

FLOWMETERS



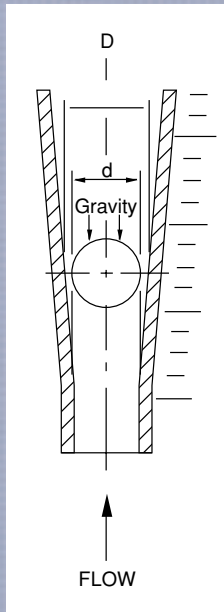
Rotameter Introduction

IMPORTANT INFORMATION ON ROTAMETERS

The Variable-Area type flowmeter, or Rotameter, is one of the most economical and reliable of flow measurement instruments. In various configurations it can be designed to withstand high pressures, corrosive fluids, high temperatures, and is completely independent of factors influencing electronic meters.

They can be calibrated to measure nearly any gas or liquid, because their principles of operation are simple and well understood. The flow indication is obtained from a balance of the fluid forces underneath the float with gravity.

This is done using a uniformly tapered tube, a float whose diameter is nearly identical to the tube ID at the inlet, and a scale to correlate float height. The flow tube is traditionally placed in a vertical position and fluid enters from the bottom, forcing the float up in the tube until a sufficient annular opening exists between the float and tube to allow the total volume of fluid to flow past the float. At this point the float is in an equilibrium position and its height is proportional to the flow rate.



General Correction equations for approximating gas or liquid flow from air or water flow readings.

Corrections for Gas Flow

Gas Flow from Air Flow:

$$q_G^\circ = q_A^\circ \sqrt{\frac{.00120}{p_G^\circ}}$$

Corrections for Temperature and Pressure:

$$q_G' = q_G^\circ \sqrt{\frac{P}{760} \cdot \frac{530}{T}}$$

Corrections for Liquid Flow

Liquid Flow from Water Flow:

$$q_L^\circ = q_w^\circ \sqrt{\frac{p_f - p_L^\circ}{(p_f - 1) p_L^\circ}}$$

Correction for Temperature

(Note: for liquids the effect of pressure is negligible):

$$q_L' = q_w^\circ \sqrt{\frac{p_f}{p_f - 1} \cdot \frac{p_L'}{p_L^\circ} \cdot \frac{p_L'}{p'}}$$

1. Definition of Terms

Standard Conditions – P = 1 ATM T = 70°F

Operating Conditions –

P = Absolute pressure of gas inlet in mm of Hg

T = Absolute temperature in °R = °F + 460

FLOW TERMS

q_A° = std. air flow reading from meter

q_G° = std. gas flow in same units

q_G' = gas flow at P and T with volume corrected to measurement at std. cond.

q_w° = std. water flow reading from meter

q_L° = std. liquid flow in same units

q_L' = liquid flow at T with volume corrected measurement at std. cond.

DENSITY TERMS

p_G° = density of gas in gm/ml at std. cond.

p_L° = density of liquid in gm/ml at std. cond.

p_L' = density of liquid in gm/ml at T

p_f = density of float = 2.53 for glass, 3.98 for ruby, 8.02 for stainless steel, 14.9 for tungsten carbide

VISCOSITY TERMS

μ_G° = viscosity of gas in cp at std. cond.

μ_L° = viscosity of liquid in cp at std. cond.

