note: 3) | 3 |
| Left | (Note: 3) | 4 |
| Bottom Vertical | (Note: 4) | 5 |

13: Outlet Connection Orientation

| | | |
|--------------|-----------|---|
| Front | (Note: 3) | 1 |
| Back | (Note: 3) | 2 |
| Right | (Note: 3) | 3 |
| Left | (Note: 3) | 4 |
| Top Vertical | (Note: 4) | 5 |

14: Float Code

| | | |
|---|-----------|----|
| 25,50,100,150 Inches H2O; 1/2-GUSVT-413 | (Note: 5) | 83 |
| 200,300,400 Inches H2O; 1/2-GUSVT-414 | (Note: 6) | 84 |

15: Tube Code

| | |
|----------------|----|
| FP-1/2-27-G-10 | A3 |
|----------------|----|

16: Float Material

| | |
|--------------------------------|---|
| 316 Stainless Steel (standard) | 1 |
|--------------------------------|---|

Additional Ordering Code

17: External Needle Valve (316 sst) & Nipple (unassembled)

| | |
|-----------------------------|----|
| 1/2 In. NPT; p/n 614C068U03 | V3 |
|-----------------------------|----|

18: Certifications

| | |
|---------------------------------------|----|
| Certificate of Conformance; per order | D1 |
|---------------------------------------|----|

19: Material Certifications

| | |
|---|----|
| Material Certifications; "typicals", per material | M1 |
|---|----|

20: Pressure Test

| | |
|---|----|
| Hydrostatic pressure test; 1/8 In. ... 1/2 In. diameter | H1 |
|---|----|

21: Tags

| | |
|---|----|
| Stainless Steel Tags (wired on) per meter | T1 |
|---|----|

Note 1: Not available with Seals code 55

Note 2: Not available with Seals code 65

Note 3: Not available with Connection Designation code 7

Note 4: Not available with Connection Designation code 5

Note 5: Not available with Orifice Differential code H, G, F

Note 6: Not available with Orifice Differential code B, C, D, E

Ordering Information

To eliminate any delays in the processing of orders and to insure prompt delivery, please specify:

- Model number
- Maximum Differential Pressure
- Main Line Flow Rate Range and Unit of Flow
- Accuracy desired
- Materials of Construction (end fittings, O-rings or packing, glands or screws)
- Options or accessories desired
- Operating conditions
 - Fluid measured
 - Fluid density or specific gravity
 - Fluid viscosity
- Operating and maximum temperature Operating and maximum pressure

ABB has Sales & Customer Support
expertise in over 100 countries worldwide

www.abb.com

The Company's policy is one of continuous product
improvement and the right is reserved to modify the
information contained herein without notice.

Printed in USA (04.17.09)

© ABB 2003, 2009

ABB Inc.
125 East County Line Road
Warminster, PA 18974
USA

Tel: +1 215 674 6000
Fax: +1 215 674 7183