

ORI-FLOWRATOR METERS

SPECIFICATION
10B3000*

File:
Section
10B

10B3000 Series

The F & P 10B3000 Series 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 can 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 per cent 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. Orifice plates sized for use with Ori-Flowrator meters are also available.

DESIGN FEATURES

- Low installation cost
- Linear indication over 10 to 1 flow range
- Inexpensive method of measuring large flow rates in direct flow units
- Easy to remove tube permits cleaning without the need for disassembling the meter or removing it from service

ENGINEERING SPECIFICATIONS

DIFFERENTIAL RANGES: 0-25, 0-50, 0-100, 0-150, 0-200, 0-300 and 0-400 inches water column



MODEL 10B3565A

PERFORMANCE

Accuracy: ± 4 per cent full scale reading when main line orifice plate or flow tube is sized and installed as recommended. ± 3 per cent of full scale reading available with special calibration.

Range or Turndown: 10 to 1 (7 to 1 for 25-inch differential meters)

Operational Limits:

Maximum pressure - 600 psi at 200 F

Maximum temperature - 400 F

Maximum thermal shock - 250 F

Note: Meter is not recommended for continuous service on alkalis above 100 F or more than 20 per cent concentration, fluorine, hydrofluoric acid, water above 200 F, steam slurries, or molten metal.

* Supersedes Specification 10B/10B3000

FISCHER & PORTER

Complete Process Instrumentation



MATERIALS OF CONSTRUCTION

Tube: Tempered borosilicate glass

Float and Range Orifice: Stainless steel.
Hastelloy¹ Alloy C, nickel, monel, optional.

O-rings: Buna N, Butyl, Viton², optional.

Packing: Neoprene, Teflon² linear optional.

Fittings: Steel[†], brass, stainless steel.
Hastelloy Alloy C, Alloy 20, nickel, Monel optional.

Float Stop: Teflon

Tube Rest Gaskets: Durabla³, Teflon optional.

Packing Glands: Die-cast aluminum. Stainless steel optional.

Packing Compression Screws: Steel. Stainless steel optional.

Meter Body: Rigid extruded aluminum with Alodine⁴ protective coating and smooth black enamel finish.

[†]Steel end fitting design offered only in packing gland option since potential rusting and/or corrosion of end fittings can quickly destroy the effectiveness of o-ring seals.

Tube Retainer Spring: Armco 17-7 PH stainless steel, external to fluid stream in oring meters.

Tube Protection: Lucite² safety shield, safety glass enclosure of stainless steel optional.

SCALES

Length: 10 inches

Type: Percentage with factor tag. Direct reading type, on external scale, optional.

MOUNTING

Pipe line mounted is standard

CONNECTIONS

1/2-inch NPTI threaded or ASA flanged

WEIGHT

4 pounds threaded

10 pounds flanged

1. T.M., Union Carbide Corporation

2. T.M., E.I. DuPont de Nemours & Company, Inc.

3. T.M., Durabla Corporation

4. T.M., Amchem Products, Inc.

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.

Nominal Main Line Pipe Size (Inches)	CAPACITY GUIDE - MAXIMUM GPM WATER						
	Inches Water (Wet Differential)						
	25	50	100	150	200	300	400
2	18 - 42	25 - 60	25 - 85	25 - 100	25 - 120	30 - 150	30 - 170
3	20 - 92	25 - 130	30 - 180	35 - 220	40 - 260	50 - 320	60 - 370
4	25 - 157	35 - 220	50 - 310	62 - 380	70 - 450	85 - 550	100 - 620
6	56 - 360	80 - 500	115 - 720	140 - 860	160 - 1000	200 - 1200	260 - 1400
8	100 - 615	140 - 870	200 - 1250	240 - 1500	280 - 1750	340 - 2100	400 - 2500
10	168 - 1000	230 - 1400	300 - 1950	380 - 2400	420 - 2800	510 - 3400	600 - 4000
12	225 - 1400	310 - 2000	390 - 2800	550 - 3400	630 - 4000	770 - 4960	800 - 5500

Note: To obtain flow in scfm of air at stp multiply values in table by 4.1

STANDARD MODELS

Type of Seal	Type of Connection	Type of Enclosure		
		Open	Lucite Safety Shield	Safety Glass
O-ring	Horizontal screwed	10B3575A	10B3565A	10B3535A
	Horizontal flanged	10B3576A	10B3566A	10B3536A
Packing Gland	Horizontal screwed	10B3675A	10B3665A	10B3635A
	Horizontal flanged	10B3676A	10B3666A	10B3636A

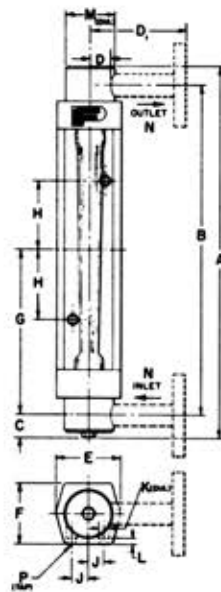
Note: When options are desired, suffix letters S or L are substituted for the letter A in the model number.