μ_L' = viscosity of liquid in cp at T



SPECIFIC GRAVITY CORRECTION FACTORS

Gas Meter is Calibrated With	Gas Being Used																
	Hydrogen	Helium	Methane	Ammonia	Neon	Acetylene	Nitrogen / Carbon Monoxide	Ethylene	Air	Ethane	Oxygen	Hydrogen Sulfide	Argone	Nitrous / Carbon Dioxide	Propane	Butane	Sulfur Dioxide
Hydrogen	1	0.70	0.35	0.34	0.32	0.28	0.27	0.27	0.26	0.26	0.25	0.24	0.22	0.21	0.21	0.18	0.18
Helium	1.41	1	0.50	0.48	0.45	0.38	0.38	0.38	0.37	0.36	0.35	0.34	0.32	0.30	0.30	0.26	0.25
Methane	2.82	2	1	0.97	0.89	0.78	0.76	0.75	0.74	0.73	0.71	0.68	0.63	0.60	0.59	0.52	0.49
Ammonia	2.92	2.06	1.03	1	0.92	0.81	0.78	0.78	0.77	0.75	0.73	0.70	0.66	0.62	0.62	0.54	0.51
Neon	3.17	2.25	1.12	1.08	1	0.88	0.85	0.84	0.83	0.82	0.80	0.76	0.71	0.67	0.67	0.58	0.55
Acetylene	3.62	2.56	1.28	1.24	1.14	1	0.97	0.96	0.95	0.93	0.91	0.87	0.81	0.77	0.76	0.66	0.63
Nitrogen / Carbon Monoxide	3.74	2.64	1.32	1.28	1.18	1.03	1	1	0.98	0.96	0.94	0.90	0.84	0.80	0.79	0.68	0.65
Ethylene	3.74	2.66	1.33	1.26	1.18	1.03	1	1	1.01	0.96	0.94	0.90	0.84	0.80	0.79	0.69	0.66
Air	3.61	2.69	1.35	1.30	1.20	1.04	1.02	1.01	1	0.98	0.95	0.92	0.85	0.81	0.80	0.70	0.66
Ethane	3.90	2.76	1.38	1.33	1.23	1.08	1.04	1.04	1.02	1	0.98	0.94	0.88	0.83	0.82	0.71	0.68
Oxygen	4	2.82	1.41	1.36	1.26	1.10	1.06	1.06	1.05	1.02	1	0.95	0.90	0.85	0.84	0.73	0.70
Hydrogen Sulfide	4.15	2.94	1.47	1.42	1.31	1.15	1.11	1.11	1.09	1.06	1.04	1	0.93	0.88	0.88	0.76	0.72
Argon	4.45	3.15	1.58	1.52	1.40	1.23	1.19	1.18	1.17	1.14	1.12	1.07	1	0.94	0.94	0.82	0.78
Nitrous Oxide / Carbon Dioxide	4.70	3.33	1.67	1.61	1.48	1.30	1.26	1.25	1.24	1.21	1.18	1.13	1.06	1	0.99	0.88	0.82
Propane	4.76	3.36	1.68	1.63	1.50	1.31	1.27	1.26	1.25	1.22	1.19	1.15	1.07	1.01	1	0.87	0.83
Butane	5.46	3.66	1.93	1.67	1.72	1.51	1.46	1.45	1.43	1.40	1.37	1.32	1.22	1.16	1.15	1	0.95
Sulfur Dioxide	5.72	4.05	2.03	1.96	1.81	1.58	1.53	1.52	1.50	1.47	1.43	1.38	1.28	1.22	1.20	1.05	1

FLOWMETER PRESSURE CORRECTION

Pressure at Which Meter Was Calibrated – PSIG	Multiply Reading By	Working Pressure of Flowmeter – PSIG																		
		0	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	110	120
0	1	1.15	1.29	1.41	1.53	1.64	1.74	1.84	1.93	2.02	2.1	2.26	2.4	2.47	2.54	2.67	2.8	2.92	3.03	3.14
5	.86	1	1.12	1.23	1.33	1.42	1.51	1.59	1.67	1.74	1.81	1.94	2.07	2.13	2.19	2.31	2.42	2.52	2.62	2.71
10	.77	.89	1	1.1	1.19	1.27	1.35	1.42	1.49	1.56	1.62	1.74	1.85	1.91	1.96	2.06	2.16	2.25	2.33	2.41
15	.7	.81	.91	1	1.08	1.16	1.23	1.3	1.36	1.42	1.48	1.59	1.69	1.74	1.79	1.88	1.97	2.05	2.13	2.21
20	.65	.75	.84	.92	1	1.07	1.14	1.2	1.26	1.31	1.36	1.46	1.56	1.61	1.65	1.74	1.82	1.9	1.97	2.04
25	.61	.7	.78	.86	.93	1	1.06	1.12	1.18	1.23	1.28	1.37	1.46	1.5	1.54	1.62	1.7	1.77	1.84	1.91
30	.57	.66	.74	.81	.88	.94	1	1.05	1.1	1.15	1.2	1.29	1.38	1.42	1.46	1.53	1.6	1.67	1.74	1.8
35	.54	.63	.71	.78	.84	.90	.95	1	1.05	1.1	1.14	1.22	1.3	1.34	1.38	1.46	1.53	1.59	1.65	1.71
40	.52	.6	.67	.74	.8	.85	.9	.95	1	1.04	1.09	1.17	1.25	1.28	1.32	1.39	1.45	1.51	1.57	1.63
45	.5	.57	.64	.71	.76	.81	.86	.91	.96	1	1.04	1.12	1.19	1.23	1.26	1.33	1.39	1.45	1.5	1.56
50	.48	.55	.62	.68	.73	.78	.83	.88	.92	.96	1	1.07	1.15	1.18	1.21	1.28	1.33	1.39	1.44	1.5
60	.44	.51	.57	.63	.68	.73	.77	.82	.86	.89	.93	1	1.06	1.10	1.13	1.19	1.24	1.3	1.35	1.4
75	.4	.47	.52	.58	.62	.67	.71	.75	.78	.82	.85	.91	.97	1	1.03	1.08	1.13	1.18	1.23	1.27
100	.36	.41	.46	.51	.55	.59	.63	.66	.69	.72	.75	.81	.86	.89	.91	.95	1	1.04	1.08	1.12

Laboratory Flowmeters

For technical application questions, contact Barnant at 800-637-3739



- High-accuracy correlated flowmeters – $\pm 2\%$ of reading!
- Wide selection of flow ranges—measure air from 0.02 ml/min to 675 LPM or water from 0.0002 ml/min to 20 LPM
- Excellent chemical compatibility with glass and PTFE construction

Shielded Flowmeters

Use these flowmeters for higher pressure applications. The clear polycarbonate shield adds strength and protects the tube from damage.

