

OMEGA® ROTAMETERS

COMPACT, UNSHIELDED

Conversion charts supplied with air and water flows for all floats versus glass with corresponding pressure drops

- Maintain concept of correlation for other fluids
- Simple construction permits interchangeability of plain ends with joints

These economical Omega rotameters are recommended when the maximum precision of the High Accuracy Flowmeters is not required. They are the best combination of acceptable accuracy and low price. With direct reading scales of 100 mm in length, they are accurate to ±5% or ±2 mm of scale length (whichever is the greater).

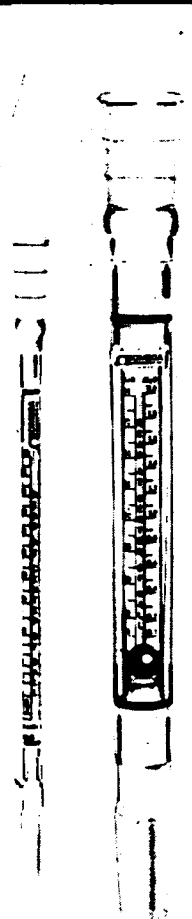
This accuracy for a direct reading meter is achieved by maintaining close tolerances of the precision bore tubes and selectivity of high precision ground glass spheres. These close tolerances permit exceptionally high flow ranges using only a single ball in each tube. On the size 10 meter the scale is mostly exponential with a remarkable range of over 500 to 1 on the water scale!

These new meters are manufactured with the same degree of care as our high precision units and have the following features:

- Stainless steel float provided on every size to increase range
- Specially designed Teflon® stops that can be used with or without joints.
- Permanent ceramic scales and white background for easy reading.
- Fluid comes in contact with only glass and Teflon.
- Precision-bore ends combined with stops to simplify disassembly and cleaning.
- Standard taper joints that may be purchased separately and added at any time.
- Supplied with chart to convert scale readings to correlate with fluids other than water or air.
- Available with plastic shields (see Shielded Compact Flowmeters).

NOTE: Extremely dry gases, at low flows, may cause erratic readings due to electrostatic charge build-up.

* T.M. DuPont



FL-200 FL-205

Shown with respective joint sets attached.

DIRECTIONS

The direct reading scales are for either air or water flowing and measured at the standard conditions of 1 atmosphere and 70°F. Each scale is appropriately marked and instructions on the tube indicate that readings are to be taken at the center of the ball. Note that on sizes 13-15, the scale figures are given in liters/minute.

To obtain accurate readings the ball and tube must be scrupulously clean, especially for the smaller sizes. When cleaning the meter care should be exercised not to lose the ball; however, replacement balls have been selected to maintain specified degree of accuracy. In replacing the clean ball avoid contact with the fingers, especially with size No. 10. The use of a clean slip of paper will be found convenient in performing this operation as follows: with the ball resting on the paper and the lower stop in place on the tube, place the open top of the tube vertically over the ball and simultaneously invert the tube with the paper held in place—then insert the top stop and the tube is ready for use.

When combined with the joints, extreme care should be exercised in disassembly since the stops will remain in the joint. Thus, disconnect the top joint first, and carefully roll the ball onto a suitable surface by inverting the tube. When used with joint sets, it is recommended especially on the smaller sizes, that short lengths of flexible tubing (such as Tygon or Teflon) be used on each end to hold the joint securely to the flowmeter.

For the transitional region between the linear and exponential scales, an average value based on the combined values from each set of equations may be used as a fair approximation; however, when more accurate results are required, the correlation method described for the High Accuracy Flowmeters is recommended. This procedure is also recommended for any part of the scale when maximum accuracy is desired. See Computerized Flow Tables Brochure.

The chart supplied with each meter enables one to convert flow readings directly to values of the diameter ratio, R, required for the correlation. Correlated values should be multiplied by an additional Correction factor of (1-R/100), and by (1-R/250) for No. 12. For gas flows see page 8 (No. 11 is same as 1 and No. 13 same as 3).