DIMENSIONS

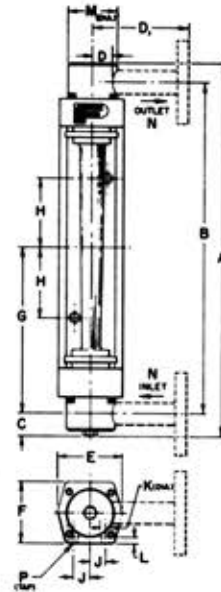
Notes:

1. All dimensions in inches.
2. When facing scale:
Inlet connection faces right, left, front, back.
Outlet connection faces right, left, front, back.
3. All connection flange bolt holes straddle $\frac{1}{2}$ ".

10B3500 SERIES



10B3600 SERIES



A	B	C	D (Screwed)	D ₁ (Flanged)	E	F	G	H	J	K	L	M	N	P
18-1/4	16-1/2	1	2 1/32	3-1/2	2-5/16	2	8-1/4	4-11/16	1/2	3/8	3/16	1-1/2	1/2	1/4 - 20

OPTIONS AND ACCESSORIES

External metal scales (suffix letter S): Graduated metal flow scale mounted adjacent to metering tube.

Illumination (suffix letter L): Standard or explosion-proof lighting fixtures are available for illumination of metering elements from rear of instrument. Illumination is normally only required in poorly lighted areas or when metering semi-opaque fluids.

Orifice plate and flange union: Primary sensing element for main flow line. See Specification 10B/10B9010.

EQUIPMENT DESCRIPTION

The flowmeter shall be a variable-area type meter giving linear indication of mainline flow rate. The metering tube shall be tempered borosilicate glass with a design rating of 600 psig at 200° F. For ease in cleaning of tube and range orifice, tube shall be removable without disassembling meter or removing it from the line. End fittings are to be rotatable through 360°.

The flowmeter shall be a Fischer & Porter Ori-Flowrator meter Series 10B3000.

To complete the EQUIPMENT DESCRIPTION of a specific unit, include data outlined under ORDERING INFORMATION.

ORDERING INFORMATION

Specify:

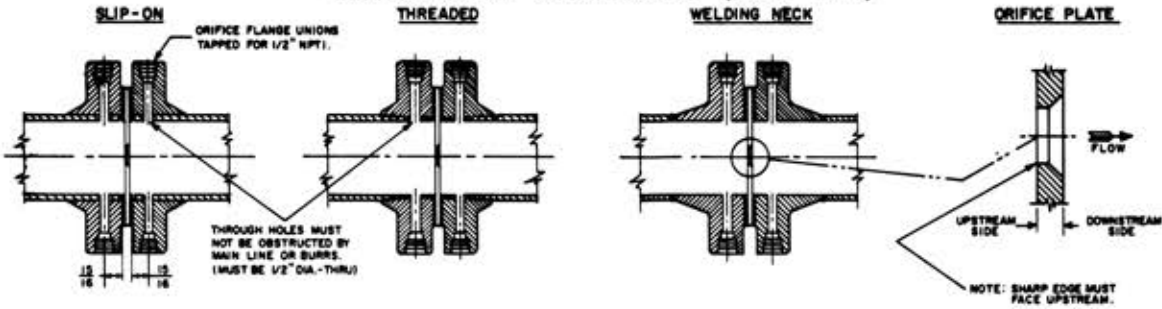
- Model number (see Standard Models)
- Differential range
- Capacity
- Accuracy desired
- Materials of Construction (float and range orifice, end fitting, packing glands or o-rings)
- Options or accessories desired

To expedite order please specify:

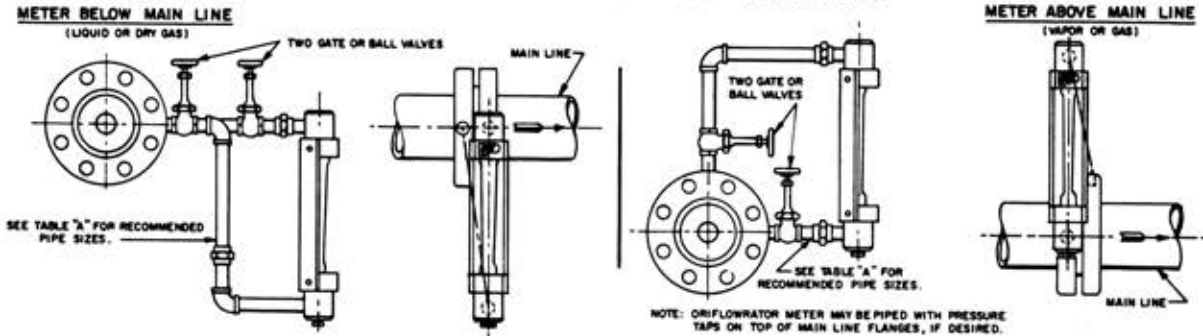
- Your order number
- Quantity desired
- Fluid being measured and operating temperature, pressure, density or specific gravity, and liquid viscosity.
- Type of main line primary sensing element if other than an orifice plate.

TYPICAL INSTALLATIONS

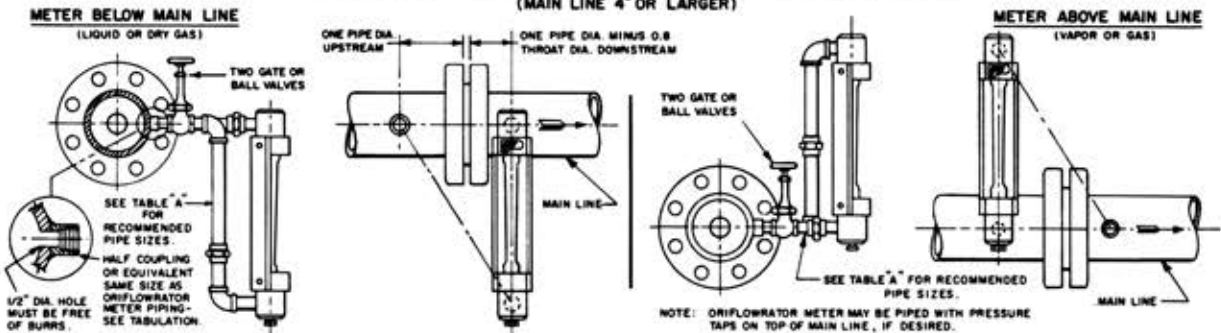
TYPICAL ORIFICE FLANGE UNIONS (A.G.A. STD.)



RECOMMENDED INSTALLATION FOR FLANGE TAPS



RECOMMENDED INSTALLATION FOR VENA CONTRACTA TAPS (MAIN LINE 4" OR LARGER)



NOTES:

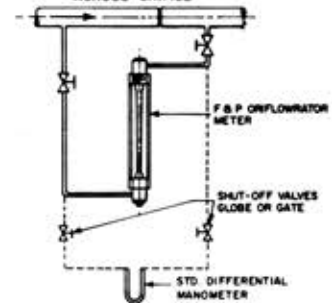
1. USE FLANGE OR VENA CONTRACTA TAPS, PIPE TAPS ARE NOT RECOMMENDED.
2. MEASURE PRESSURE AT THE DOWNSTREAM TAP WHEN REQUIRED. MEASURE TEMPERATURE 3-5 DIAMETERS DOWNSTREAM OR 10-15 DIAMETERS UPSTREAM.
3. WHEN METERING LIQUIDS, PROVIDE AIR VENTS AT THE HIGH POINTS.
4. LAG ORIFLOWRATOR METER PIPING WHEN NECESSARY.

TABLE A

PIPE SIZE	ALLOWABLE EQUIV LENGTH OF ORIFLOWRATOR PIPING	EQUIV PIPE LENGTH OF FITTINGS, FT.		
		90° EL.	45° EL.	VALVE UNION
1/2"	UP TO 10 FEET	1.5	8	.35 .17
3/4"	UP TO 20 FEET	2.0	1.0	.45 .19
1"	UP TO 60 FEET	2.5	1.2	.60 .21

NOTES:
KEEP NUMBER OF FITTINGS TO A MINIMUM.
USE NECESSARY REDUCING FTGS. AT ORIFICE CONNS. & METER PIPE TO BE FREE OF BURRS. FRICTION LOSSES BASED ON SCHEDULE 40 PIPE.

SCHEMATIC ORIFLOWRATOR METER HOOK-UP FOR CHECKING PRESSURE DROP ACROSS ORIFICE



FISCHER & PORTER COMPANY

GENERAL OFFICES: WARMINGTOWN, PENNSYLVANIA, U.S.A.

A world-wide control instrument company with manufacturing plants in Australia, Canada, England, France, West Germany, Italy, Mexico, Netherlands, Puerto Rico, Spain and U.S.A.