Fluid contacts only the borosilicate glass tube, PTFE body, and VITON® fluoroelastomer O-rings. End bushings are polypropylene with PTFE inserts.

Shielded Flowmeters with Valves

Choose these flowmeters for greater control; micrometer capillary valves ensure precise, reproducible measurement and flow control. Shields are clear polycarbonate; valve consists of a precision-bore glass tube for the fluid and a precision-ground rod of PCTFE (PTFE for sizes 4, 5, 14, and 15). The 20-turn micrometer valve can be adjusted from 0.1 to 100% of maximum flow. You can interchange flowtubes among valve assemblies of the same size.

Direct Reading Flowmeters

Read air and water flow directly with these compact meters. Accuracy is $\pm 5\%$ of reading or 2 mm of the scale length, whichever is greater.

Correlated Flowmeters

Extremely accurate . . . $\pm 2\%$ of reading or ± 1 scale division, whichever is greater. Determine flow values for air and water from the computerized calibration table enclosed with each flowmeter. Tables are included. See page 58 to order our flow analysis software to generate flow charts specific to your individual applications.

Product Description

Unshielded Flowmeters

Choose unshielded flowmeters for high purity and corrosion resistance in low-pressure applications. PTFE stops accept taper joints to make quick glass-to-glass connections.

PRODUCT SPECIFICATIONS

Tube size	Float included	Flow rate*		Unshielded flowmeters		Shielded flowmeters			Shielded flowmeters with valves		
		Air (ml/min)	Water (ml/min)	Catalog number	Max psi	Catalog number	Ports NPT(M)	Max psi	Catalog number	Ports NPT(M)	Max psi
10	Glass 316 SS	0.2-90 0.36-160	0.002-1.1 0.004-2.3	GF-2000	15	GF-2060	1/4"	125	GF-9060	1/8"	125
11	Glass 316 SS	1-280 2-500	0.01-4.0 0.02-8.6	GF-2100	15	GF-2160	1/4"	125	GF-9160	1/8"	125
12	Glass 316 SS	20-2100 36-3700	0.4-40 0.86-86	GF-2200	15	GF-2260	1/4"	100	GF-9260	1/8"	100
13	Glass 316 SS	200-14,000 360-25,000	2-300 4-640	GF-2300	15	GF-2360	1/4"	75	GF-9360	1/8"	75
14	Glass 316 SS	1000-36,000 1800-64,000	10-850 21-1820	GF-2400	15	GF-2460	1/2"	60	GF-9460	1/4"	60
15	Glass 316 SS	3000-77,000 5300-137,000	30-1900 64-4100	GF-2500	15	GF-2560	1/2"	50	GF-9560	1/4"	50

Tube size	Float included	Flow rate*		Unshielded flowmeters		Shielded flowmeters			Shielded flowmeters with valves		
		Air (ml/min)	Water (ml/min)	Catalog number	Max psi	Catalog number	Ports NPT	Max psi	Catalog number	Ports NPT	Max psi
Micro	Ruby	0.02-15	0.0002-0.12	GF-3000	15	GF-3060	1/4 (M)	125	GF-9760	1/8 (M)	125
0	Glass 316 SS	0.2-100 0.36-180	0.002-1.1 0.004-2.3	GF-1000	15	GF-1060	1/4 (M)	125	GF-7060	1/8 (M)	125
1	Glass 316 SS	1-280 2-500	0.01-4.0 0.02-8.6	GF-1100	15	GF-1160	1/4 (M)	125	GF-7160	1/8 (M)	125
2	Glass 316 SS	10-1900 20-3400	0.2-36 0.43-77	GF-1200	15	GF-1260	1/4 (M)	100	GF-7260	1/8 (M)	100
3	Glass 316 SS	200-14,000 360-25,000	3-300 6-640	GF-1300	15	GF-1360	1/4 (M)	75	GF-7360	1/8 (M)	75
4	Glass 316 SS	1000-36,000 1800-64,000	10-850 21-1820	GF-1400	15	GF-1460	1/2 (M)	60	GF-7460	1/4 (M)	60
5	Glass 316 SS	3000-77,000 5300-137,000	30-1900 64-4100	GF-1500	15	GF-1560	1/2 (M)	50	GF-7560	1/4 (M)	50
6	Glass 316 SS	25,000-330,000 50,000-675,000	500-8000 1500-20,000	—	—	GF-1660	1/2 (F)	50	—	—	—

NOTE: For pressure drop of each flowmeter, please call our Application Specialists.

