cleanwater1

Flow Measurement Equipment
Glass Tube Varea-Meter® Units

Features

Rugged, One-Piece Enclosure
The welded, deep-formed frame is heavy gauge 302 stainless steel. It protects tube alignment from pipe strain and makes for easy assembly with minimum number of parts.

Positive Tube Seating, Easy Tube Removal
An external clamp locks the tube in place. An O-ring gasketed tube retainer gives positive tube, seating, and sealing (yet tube removal is quick and easy). The clamp is loosened, and the tube lifted out. There is no spring in the flow stream to foul or corrode. O-rings are the same size, minimizing the number of wearable spares.

Convenient to Connect
Horizontal end fittings rotate through 360 degrees. Piping can be brought in from any direction. End fittings for vertical connection are available also.

Size for Size, Greater Capacity, Less Cost
Varea-Meter® floats have their metering discs between the upper and lower bodies. The resultant short lower body permits greater pressure recovery and restricts flow less than other designs. This float design allows tubes to be made with a taper that gives low pressure drop plus high capacity for the tube, and size. Often a smaller Varea-Meter® unit can be specified for a given capacity at less cost.

Convenient Capacity Change
All viscosity-immune floats for any given-size tube have similar characteristic flow curves. Thus, capacity can usually be changed by changing the float only. The same percentage flow scale may be used and the meter will not lose its inherent accuracy of 2% of full scale.

Key Benefits

- *Protects your investment with a longer lifespan than other meters.*
- *Easily installed in any piping system.*
- *Reliable long term performance in gas or liquid service.*
- *Highly accurate and stable readings for precise measurement and control.*
- *Reduced maintenance costs compared to other meters.*

Glass Tube Varea-Meter® Flow Measurement Unit

Technical Data

Accuracy
2% of full scale.

Capacity
0.24to 69 GPM water or 1.0 to 281 SCFM air.

Range
10 to 1.

Pressure-temperature rating
350 psi and 200°F maximum (See chart on page 3).

Tubes
3/8 to 1-1/2-inch sizes are beaded types. Made of high quality borosilicate glass to very close tolerances.

Scales
Meters with 5 or 10-inch scales available. The detached scales are aluminum with etched white graduations on black background.

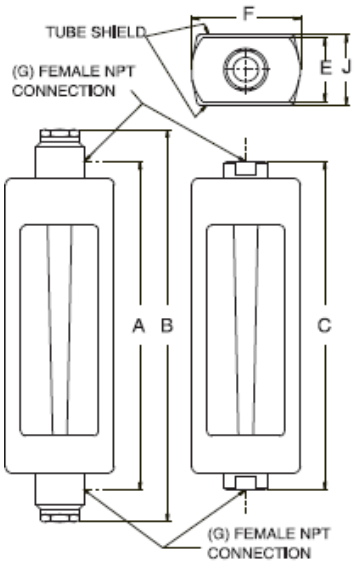
Scale Units
Percent is standard. GPM water, SCFM air, or specific unit graduations are also available.

End Fittings
For vertical or horizontal connection. Both types available with screwed connections.

Enclosure
The enclosure is a welded one-piece heavy gauge, 302 stainless steel. Standard front and rear tube shields have clear polycarbonate windows and stainless-steel bezels.

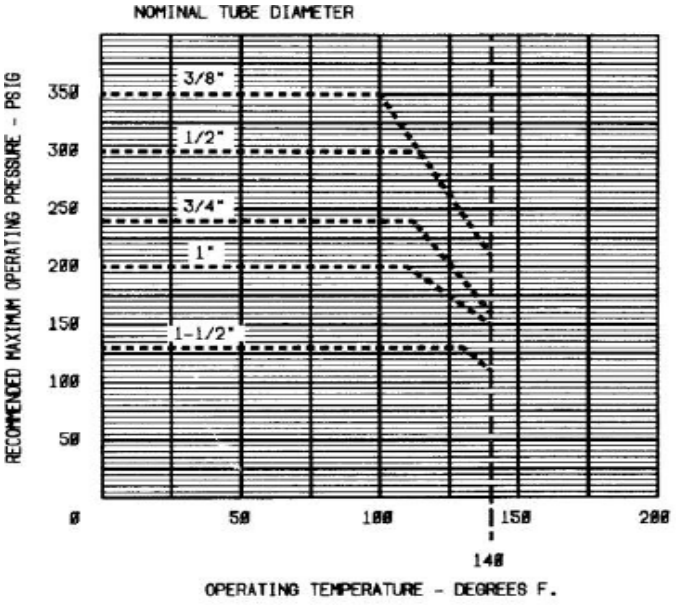
Mounting
May be pipeline mounted with vertical or horizontal connections. Optional bezels for flush panel mounting.