APPROXIMATE CORRECTION FOR GAS FLOW

Linear Range Exponential Range†††

Gas flow from Air flow

$$q'_c = q'_a \sqrt{\frac{0.0120}{\rho'_g}} \quad q'_c = q'_a \frac{0.181}{\rho'_g}$$

Correction for temperature and pressure

$$q'_c = q'_c \sqrt{\frac{P}{760} \frac{530}{T}} \quad q'_c = q'_c \frac{P}{760} \left[\frac{530}{T} \right]^{1.5}$$

where, q'_a = std. air flow as read from meter

q'_c = std. gas flow in same units

ρ'_g = density of gas in gms/ml at std. cond.

μ'_g = viscosity of gas in centipoises at std. cond.

q'_c = gas flowing at P and T, but volume reduced to measurement at std. cond.

P = absolute pressure in mm. of Hg.

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

APPROXIMATE CORRECTION FOR LIQUID FLOW

Linear Range Exponential Range

Liquid flow from Water flow

$$q'_l = q'_w \sqrt{\frac{2.53 - \rho'_l}{1.53 \rho'_l}} \quad q'_l = q'_w \frac{2.53 - \rho'_l}{1.53 \rho'_l}$$

Correction for temperature

$$q'_l = q'_l \sqrt{\frac{2.53 - \rho'_l}{2.53 - \rho'_l} \frac{\mu'_l}{\mu'_l}} \quad q'_l = q'_l \frac{2.53 - \rho'_l}{2.53 - \rho'_l} \frac{\mu'_l}{\mu'_l}$$

For liquids, the effect of pressure is negligible.

where, q'_w = std. water flow as read from meter

q'_l = std. liquid flow in same units

ρ'_l = density of liquid in gms/ml at std. temp.

ρ'_l = density of liquid in gms/ml at temp. T

μ'_l = viscosity of liquid in centipoises (cp) at std. temp.

μ'_l = viscosity of liquid in cp at temp. T

q'_l = liquid flowing at temperature T, but volume reduced to measurement at std. temp.

*NOTE: For Liquid Flow, the above corrections are for the glass ball only. With the S.S. ball, change 2.53 to 8.02 and 1.53 to 7.02 to account for the change in float density; similarly, for Tungsten Carbide use 14.9 and 13.9 respectively.

COMPACT FLOWMETER, PLAIN ENDS

RANGES ml/mm††

SIZE	AIR	WATER	CAT. NO.	FLOAT DIAM. "	TUBE O.D. "	TUBE LENGTH "	— S	CAT. NO.
10	0.2-90	.002-1.1	FL-200	.0469	5/16	5%	10/30	FL-J1
11	1-280	.01-4.0	FL-201	.0625	5/16	5%	10/30	FL-J1
12	20-2100	0.4-40	FL-202	.125	5/16	5%	12/30	FL-J2
13	200-14,000	2-300	FL-203	.250	7/16	5%	14/35	FL-J3
14	1000-36,000	10-850	FL-204	.375	11/16	5%	19/38	FL-J4
15	3000-77,000	30-1900	FL-205	.500	15/16	5%	24/40	FL-J5

SET OF JOINTS†

†Consists of one inner and outer joint plus two O-Rings

††Flow ranges stated above may be extended by factors or from 2 to 3 by using heavier floats. See Spare Parts List.

SPARE PARTS LIST

Approximate Multiplying Factor for Floats	Description & (ρ _f)	SIZE NO.		10		11		12		13		14		15	
		Cat. No.	F-2004	Cat. No.	F-1104	Cat. No.	F-1204	Cat. No.	F-1304	Cat. No.	F-1404	Cat. No.	F-1504		
	Teflon Stop, Top	F-2005	F-1105	F-1205	F-1305	F-1405	F-1505								
	Teflon Stop, Bottom	F-2031	F-1131	F-1231	F-1331	F-1431	F-1531								
	Flowmeter Tube	F-2032	F-1132	F-1232	F-1332	F-1432	F-1532								
1	Float, Glass (2.53)	F-2032-S	F-1132-S	F-1232-S	F-1332-S	F-1432-S	F-1532-S								
1.78	Float, 316 S.S. (8.02)														
2.56	Float, Tantalum (16.6)														
2.43	Float, Tungsten C. (14.9)	F-2032-TC										F-1432-TC		F-1532-TC	