*When using stainless steel float, refer to included correlation table for proper reading.

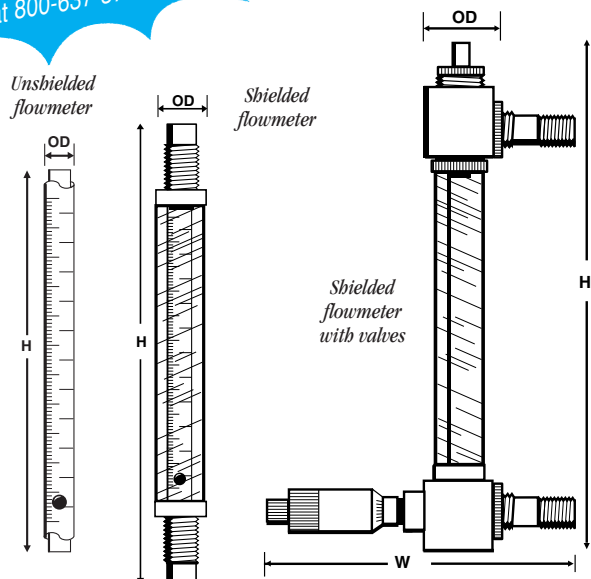
Laboratory Flowmeters

PRODUCT SPECIFICATIONS

	Direct Reading	Correlated
Accuracy:	±5% of reading or 2mm of scale length whichever is greater.	±2% of reading or ±1 scale division, whichever is greater. For micro: ±5% of reading or ±2 scale division (Air); ±10% of reading or ±3 scale division (water).
Repeatability:	±1% of reading or ±0.5 scale division, whichever is greater.	
Turndown Ratio:	Better than 25:1	
Pressure Rating:	See tables, page 56	
Operating Temperatures:	-15°F to 150°F (-26°C to 65°C) at full pressure rating.	
Connections:	Unshielded	Use Taper Joint Adapters—see chart at right
	Shielded	3/8" I.D. tubing on Sizes 0-3, and Micro to 13, 5/8" I.D. tubing on Sizes 4-5, and 14 to 15, or see chart at right for coupling adapters.
	Shielded with Valve	1/8" NPT(M) Sizes 0-3, Micro-13 1/4" NPT(M) Sizes 4-5, 14-15
Shipping Weight:	Unshielded	0.5 lb. (0.3 kg)
	Shielded	1.0 lb. (0.5 kg)
	Shielded with Valve	1.0 lb. (0.5 kg)

TAPER JOINTS AND PTFE COUPLING ADAPTERS		
Cat. No.	Tube Size	Connection
Taper joints for unshielded flowmeters		
GF-1121	Micro., 0, 1, 10, 11	10/30 taper
GF-1221	2 and 12	12/30 taper
GF-1321	3 and 13	14/35 taper
GF-1421	4 and 14	19/38 taper
GF-1521	5 and 15	24/40 taper
PTFE coupling adapters for shielded flowmeters		
GF-4010	Micro., 0, 1, 2, 3, 10, 11, 12, 13	1/4" NPT(F)
GF-4020	4, 5, 14, 15	1/2" NPT(F)

For technical application questions, contact Barnant at 800-637-3739



MATERIALS OF CONSTRUCTION

Borosilicate glass	Flowtube
Glass/316 SS (Ruby-micro size only)	Floats
PTFE	End blocks/stops
PTFE	Inlet/Outlet
Polycarbonate	Shield
Polypropylene	Shield ends
PTFE, PCTFE, Glass	Valve
Viton®	O-rings

DIMENSIONS

Tube Sizes	Unshielded (H x OD)	Dimensions Shielded (H x OD)	Shielded with valves (H x W' x OD)
Micro	5-1/8" x 5/16"	8" x 1"	8-7/8" x 6" x 15/16"
0, 1, 2	7-1/2" x 5/16"	10-1/4" x 1"	11" x 6" x 15/16"
3	7-1/2" x 7/16"	10-1/4" x 1"	11" x 6" x 15/16"
4	9" x 11/16"	13-1/4" x 11/2"	14-1/2" x 7" x 1-15/16"
5	9" x 15/16"	13-1/4" x 11/2"	14-1/2" x 7" x 1-15/16"
6	—	15-7/8" x 13/4"	—
10, 11, 12	5-1/8" x 5/16"	8" x 1"	8-7/8" x 6" x 15/16"
13	5-1/8" x 7/16"	8" x 1"	8-7/8" x 6" x 15/16"
14	5-1/2" x 11/16"	9-3/4" x 11/2"	11" x 7" x 1-15/16"
15	5-1/2" x 15/16"	9-3/4" x 11/2"	11" x 7" x 1-15/16"

*Width is from terminal end of valve to inlet adapter.