Glass Tube Varea-Meter® Units with Screwed End Fittings

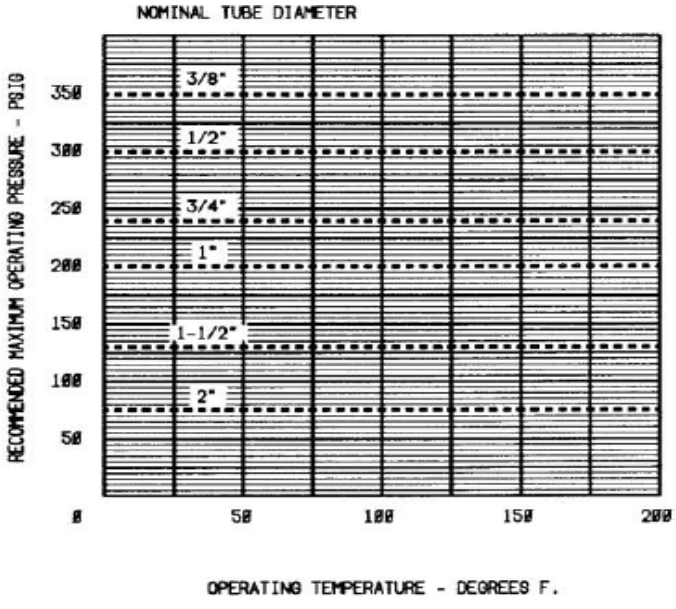


Screwed

Tube size	Scale length	A (Horiz)	B (Horiz)	C (vertical) Screwed	E	F	G	J
3/8"	5"	11½" (292)	14 3/8" (365)	12 3/8" (314)	2½" (64)	3¾" (95)	½" (13)	3⅛" (79)
	10"	16½" (419)	19 3/8" (492)	17 3/8" (441)				
½"	5"	11½" (292)	14 3/8" (365)	12 3/8" (314)	2 ½" (64)	3¾" (95)	½" (13)	3⅛" (79)
	10"	16 ½" (419)	19 3/8" (492)	17 3/8" (441)				
¾"	5"	12½" (318)	15 5/8" (397)	12½" (318)	2½" (64)	3 ½" (13)	¾" (19)	3⅛" (79)
	10"	17½" (445)	20 5/8" (524)	17½" (445)				
1"	5"	12½" (318)	16" (406)	12½" (318)	3¼" (83)	4¾" (121)	1" (25)	4 3/16" (106)
	10"	17½" (445)	21" (533)	17½" (445)				
1½"	5"	15½" (394)	18½" (470)	15½" (394)	4¼" (108)	5¾" (146)	1½" (38)	5½" (140)
	10"	20½" (521)	23½" (597)	20½" (521)				



PVC End Fittings



Stainless Steel End Fittings

Liquid Service

Selection Procedure

Determine the capacity range, temperature and pressure capability, materials of construction, and options required for each meter. (See Pg. 3)

From chemical supplier determine float material. If the liquid is other than water, the desired units are other than GPM, its flow rate must be converted to GPM water (Equivalent Flow Rate).

