Variable Area Flow Meters

Chemline F Series Variable Area Flow Meters are ideal for plastic piping. They provide a combination of accurate visual flow rate measurement and clear flow indication from a distance. Optional limit switches allow the units to signal a low or high flow alarm. An optional flow transmitter provides a 4-20 mA signal output. These flow meters must be installed vertically with flow upward.

Low Cost Visual Indication

For Water, Chemicals or Gas

CHEMLINE Plastics Limited

Your Pipeline To Quality

SERIES: FC – Compact – 5" Single Scale
FS – Full Size – 7" Dual Scale[1]

MATERIALS:

Tube: Clear PVC, Polyamide (PA), Polysulfone (PSU), or PVDF[2]

Float: PVDF

Ends: PVC, CPVC, PP, PVDF Socket, Threaded, Flanged or Butt

O-Rings: EPDM, Viton

CAPACITIES: Up to 220 USGPM (50,000 litres per hour)

Features

- **Clear Visual Indication**
  – Large orange float is visible from a distance
  – Range indicators slide along dovetail track
- **Easy Installation and Maintenance**
  Just unscrew union nuts and tube slides out of line
- **Choice of Four Tube Materials for Many Applications:**
  Clear PVC – For Water or Chemicals up to 60ºC. – High Chemical resistance at low cost.
  Polyamide (PA) - For Water or Air up to 75ºC. – High impact strength and optical clarity.
  Polysulfone (PSU) – For Chemicals and Gases up to 100ºC. – High impact strength and good chemical resistance.
  PVDF [1] – For Chemicals and Ultrapure fluids up to 110ºC. – High impact strength and excellent chemical resistance.
- **Ideal for All Types of Plastic Piping**
  All types of end connections in PVC, CPVC, PP & PVDF
- **Low Pressure Drop**
- **Good Measuring Accuracy**
  ± 3% of indicated value, plus ± 1% of full scale.
  – Read scale at top (largest diameter) of float
- **Non Fouling** - Float is self supporting in the flow. No guide rod (which can cause the float to jam) is necessary.



Standard Full Size

Compact

[1] USGPM and litres per hour (water) scale is supplied as standard on full size meters.
[2] Because PVDF is translucent, a magnetic float and limit switches are usually used.

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Variable Area Flow Meters

NOTES:

PVDF flow meters are available in all sizes. Change third letter in item number to **K**.
[1] △P = Pressure loss through flow meter at maximum flow rate of water at 20ºC.
[2] Dimension **L** is for PVC Socket ends.

FC SERIES – COMPACT SIZE – 5" SCALE

Single USGPM (water) scale is supplied standard.

End Conn. Size	Item Number			Flow Range (water)		Dimensions (inches)			Pressure Drop (psi)[1]	
	PVC Tube	Polyamide Tube	Polysulfone Tube	USGPM	Litres per hour	A	L[2]	D	Water	Air
3/8"	FCA00020	FCT00020	FCP00020	0.0132 – 0.106	3 – 24	6.50	8.2	1.38	0.05	0.07
	FCA00060	FCT00060	FCP00060	0.022 – 0.264	5 – 60	6.50	8.2	1.38	0.05	0.07
	FCA00100	FCT00100	FCP00100	0.04 – 0.44	10 – 100	6.50	8.2	1.38	0.05	0.07
	FCA00250	FCT00250	FCP00250	0.11 – 1.10	25 – 250	6.50	8.2	1.38	0.05	0.07
1/2"	FCA00051	FCT00051	FCP00051	0.02 – 0.22	5 – 50	6.69	8.7	1.69	0.04	0.06
	FCA00151	FCT00151	FCP00151	0.07 – 0.66	15 – 150	6.69	8.7	1.69	0.04	0.06
	FCA00251	FCT00251	FCP00251	0.11 – 1.10	25 – 250	6.69	8.7	1.69	0.04	0.06
	FCA00401	FCT00401	FCP00401	0.18 – 1.76	40 – 400	6.69	8.7	1.69	0.04	0.06
3/4"	FAC00152	FAC00152	FAC00152	0.07 – 0.66	15 – 150	7.28	9.6	2.09	0.09	0.12
	FCA00402	FCT00402	FCP00402	0.22 – 1.76	40 – 400	7.28	9.6	2.09	0.09	0.12
	FCA00602	FCT00602	FCP00602	0.26 – 2.64	60 – 600	7.28	9.6	2.09	0.09	0.12
	FCA01002	FCT01002	FCP01002	0.44 – 4.40	100 – 1,000	7.28	9.6	2.09	0.09	0.12
1"	FCA00253	FCT00253	FCP00253	0.11 – 1.10	25 – 250	7.87	10.5	2.36	0.09	0.12
	FCA00403	FCT00403	FCP00403	0.18 – 1.76	40 – 400	7.87	10.5	2.36	0.09	0.12
	FCA01003	FCT01003	FCP01003	0.44 – 4.40	100 – 1,000	7.87	10.5	2.36	0.09	0.12
	FCA01503	FCT01503	FCP01503	0.66 – 6.60	150 – 1,500	7.87	10.5	2.36	0.09	0.12

FS SERIES – STANDARD FULL SIZE – 7" SCALE

Dual USGPM (water) and litres per hour scales are supplied standard.