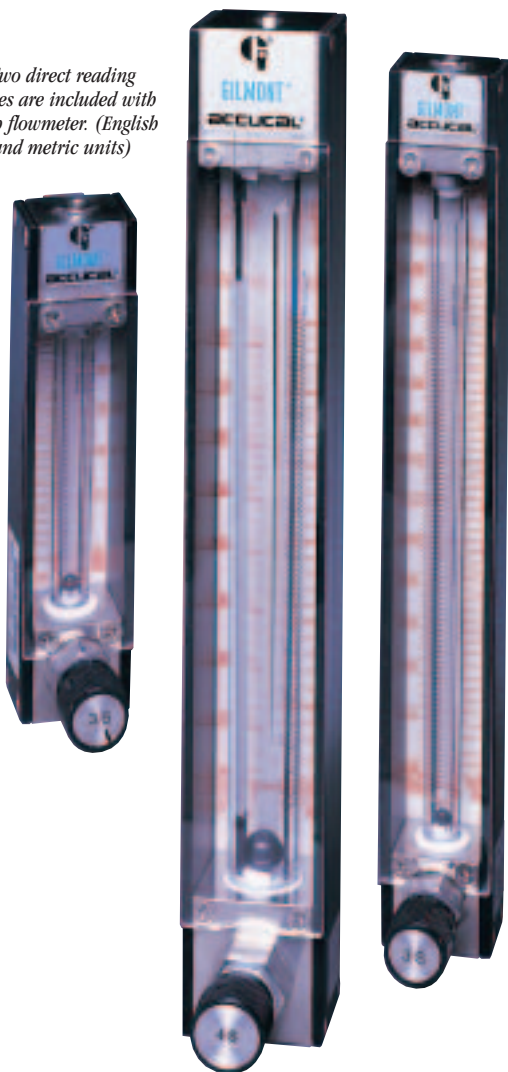
- GF-4004** Flowmeter stand kit. Includes one base, one rod, and two mounting clamps
- GF-4001** Flowmeter base
- GF-4002** Rod, 18"L
- GF-4003** Mounting clamp. Includes wood screws

Flowmeter Stand Kit and Components

The flowmeter stand kit contains everything you need to mount your GILMONT® flowmeter on a stand, a benchtop, or a wall. The base is machined from rugged aluminum. A built-in "bubble level" ensures that the base is level for maximum accuracy. Configure base to accept three rod and clamp assemblies for unshielded or shielded flowmeters. Mount valved flowmeters directly—base accepts two large flowmeters (size 4, 5, 14, or 15) or three of the smaller flowmeters. Mounting clamps hold flowmeters firmly in place without obstructing your view of the flowmeter scale or damaging the flowtube or shield. Clamps are L-shaped with mounting holes bored into them for mounting flowmeters to a wall or panel (wood screws included).

Gilmont® Accucal® Flowmeters

Two direct reading scales are included with each flowmeter. (English and metric units)



These flowmeters can be mounted on a panel or base.

For technical application questions, contact Barnant at 800-637-3739

Accessories

GF-4001 Flowmeter Base is made of rugged aluminum. Mount flowmeters directly—base accepts three flowmeters. Built-in bubble level.

GF-4000 Flowrate Analysis Software makes flow analysis simple. You can produce flow rate tables and custom scales based on your temperature, pressure, viscosity and density conditions; float material; and the gas or liquid being measured.

- Correlated and direct reading all in one easy-to-read meter
- Accuracy up to $\pm 2\%$ of reading!
- Interchangeable scales—customize your application
- Extremely low pressure drops—ideal for procedures with critical pressure values

Correlated and Direct Reading in one easy to use flowmeter. Each meter includes correlation charts for air and water and two direct-reading scales—an air scale and a water scale. Easily change between correlated and direct-reading scales depending on your application. Meters are available in 65mm and 150mm scale lengths.

Each direct-reading scale indicates flow rates in metric and English units, for both glass and stainless steel floats under standard operating conditions. Use the new GF-4000 software to create your own custom scales.

Excellent Accuracy is achieved with our second-generation correlation techniques and the factory calibration of the tube. Accuracy can be expressed as a percent of reading—not of full-scale! With correlated use, accuracy is $\pm 2\%$ of reading or $\pm 1\%$ scale division, whichever is greater. With direct-reading use, ± 2 divisions accuracy is $\pm 5\%$ of reading or ± 3 mm on scale, whichever is greater. All flowtubes have serial numbers for traceability to calibration, accuracy, and manufacturing data.

Quality Industrial Design ensures use in most tough applications. The clear polycarbonate front shield provides a 90° view of the scales on the stainless meters.