How to Determine Water Equivalent

For liquids with viscosities greater than viscosity ceiling table 1, pages 6 and 7, consult distributor. For liquids with specific gravities other than 1, follow the formula to determine Equivalent Flow Rate Q_E in GPM

Equivalent		Desired		Correction
Flow Rate	=	Flow Rate	x	Factors
Q_E GPM	=	Q_D	x	$F_E \times F_U$

1. From Table A determine F_E from Specific Gravity Correction factors.
2. From Table B determine F_U from Unit Conversion factors.
3. Work formula to obtain Equivalent Flow Rate (Q_E).

Table A

Liquid Specific Gravity Correction F_E

Specific Gravity	Float Material F_E 316 Stainless Steel
0.50	0.682
0.55	0.718
0.60	0.753
0.65	0.786
.070	0.818
0.75	0.851
0.80	0.882
0.85	0.912
0.90	0.941
0.95	0.971
1.00	1.000
1.05	1.026
1.10	1.055
1.15	1.083
1.20	1.110
1.25	1.137

Specific Gravity	Float Material F_E 316 Stainless Steel
1.30	1.164
1.35	1.192
1.40	1.218
1.45	1.244
1.50	1.271
1.55	1.296
1.60	1.323
1.65	1.347
1.70	1.374
1.75	1.400
1.80	1.426
1.85	1.450
1.90	1.475
1.95	1.503
2.00	1.527

To determine F_E for specific gravities not shown in Table A use liquid specific gravity correction equation.

Table B

Unit Conversion F_U

Imp gal/min	**X**	**1.201**	**=**	**GAL/MIN**
Ltr/min	**X**	**0.2642**	**=**	**GAL/MIN**
Lbs/min	**X**	**0.1198 ÷ S_L**	**=**	**GAL/MIN**
Kilograms/min	**X**	**S_L 0.2641 ÷**	**=**	**GAL/MIN**

Liquid Specific Gravity Correction Equation

$$F_E = \sqrt{\frac{6.96 \times S_L}{S_F - S_L}}$$

F_E = Equivalence factor
S_L = Specific gravity of liquid
S_F = Specific gravity of float

SPECIFIC GRAVITY OF FLOAT (S_F)
316SS = 7.96

Ordering Procedure 10” Glass Tube Gas or Liquid Service

Example: To order a 1” Glass tube meter with 10” scale length, 316 SS float, NPT Vertical In/Out 316 stainless steel end fittings, Kynar® retainers, Buna O-rings, a capacity of 62 SCFM of air, standard percent calibration, detached scales, no accessories & no tag, specify: **5210 G 0 2 1 16 X X D D412 S X X**
Note: Your order number should consist of 20 characters.

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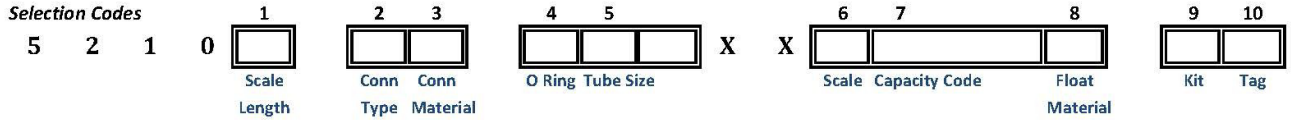

Selection 1 – SCALE LENGTH

Code	Material
B	5” Bead Guided
G	10” Bead Guided

Selection 2 – CONNECTION TYPE

Code	Material
0	In/Out Vertical NPT
1	In/Out Horizontal NPT
H	In Vertical NPT/Out Horizontal NPT
I	In Horizontal NPT/Out Vertical NPT

Selection 3 – CONNECTION MATERIAL

Code	Description
2	316 Stainless
4	PVC

Selection 4 – Retainer/O-Ring Material

Code	Description
1	Standard - Kynar [Buna N]
2	Optional - Kynar [Viton]

Selection 5 – TUBE SIZE

Code	Size
06	3/8”
08	1/2"
12	3/4"
16	1”
24	1 1/2"

*Selection 6 – SCALE TYPE**

Code	Description
B	Gas Detached Direct Read
D	Gas Detached Percent
I	Liquid Detached Direct Read
P	Water Detached Percent

