FieldIT
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

ABB
**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 non-adjustable 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.

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**CAUTION**

It is important that the “0” ring material be compatible with the process fluid. Meter tube breakage can occur if the wrong materials is used. For example VITON ‘0’ RINGS MUST NEVER BE USED FOR AMMONIA SERVICE.

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**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.

<table>
<thead>
<tr>
<th>Nominal Main Line Pipe Size</th>
<th>Capacity Guide – Maximum GPM Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches (mm)</td>
<td>25 (6.25)</td>
</tr>
<tr>
<td>2 (50)</td>
<td>18 – 42</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Pipe Size</th>
<th>Allowable Equiv. Length of Oriflowrator Piping</th>
<th>90º EL</th>
<th>45º EL</th>
<th>Valve</th>
<th>Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI</td>
<td>DIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>½</td>
<td>15 Up to 10 feet (3m)</td>
<td>1.5</td>
<td>0.8</td>
<td>0.35</td>
<td>0.17</td>
</tr>
<tr>
<td>¾</td>
<td>20 Up to 20 feet (6m)</td>
<td>2.0</td>
<td>1.0</td>
<td>0.45</td>
<td>0.19</td>
</tr>
<tr>
<td>1</td>
<td>25 Up to 60 feet (20m)</td>
<td>2.5</td>
<td>1.2</td>
<td>0.60</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Notes:
Keep number of fittings to a minimum.
Use necessary reducing fittings at orifice conn. and meter. Pipe to be free of burns, friction losses based on schedule 40 pipe.
<table>
<thead>
<tr>
<th>METER TUBE SIZE</th>
<th>1/2</th>
</tr>
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<tbody>
<tr>
<td>DIM</td>
<td>INCH</td>
</tr>
<tr>
<td>A</td>
<td>19-5/16</td>
</tr>
<tr>
<td>B</td>
<td>16-1/2</td>
</tr>
<tr>
<td>C</td>
<td>1-13/32</td>
</tr>
<tr>
<td>D</td>
<td>3-1/2</td>
</tr>
<tr>
<td>E</td>
<td>3-3/8</td>
</tr>
<tr>
<td>F</td>
<td>2-5/8</td>
</tr>
<tr>
<td>G</td>
<td>8-1/4</td>
</tr>
<tr>
<td>L</td>
<td>1-1/2</td>
</tr>
<tr>
<td>M</td>
<td>1-1/4</td>
</tr>
<tr>
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<tr>
<td>P</td>
<td>3/4</td>
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<td>Q</td>
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</tr>
<tr>
<td>A</td>
<td>18-9/16</td>
</tr>
<tr>
<td>B</td>
<td>20-5/8</td>
</tr>
<tr>
<td>C</td>
<td>2-21/32</td>
</tr>
<tr>
<td>D</td>
<td>1-5/8</td>
</tr>
<tr>
<td>E</td>
<td>3-3/8</td>
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Model Number Designation

Seals
- O-ring Pressure: 55
- Packing Gland Type Pressure: 65

Connection Designation
- Horizontal Threaded: 5
- Vertical Threaded: 7

Scales
- Percent on Tube: X
- Direct Reading Metal Scale: S
- Dual Direct Reading Metal Scales: D
- Direct Reading on Tube: Y
- Direct Reading Metal Scale & Percent of Tube: E
- Percent on Metal Scale: P

Panel Mounting
- Line Mounted: X
- Front Panel Mounted: Y
- Rear (Flush) Panel Mounted: Z

Design Level: B

Size (inches)
- Connection Size = 1/2" NPT; Tube Size = 1/2" ... H

Fitting Material
- 316 Stainless Steel: C

Seal Material
- Packing Gland Design: Neoprene: E
- Teflon: D
- O-Ring Design: Buna-N: F
- Viton: H

Connection Type - NPT: B

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