Meters are designed for easy flowtube exchange or replacement. The end stop has a large diameter to let you center the flowtube quickly and more accurately than most flowmeters. All flowtubes are interchangeable within the same frame size. Call our Application Specialist to order a replacement flowtube or to upgrade your unit.

Mount flowmeters on a panel or on our flowmeter base (see below). Invert frame for vacuum applications or when back pressure compensation is required.

Advanced Metering Valves are available with GILMONT® flowmeters. The shallow taper design gives you linear control over 80% of the usable range. Valves are 14-turn.

Float	Max flow rate (ml/min)		Tube size	65mm, 303 stainless steel flowmeters	
	Air	H ₂ O		Without valves Cat. no.	With precision valves Cat. no.
Glass	95	1.1	100	GF-6340-1100	GF-6341-1100
SS	230	4.9			
Glass	280	3.9	110	GF-6340-1110	GF-6341-1110
SS	620	15			
Glass	1000	17	115	GF-6340-1115	GF-6341-1115
SS	2000	55			
Glass	2200	43	120	GF-6340-1120	GF-6341-1120
SS	4200	120			
Glass	6500	140	125	GF-6340-1125	GF-6341-1125
SS	12,000	360			
Glass	14,000	320	130	GF-4340-1130	GF-4341-1130
SS	25,000	800			
Glass	25,000	590	135	GF-4340-1135	GF-4341-1135
SS	46,000	1400			

NOTE: For pressure drop of each flowmeter, please call our Application Specialists.



Gilmont® Accucal® Flowmeters

PRODUCT SPECIFICATIONS

Accuracy: The greater of $\pm 2\%$ of reading or ± 1 division (correlated use); the greater of $\pm 5\%$ of reading ± 2 division of scale (direct reading use)

Repeatability: $\pm 1\%$ of reading or ± 0.5 scale division, whichever is greater

Turn-Down Ratio: Better than 25:1

Maximum Pressure: 200 psig at 250°F

Maximum Operating Temperature: 250°F (121°C)

Connections: 1/4" NPT(F) for 240 and 250 tube sizes; 1/8 NPT(F) for all others

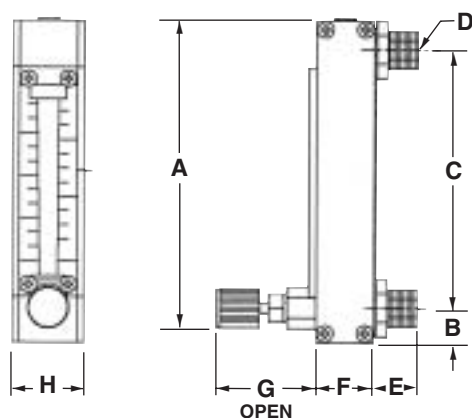
Shipping Weight: 65mm flowmeters: 1 lb (0.5 kg)
150mm flowmeters: 2 lb (1.0kg)

MATERIALS OF CONSTRUCTION

Flowmeter Type	Flowtube	Floats	End Blocks	Inlet/Outlet Connections	Valve	O-rings
303 SS	Borosilicate glass	Glass/316 SS	303 SS	303 SS	PCTFE/PTFE (303 SS PCTFE/PTFE for tube sizes 240 and 250)	Viton®

Mount these flowmeters on a panel or base.

*Other Floats/materials available. Call our application specialists for details.



Flowmeter base GF-4001



DIMENSIONS

Flowmeter	Dimensions - inches (mm)							
	A	B	C	D	E	F	G	H
65 mm scale (all tube sizes)	5.65 (143.5)	0.60 (15.2)	4.50 (114.3)	1/8 - 27 NPT	0.78 (19.8)	1.00 (25.4)	1.75 (44.4)	1.25 (31.7)
150 mm scale (200-235 tubes)	10.02 (254.5)	0.60 (15.2)	8.81 (223.8)	1/8 - 27 NPT	0.78 (19.8)	1.00 (25.4)	1.75 (44.4)	1.25 (31.7)
150 mm scale (240-250 tubes)	12.64 (321.1)	0.79 (20.1)	11.00 (279.4)	1/8 - 27 NPT	0.95 (24.1)	1.50 (38.1)	2.13 (54.1)	1.75 (44.4)

Float	Max flow rate (ml/min)		Tube size	150-mm, 303 stainless steel flowmeters	
	Air	H ₂ O		Without valves	With precision valves
				Cat. no.	Cat. no.
Glass	95	1.1	200	GF-6540-1200	GF-6541-1200
	230	4.9			
Glass	280	3.9	210	GF-6540-1210	GF-6541-1210
	620	15			
Glass	1000	17	215	GF-6540-1215	GF-6541-1215
	2000	55			
Glass	2200	43	220	GF-6540-1220	GF-6541-1220
	4200	120			
Glass	6500	140	225	GF-6540-1225	GF-6541-1225
	12,000	360			
Glass	14,000	320	230	GF-6540-1230	GF-6541-1230
	25,000	800			
Glass	25,000	590	235	GF-6540-1235	GF-6541-1235
	46,000	1400			
Glass	40,000	960	240	GF-6540-1240	GF-6541-1240
	73,000	2200			
Glass	85,000	2000	250	GF-6540-1250	GF-6541-1250
	150,000	4700			



