

Low flow flowmeters



Variable area flowmeters are basically vertical internally tapered tubes mounted with the large end at the top. A float or rotor with an outer diameter slightly less than the minimum diameter of the tube is placed inside the tube. The clearance space between the float and the tube forms an annular passage or orifice. As the tube is tapered, the area of this orifice is larger when the float is near the top than it is when the float is near the bottom. By connecting the tube into a fluid flow line so flow direction is from bottom to top, the float will move upward and be supported at a point where the orifice is just large enough to pass the fluid flowing through the system.

These flowmeters are equipped with a needle valve which allows an accurate regulation of the desired flow.

Technical data

Accuracy:	±3,0% f.s.
Connections:	From 1/4"-Female up to 3/4"-Female, depending on range.
Temp. service:	0...100°C.
Materials:	Borosilicate glass measuring tube. Closing pillows, U profile and needle valve in st. steel AISI316. NBR o-rings (EPDM or viton® upon request).

Ranges water in litres per hour

0,1...1	0,2...2,5	0,5...5	1...10	1,6...16
2,5...25	4...40	6...60	10...100	16...160
25...250	40...400	60...630	100...1000	

Rangos air (atm. press) in N litres/hour

3...30	8...80	15...160	30...350	40...450
80...800	120...1200	200...2000	300...3500	700...7000
1000...10000	1700...17000			

Note: Also available in litres/minute upon request.

Operation principle

The flow meter is basically composed of a conic tube and a float. The upward flow propels the float to a point of balance defined by the area obtained between the float and the tube.

This balance point depends on:

Flow weight: P_f
Thrust of the fluid: E
Free pass area: A_l

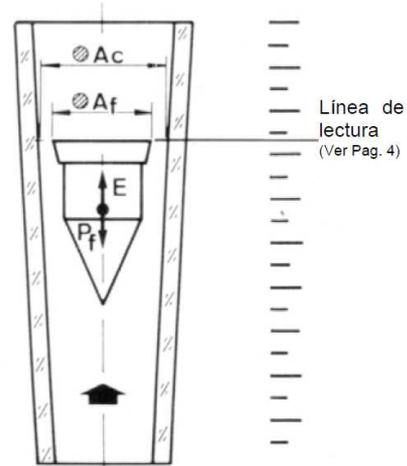
The proportional area related to flow is:

$$A_l = A_c - A_f$$

Where:

A_c = tube section
 A_f = Float section

Each position of the float is related to a flow rate, which is engraved on the measuring tube.



Installation

The instrument should be mounted taking in account the following points:

- The fluid inlet is the lower part of the flowmeter (minimum value of the scale).
- The flowmeter should be installed completely vertical; a slight deviation of around $5-10^\circ$ related to the vertical may cause errors up to 10%.
- It is recommended to install the flowmeter between two straight pipelines, with no bends, before the inlet and after the outlet, of approximate five times the height of the flowmeter, in order to avoid turbulences.
- Do not forget to install seals when installing the flowmeter in the process.
- **WARNING:** Do not open abruptly the regulation valve: the float may hit the glass tube damaging it.

Cleaning and maintenance

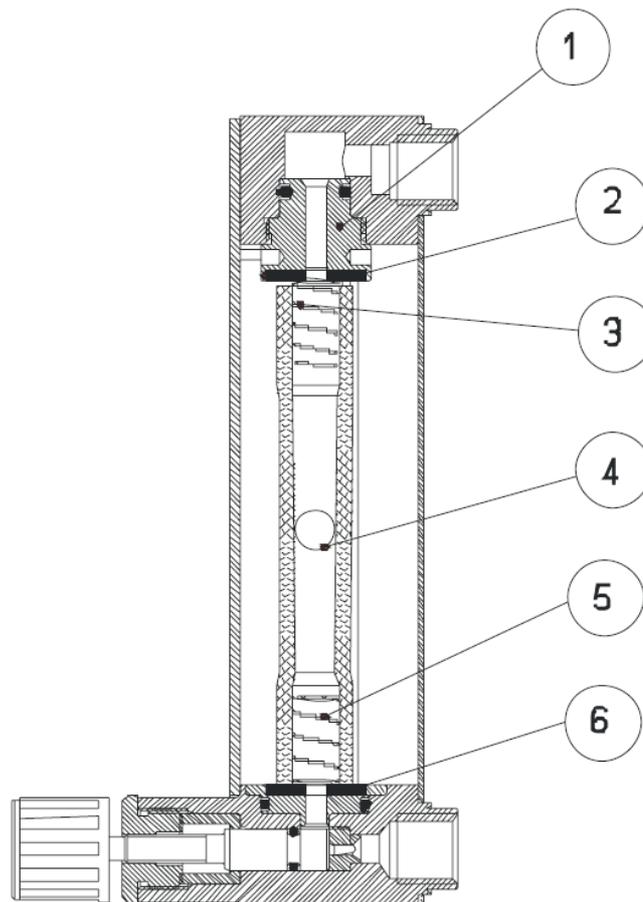
If necessary to clean the measuring tube, proceed to disassemble it as follows:

Swivel the press (1) clockwise between half and one and a half turn, depending on the model, to release the tube.

Remove the springs or stops (3 and 5) and the float (4). The cleaning of the tube and the float shall be carried out with a soft brush, avoiding to scratch the tube.

Once the tube is clean proceed to mount the float (4), then the springs or stops (3 and 5), and finally the seals (2 and 6) making sure they are well centred.

Install the measuring tube, centre it and tighten the press (1) anti-clockwise to achieve the required sealing.



Models

Cono Nº.	Long. tubo (mm)	Escalas de medida, Flotador Series AC / ECG												
		AGUA 20°C l/h					AIRE 20°C 1,013 mbar NI/h					Pérdida de carga mm C.A.		
		AISI316L ⁽¹⁾		VIDRIO		AISI316L ⁽¹⁾		VIDRIO		PLÁSTICO	AISI316L ⁽¹⁾	VIDRIO	PLÁSTICO	
Serie 2100														
C110/0001	100	0,1	1	0,05	0,5	3	35	1	15	0,5	5	20	10	5
C110/0002,5		0,2	2,5	0,1	1	8	80	4	40	1,5	16			
C111/0005		0,5	5	0,2	2	15	160	7	70	2	25			
C111/0010		1	10	0,4	4	30	350	10	200	8	110			
C111/0016		1,6	16	0,6	6	40	450	20	240	10	140			
C112/0025		2,5	25	1	10	80	800	40	400	20	250	35	20	10
C113/0040		4	40	1,6	16	120	1200	70	700	40	400			
C114/0060		6	60	2	20	200	2000	100	1000	70	700			
C115/0100		10	100	4	40	300	3500	150	1600	100	1100	50	25	15
Serie 2150														
C210/0001	150	0,1	1	0,05	0,5	3	30	1	14	0,4	4,5	20	10	5
C210/0002,5		0,2	2,5	0,1	1	8	100	0,5	40	1	16			
C211/0005		0,5	5	0,2	2	15	180	8	80	3	30			
C211/0010		1	10	0,4	4	30	300	15	180	10	100			
C211/0016		1,6	16	0,6	6	50	500	25	250	10	150			
C212/0025		2,5	25	1	10	80	800	40	400	20	250	35	20	10
C213/0040		4	40	1,6	16	100	1200	70	700	40	400			
C214/0060		6	60	2	20	150	1800	100	1000	70	700			
C215/0100		10	100	4	40	300	3000	150	1800	100	1100	50	25	15

Cono Nº.	Long. tubo (mm)	Escalas de medida, Flotador Serie AC										
		AGUA 20°C l/h			AIRE 20°C 1,013 mbar NI/h			Pérdida de carga mm C.A.				
		AISI316L ⁽¹⁾		VIDRIO	ALUMINIO		AISI316L ⁽¹⁾	AISI316L ⁽¹⁾	VIDRIO	ALUMINIO		
Serie 2300												
C311/0025	300	2,5	25	1	10	40	400	120	800	55	18	22
C311/0040		4	40	1,6	16	70	700	150	1400			
C311/0060		6	60	2	20	100	1000	150	2000			
C312/0100		10	100			170	1700	300	3000	90	30	35
C312/0160		16	160			250	2500	400	4500			
C312/0250		25	250			400	4000	700	7000			
Serie 2340												
C313/0400	300	40	400			700	7000	1000	10000	125	40	50
C313/0630		60	630			1000	10000	1800	18000			
C313/1000		100	1000			1700	17000	3000	30000			