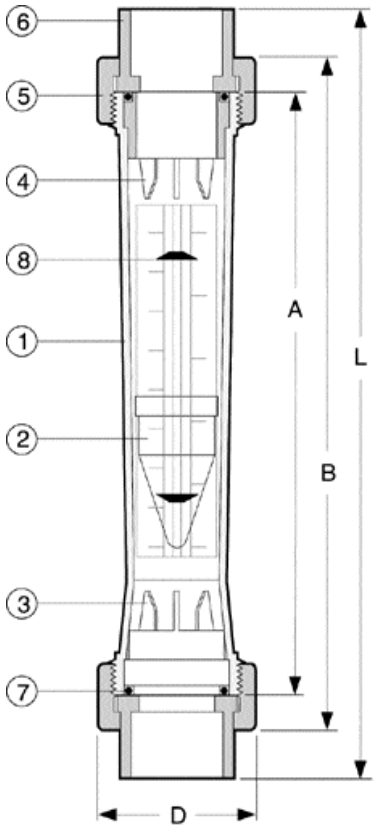
End Conn. Size	Item Number			Flow Range (water)		Dimensions (inches)			Pressure Drop (psi)[1]	
	PVC Tube	Polyamide Tube	Polysulfone Tube	USGPM	Litres per hour	A	L[2]	D	Water	Air
1"	FSA00150	FST00150	FSP00150	0.07 – 0.66	15 – 150	13.78	16.3	2.36	0.18	0.23
	FSA00300	FST00300	FSP00300	0.13 – 1.32	30 – 300	13.78	16.3	2.36	0.18	0.23
	FSA00600	FST00600	FSP00600	0.26 – 2.64	60 – 600	13.78	16.3	2.36	0.18	0.23
	FSA01000	FST01000	FSP01000	0.44 – 4.40	100 – 1,000	13.78	16.3	2.36	0.18	0.23
1-1/4"	FSA01500	FST01500	FSP01500	0.66 – 6.60	150 – 1,500	13.78	16.6	2.83	0.18	0.23
	FSA02500	FST02500	FSP02500	1.10 – 11.00	250 – 2,500	13.78	16.6	2.83	0.18	0.23
1-1/2"	FSA02000	FST02000	FSP02000	0.88 – 8.80	200 – 2,000	13.78	16.8	3.27	0.18	0.23
	FSA03000	FST03000	FSP03000	1.32 – 13.20	300 – 3,000	13.78	16.8	3.27	0.18	0.23
2"	FSA04000	FST04000	FSP04000	1.76 – 17.60	400 – 4,000	13.78	17.2	4.06	0.32	0.39
	FSA06000	FST06000	FSP06000	2.64 – 26.40	600 – 6,000	13.78	17.2	4.06	0.32	0.39
	FSA10000	FST10000	FSP10000	4.40 – 44.00	1,000 – 10,000	13.78	17.2	4.06	0.32	0.39
2-1/2"	FSA15000	FST15000	FSP15000	6.60 – 66.00	1,500 – 15,000	13.78	17.7	4.80	0.49	0.58
	FSA25000	FST25000	FSP25000	11.00 – 110.00	2,500 – 25,000	13.78	17.7	4.80	0.49	0.58
	FSA50000	FST50000	FSP50000	44.00 – 220.00	10,000 – 50,000	13.78	17.7	4.80	0.49	0.58

CONVERSION CHART – FLOW UNITS

From To	m³/hr	litres/hr	USGPM	ImpGPM	ft³/min
m³/hr	1	1000	4.4029	3.6662	0.5886
litres/hr	0.001	1	.004403	.003666	.000589
USGPM	0.2271	227.12	1	0.8327	0.1337
ImpGPM	0.2728	272.77	1.2009	1	0.1605
ft³/min	1.6990	1699	7.4806	6.2289	1

†Values based on water at 20ºC

Variable Area Flow Meters



PARTS

▲Recommended Spare Parts

No.	Part	Pcs.	Materials
1	Tube	1	Polyamide (PA), Polysulfone (PSU), Clear PVC, PVDF
2	Float	1	PVDF (standard or magnetic)
3	Lower Float Stop	1	PVDF
4	Upper Float Stop	1	PVDF
5	Union Nut	2	PVC, PPG, PVDF
6	End Connector	2	PVC, CPVC, PP or PVDF
7▲	O-Rings	2	EPDM, Viton
8▲	Range Indicator	2	ABS

ACCESSORIES

- **Limit Switches** - One switch for both maximum or minimum, 24 volts rated.
- **Magnetic Float** - Required when limit switches or transmitter is used.
- **Throttling Valve** for flow control.
- **4-20 mA Output Signal Unit** must be factory calibrated for specific service.