Industrial Flowmeters

	Max Flow SML / min		NO VALVE			STANDARD VALVE Flowmeters are supplied with an 8-turn metering valve.			HIGH ACCURACY VALVE 16-turn metering valve is supplied.		
	Air	WATER	ALUMINUM	BRASS	STAINLESS STEEL	ALUMINUM	BRASS	STAINLESS STEEL	ALUMINUM	BRASS	STAINLESS STEEL
65 mm Calibrated	8.1 - 145	0.1 - 2.4	GF-8320-1001	GF-8330-1001	GF-8340-1001	GF-8321-1001	GF-8331-1001	GF-8341-1001			
	30.2 - 298	0.46 - 7.7	GF-8320-1002	GF-8330-1002	GF-8340-1002	GF-8321-1002	GF-8331-1002	GF-8341-1002			
	45 - 522	0.8 - 12	GF-8320-1101	GF-8330-1101	GF-8340-1101	GF-8321-1101	GF-8331-1101	GF-8341-1101			
	28 - 1249	0.6 - 27	GF-8320-1201	GF-8330-1201	GF-8340-1201	GF-8321-1201	GF-8331-1201	GF-8341-1201			
	90 - 2520	3.7 - 71	GF-8320-1202	GF-8330-1202	GF-8340-1202	GF-8321-1202	GF-8331-1202	GF-8341-1202			
	845 - 6318	4 - 147	GF-8320-1401	GF-8330-1401	GF-8340-1401	GF-8321-1401	GF-8331-1401	GF-8341-1401			
	1973 - 12058	42 - 364	GF-8320-1402	GF-8330-1402	GF-8340-1402	GF-8321-1402	GF-8331-1402	GF-8341-1402			
	2272 - 24680	127 - 745	GF-8320-1501	GF-8330-1501	GF-8340-1501	GF-8321-1501	GF-8331-1501	GF-8341-1501			
6082 - 58500	176 - 1866	GF-8320-1502	GF-8330-1502	GF-8340-1502	GF-8321-1502	GF-8331-1502	GF-8341-1502				
65 mm Direct Reading	5 - 100		GF-8320-2009	GF-8330-2009	GF-8340-2009	GF-8321-2009	GF-8331-2009	GF-8341-2009			
	20 - 250		GF-8320-2010	GF-8330-2010	GF-8340-2010	GF-8321-2010	GF-8331-2010	GF-8341-2010			
	20 - 500		GF-8320-2109	GF-8330-2109	GF-8340-2109	GF-8321-2109	GF-8331-2109	GF-8341-2109			
	100 - 1000		GF-8320-2110	GF-8330-2110	GF-8340-2110	GF-8321-2110	GF-8331-2110	GF-8341-2110			
	500 - 10000		GF-8320-2410	GF-8330-2410	GF-8340-2410	GF-8321-2410	GF-8331-2410	GF-8341-2410			
	2000 - 40000		GF-8320-2510	GF-8330-2510	GF-8340-2510	GF-8321-2510	GF-8331-2510	GF-8341-2510			
		0.025 - 0.5	GF-8320-2004	GF-8321-2004	GF-8330-2004	GF-8331-2004	GF-8340-2004	GF-8341-2004			
		0.4 - 6	GF-8320-2014	GF-8330-2014	GF-8340-2014	GF-8321-2014	GF-8331-2014	GF-8341-2014			
		1 - 25	GF-8320-2114	GF-8330-2114	GF-8340-2114	GF-8321-2114	GF-8331-2114	GF-8341-2114			
		5 - 60	GF-8320-2214	GF-8330-2214	GF-8340-2214	GF-8321-2214	GF-8331-2214	GF-8341-2214			
	20 - 250	GF-8320-2414	GF-8330-2414	GF-8340-2414	GF-8321-2414	GF-8331-2414	GF-8341-2414				
	100 - 1500	GF-8320-2516	GF-8330-2516	GF-8340-2516	GF-8321-2516	GF-8331-2516	GF-8341-2516				
150 mm Calibrated	8.1 - 140	0.12 - 2.34	GF-8520-1100	GF-8530-1100	GF-8540-1100	GF-8521-1100	GF-8531-1100	GF-8541-1100	GF-8522-1100	GF-8532-1100	GF-8542-1100
	33 - 264	0.28 - 4.7	GF-8520-1200	GF-8530-1200	GF-8540-1200	GF-8521-1200	GF-8531-1200	GF-8541-1200	GF-8522-1200	GF-8532-1200	GF-8542-1200