GLASS TUBE VAREA-METER (5” Scale)
Selection 7 – CAPACITY CODE

Float Code	Tube Code	GPM	SCFM
A202	6	0.24	1
A204	6	0.32	1.3
A206	6	0.4	1.6
A208	6	0.49	2.2
A210	6	0.59	2.6
A402	6	0.71	3.1
A404	6	0.84	3.6
A406	6	1	4.5
A408	6	1.2	5.2
A410	6	1.5	6.3
B402	8	1.38	6
A412	6	1.9	7.9
B404	8	1.7	7.3
B406	8	2	8.9
B408	8	2.5	10.9
B410	8	2.9	12.8
C402	12	2.8	12.5
B412	8	3.7	16.6
C404	12	3.4	15
B414	8	4.3	19.8
C406	12	4	17.7
C408	12	4.6	20
B434*	8	5	21
C428*	12	5.6	26
C410	12	5.9	25
D402	16	5.7	25
C412	12	7	30

Selection 7 – CAPACITY CODE

Float Code	Tube Code	GPM	SCFM
D404	16	6.9	30
C414	12	8.5	37
D406	16	8.1	34
C416	12	10	41
D408	16	9.8	42
D410	16	11.6	48
C436*	12	12.5	59
E402	24	11.5	48
D412	16	14	62
E404	24	14	60
D414	16	18	70
E406	24	17.5	73
D416	16	21	91
E408	24	21	89
D434*	16	24	104
E426*	24	23	99
D436*	16	29	127
E410	24	26	113
E428*	24	29	127
E412	24	32	140
E414	24	38	155
E416	24	46	200
E434*	24	53	241
E436*	24	69	281

* Indicates a Non-Viscosity Immune (NVI) float configuration; all other floats are Viscosity Immune (VI) types.

GLASS TUBE VAREA-METER (10" Scale)
Selection 7 – CAPACITY CODE (Continued)

Float Code	Tube Code	GPM	SCFM
A202	6	0.24	1
A204	6	0.32	1.3
A206	6	0.39	1.7
A208	6	0.48	2.1
A210	6	0.58	2.5
A402	6	0.7	3
A404	6	0.82	3.6
A406	6	1	4.3
A408	6	1.2	5
A410	6	1.4	6
B402	8	1.4	6
A412	6	1.7	7.3
B404	8	1.7	7.2
B406	8	2	8.9
B408	8	2.5	10.8
B410	8	2.9	12.7
C402	12	2.8	12.4
B412	8	3.6	16.2
C404	12	3.5	15.1
B414	8	4.2	19
C406	12	4	17.8
C408	12	4.7	20.5
B434*	8	4.6	22
C428*	12	5.8	25.1
C410	12	5.9	24.8
D402	16	5.6	24.8
C412	12	7	30.5

Float Code	Tube Code	GPM	SCFM
D404	16	6.9	30.3
C414	12	8.3	36.1
D406	16	8.2	36.4
C416	12	9.9	43.8
D408	16	9.7	42.3
D410	16	11.4	49.9
C436*	12	11.5	53.9
E402	24	11.6	50
D412	16	14	62
E404	24	14.7	62
D414	16	17.3	79
E406	24	17.7	75
D416	16	21.2	98
E408	24	22	92
D434*	16	23.8	107
E426*	24	24.2	106
D436*	16	27	121
E410	24	26.4	112
E428*	24	26.5	109
E412	24	31.6	138
E414	24	37.5	169
E416	24	45.6	189
E434*	24	51.7	240
E436*	24	59.9	254

* Indicates a Non-Viscosity Immune (NVI) float configuration; all other floats are Viscosity Immune (VI) types.

Selection 8 – FLOAT MATERIAL

Code	Description
S	316 Stainless Steel
H	Hast C *

*Special Made to order, 6-8 week delivery

Selection 9 – Panel Mount (Kits)

Code	Description
X	None
D	Panel Mtg. Brackets – 5"
E	Panel Mtg. Brackets – 10"

Selection 10 – TAG

Code	Description
X	None
1	Stainless Steel (wire on)

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