OPTIONS

- **Custom Direct Reading Scale** for services other than water
- **Alternate O-rings** - ie. Viton
- **End Size Reduction** - Accuracy is not significantly affected by end reduction
- **Other Ends** - Threaded, socket or flanged end connections in PVC, CPVC, PP or PVDF. Butt ends in PP or PVDF.

MAXIMUM WORKING PRESSURES AND TEMPERATURE RANGES

Construction (‡ = Optional Materials)				Maximum Pressure[2]	Temperature Range
Tube	O-Rings	Union Nuts	Ends		
PVC	EPDM	PVC	PVC	150 psi	0 to 60ºC
Polyamide (PA)	EPDM	PVC	PVC	150 psi	0 to 60ºC
Polyamide (PA)	EPDM	PPG‡	PP or CPVC‡	150 psi	0 to 75ºC
Polysulfone (PSU)	EPDM	PVC	PVC	150 psi	0 to 60ºC
Polysulfone (PSU)	EPDM	PPG‡	PP or CPVC‡	150 psi	0 to 90ºC
PVDF	Viton	PVDF	PVDF	150 psi	-40 to 110ºC

[2] 150 psi is not recommended at maximum temperatures. Consult Chemline.

Flow Meter Sizing – Liquid Flow

Standard Scale values are for clean water flow at 20ºC. For liquids with densities and viscosities similar to water (ie. specific gravity of 1.0 and viscosities between 0.5 cP and 1.3 cP) the standard water scale will be accurate enough.

The table below shows correction factors to be applied for liquids with specific gravities other then 1.0. Multiply the correction factor by the water scale value to obtain actual flow rate. Example: For a liquid of specific gravity of 1.66, the correction factor is 0.740. For water flow range of 100 to 1000 litres/hr, corrected range becomes 74 to 740 litres/hr. Viscosity should be between 0.5 cP and 1.3 cP for standard scales to be accurate.

For "sizing" liquid flows ie. determining actual flow range of a tube, please advise the **chemical name, concentration, temperature, specific gravity** and **viscosity.** Custom direct reading scales in any units are available special order.

SCALE CORRECTION FACTORS – FOR LIQUIDS WITH SPECIFIC GRAVITIES OTHER THAN 1.00

Specific Gravity	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
	Scale Correction Factor									
0.4	1.647	1.626	1.605	1.585	1.565	1.548	1.529	1.513	1.495	1.479
0.5	1.462	1.447	1.433	1.418	1.404	1.391	1.377	1.364	1.351	1.339
0.6	1.326	1.316	1.304	1.292	1.282	1.271	1.259	1.250	1.239	1.229
0.7	1.220	1.211	1.202	1.192	1.183	1.175	1.167	1.157	1.149	1.142
0.8	1.134	1.125	1.117	1.111	1.104	1.096	1.089	1.082	1.075	1.068
0.9	1.062	1.055	1.048	1.042	1.035	1.030	1.024	1.017	1.011	1.005
1.0	1.000	0.994	0.988	0.982	0.978	0.972	0.967	0.962	0.956	0.951
1.1	0.947	0.943	0.936	0.932	0.927	0.923	0.917	0.913	0.909	0.904
1.2	0.900	0.895	0.891	0.887	0.883	0.878	0.874	0.870	0.866	0.862
1.3	0.858	0.854	0.850	0.846	0.842	0.838	0.835	0.831	0.827	0.824
1.4	0.820	0.818	0.814	0.810	0.806	0.803	0.800	0.797	0.794	0.791
1.5	0.787	0.784	0.781	0.778	0.776	0.773	0.770	0.767	0.764	0.759
1.6	0.756	0.754	0.751	0.748	0.745	0.742	0.740	0.737	0.734	0.730
1.7	0.728	0.726	0.723	0.720	0.717	0.714	0.712	0.709	0.706	0.704
1.8	0.701	0.699	0.696	0.694	0.691	0.689	0.686	0.684	0.682	0.679
1.9	0.677	0.674	0.672	0.669	0.667	0.665	0.663	0.661	0.658	0.657
2.0	0.654	0.652	0.650	0.648	0.646	0.644	0.641	0.604	0.637	0.636

Variable Area Flow Meters

Flow Meter Sizing – Gas Flow

FLOW RANGES FOR AIR – AT STANDARD CONDITIONS (atmospheric pressure 14.7 psia/20°C).