	70 - 825	0.8 - 16	GF-8520-1300	GF-8530-1300	GF-8540-1300	GF-8521-1300	GF-8531-1300	GF-8541-1300	GF-8522-1300	GF-8532-1300	GF-8542-1300
	201 - 1682	3.5 - 46	GF-8520-1406	GF-8530-1406	GF-8540-1406	GF-8521-1406	GF-8531-1406	GF-8541-1406	GF-8522-1406	GF-8532-1406	GF-8542-1406
	480 - 4562	5.4 - 133	GF-8520-1500	GF-8530-1500	GF-8540-1500	GF-8521-1500	GF-8531-1500	GF-8541-1500	GF-8522-1500	GF-8532-1500	GF-8542-1500
	288 - 7590	6 - 217	GF-8520-1606	GF-8530-1606	GF-8540-1606	GF-8521-1606	GF-8531-1606	GF-8541-1606	GF-8522-1606	GF-8532-1606	GF-8542-1606
	462 - 22536	15 - 541	GF-8520-1700	GF-8530-1700	GF-8540-1700	GF-8521-1700	GF-8531-1700	GF-8541-1700	GF-8522-1700	GF-8532-1700	GF-8542-1700
	3542 - 59494	103 - 1881	GF-8520-1800	GF-8530-1800	GF-8540-1800	GF-8521-1800	GF-8531-1800	GF-8541-1800	GF-8522-1800	GF-8532-1800	GF-8542-1800
150 mm Direct Reading	1 - 100		GF-8520-2117	GF-8530-2117	GF-8540-2117	GF-8521-2117	GF-8531-2117	GF-8541-2117	GF-8522-2117	GF-8532-2117	GF-8542-2117
	20 - 200		GF-8520-2217	GF-8530-2217	GF-8540-2217	GF-8521-2217	GF-8531-2217	GF-8541-2217	GF-8522-2217	GF-8532-2217	GF-8542-2217
	50 - 800		GF-8520-2317	GF-8530-2317	GF-8540-2317	GF-8521-2317	GF-8531-2317	GF-8541-2317	GF-8522-2317	GF-8532-2317	GF-8542-2317
	200 - 2500		GF-8520-2417	GF-8530-2417	GF-8540-2417	GF-8521-2417	GF-8531-2417	GF-8541-2417	GF-8522-2417	GF-8532-2417	GF-8542-2417
	400 - 4800		GF-8520-2517	GF-8530-2517	GF-8540-2517	GF-8521-2517	GF-8531-2517	GF-8541-2517	GF-8522-2517	GF-8532-2517	GF-8542-2517
	800 - 10000		GF-8520-2617	GF-8530-2617	GF-8540-2617	GF-8521-2617	GF-8531-2617	GF-8541-2617	GF-8522-2617	GF-8532-2617	GF-8542-2617
	1000 - 23000		GF-8520-2717	GF-8530-2717	GF-8540-2717	GF-8521-2717	GF-8531-2717	GF-8541-2717	GF-8522-2717	GF-8532-2717	GF-8542-2717
	5000 - 60000		GF-8520-2817	GF-8530-2817	GF-8540-2817	GF-8521-2817	GF-8531-2817	GF-8541-2817	GF-8522-2817	GF-8532-2817	GF-8542-2817
		0.5 - 10	GF-8520-2227	GF-8530-2227	GF-8540-2227	GF-8521-2227	GF-8531-2227	GF-8541-2227	GF-8522-2227	GF-8532-2227	GF-8542-2227
		1 - 20	GF-8520-2327	GF-8530-2327	GF-8540-2327	GF-8521-2327	GF-8531-2327	GF-8541-2327	GF-8522-2327	GF-8532-2327	GF-8542-2327
		1 - 50	GF-8520-2427	GF-8530-2427	GF-8540-2427	GF-8521-2427	GF-8531-2427	GF-8541-2427	GF-8522-2427	GF-8532-2427	GF-8542-2427
		10 - 200	GF-8520-2627	GF-8530-2627	GF-8540-2627	GF-8521-2627	GF-8531-2627	GF-8541-2627	GF-8522-2627	GF-8532-2627	GF-8542-2627
	20 - 500	GF-8520-2727	GF-8530-2727	GF-8540-2727	GF-8521-2727	GF-8531-2727	GF-8541-2727	GF-8522-2727	GF-8532-2727	GF-8542-2727	
	150 - 1200	GF-8520-2827	GF-8530-2827	GF-8540-2827	GF-8521-2827	GF-8531-2827	GF-8541-2827	GF-8522-2827	GF-8532-2827	GF-8542-2827	