FC SERIES – COMPACT SIZE – 5" SCALE

Flow Meter Item No.	Normal m^3/hr	Standard CFM
FCT00020	0.2 – 1.0	0.1 – 0.6
FCT00060	0.2 – 2.5	0.1 – 1.5
FCT00100	0.6 – 3.6	0.4 – 2.1
FCT00250	0.5 – 9.0	0.3 – 5.3
FCT00051	0.4 – 2.8	0.2 – 1.6
FCT00151	0.8 – 6.2	0.5 – 3.6
FCT00251	0.9 – 9.5	0.5 – 5.6
FCT00401	2.0 – 15.0	1.2 – 8.8
FCT00152	0.5 – 5.5	0.3 – 3.2
FCT00402	2.0 – 14.0	1.2 – 8.2
FCT00602	2.5 – 22.0	1.5 – 12.9
FCT01002	4.0 – 34.0	2.4 – 20.0
FCT00253	1.0 – 8.0	0.6 – 4.7
FCT00403	2.0 – 14.0	1.2 – 8.2
FCT01003	4.0 – 34.0	2.4 – 20.0
FCT01503	5.0 – 50.0	2.9 – 29.4

FS SERIES – STANDARD FULL SIZE – 7" SCALE

Flow Meter Item No.	Normal m^3/hr	Standard CFM
FST00150	0.7 – 5.5	0.4 – 3.2
FST00300	1 – 10	0.6 – 5.9
FST00600	2.5 – 20	1.5 – 12
FST01000	4 – 34	2.4 – 20
FST01500	5 – 50	2.9 – 29
FST02000	8.5 – 76	5.0 – 45
FST02500	8 – 70	4.7 – 41
FST03000	10 – 90	5.9 – 53
FST04000	14 – 125	8.2 – 74
FST06000	22 – 190	13 – 112
FST10000	35 – 300	21 – 177
FST15000	50 – 500	29 – 294
FST25000	80 – 720	47 – 424
FST50000	400 – 1,500	234 – 883

SCALE CORRECTION FACTORS – FOR AIR AT NON-STANDARD TEMPERATURES AND PRESSURES

Air density is dependent on the actual pressure and temperature.
Calculate the Scale Correction Factor using either Method 1 or 2. Multiply the standard air flow ranges above by the Factor to obtain actual flow rates.

Method 1

Calculate the Factor with the following formula.

$$\text{Factor} = \frac{1}{3.7005}\sqrt{\frac{\text{psia}}{(1+0.00367t)}}$$

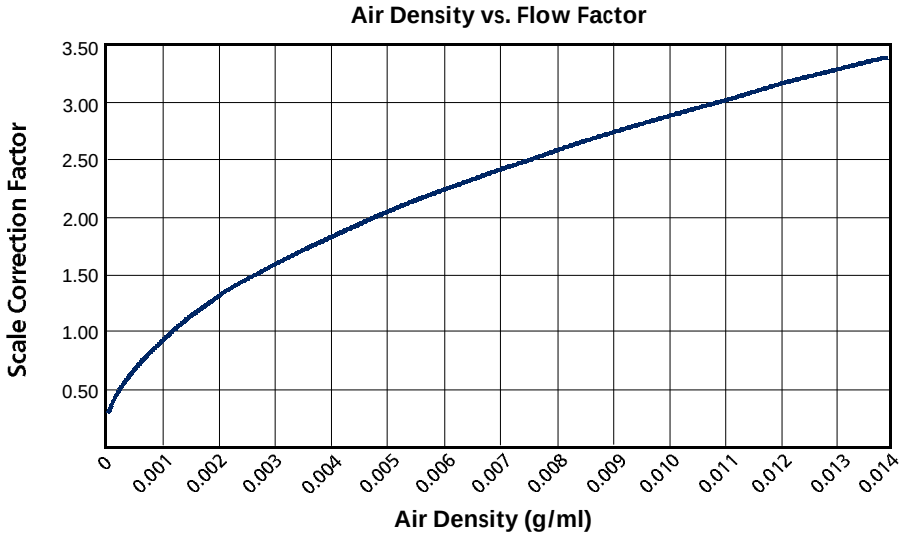
psia = pressure of the air absolute
= psig + 14.7 (atmospheric pressure = 14.7 psia)
t = temperature of the air °C

Method 2

Calculate the density of the air at conditions and find factor from the chart below.

$$\text{Air Density (g/ml)} = \frac{\text{psia}}{11{,}360(1+0.00367t)}$$

psia = pressure of the air absolute
= psig + 14.7 (atmospheric pressure = 14.7 psia)
t = temperature of the air °C



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Established in 1968