



# SM-12N

## Conical Glass Flowmeter as per the Variable Area Principle



## Features

- / For fluids and gases
- / Wide range of measuring
- / Easy to read scale
- / Low pressure drop
- / Turnable splinter shield
- / Optional limit switch

## Description:

A float made of plastic or metal gets lifted by a fluid flowing vertically through a conical glass tube and set into rotation. Its upward movement stops at a point where the gravitational and dynamic forces become equal against each other. The body's position in the cone, therefore, depends of the flow with the result that the volume of flow can be read from the scale engraved on the sight glass.

## Application:

Six different sight glass geometries and four different float materials allow a wide range of measuring with the SM-12N for all types of fluids and gases which are compatible with material being used. This data sheet provides an overview of possibilities for water and air at atmospheric state. Please ask us for different media, pressures or temperatures. The SM-12N series of variable area flowmeters is deployed wherever a volume of flow needs to be displayed without electrical means. Specially manufactured floats produce a negligible pressure drop. Often the advantage is that the characteristics of the material being measured can be assessed visually through the glass tube.



## Technical Specifications:

### Materials /

Process conn.:	AISI 316L - st. steel 1.4404
Housing:	AISI 304 - st. steel 1.4301
Nut:	AISI 316 - st. steel 1.4401 (or galvanized steel)
Stoppers:	PFA (tube L6, L7) PVDF, AISI 316L (tube P0-P4)
Measuring cone:	Borosilicate glass
Float: (see table 1+2)	Titan, PVDF (tube L6, L7) PTFE, PVDF (FDA conform), AISI 316Ti (1.4571) (tube P0-P4)
Sealing:	NBR (standard) FKM, EPDM (on request)

### Pressure /

Measuring tube:	L6; L7	P0; P1	P2	P4
$P_{max}$ [bar]:	16	10	8	6

**Temperature /** -25...+100°C

**Mounting length /** 375 mm (thread, clamp),  
425 mm (flange)

**Weight /** 1.7...7.1 kg (see Table 4)

**Mounting position /** vertical, flow from bottom

**Operating ranges /** 0,002 l/h to 10 m<sup>3</sup>/h water (20°C)  
0,1 l/h to 160 m<sup>3</sup>/h air (20°C, 1 bar abs.)

**Range /** 10:1 for P measuring tubes  
20:1 for L measuring tubes

**Accuracy /** Class 2.5 for tube L613-L623  
**(as per VDI 3513)** Class 1.6 for tube L624-L747  
Class 1.6 for tube P051-P471

## Versions:

**Operating range code:** To determine the operating range code, the desired operating range is ascertained in the relevant tables (Table 1 for water and fluids; Table 2 for air and gases) and the code is determined according to the measuring tube, the float and the other listed criteria. For example, the code [P]-[0]-[51]-[SS]-[0]-[3]-[N] indicates the operating range of 10 to 100 l/h water, a float in stainless steel 1.4571 without preparation for a limit contact, this means, without magnets in the float.

**Process connection:** G female thread, NPT female thread, EN and ASME flanges in stainless steel are available as variants for the connection. The table 3 (Model specification) provides information as to which measuring tube can be fitted with which connection.

**Valve:** A number of device variants can be equipped with a regulating valve. Optionally, the valve can be made of brass or stainless steel. Depending on the version, the valve can be mounted at the inlet or outlet. The table 3 (Model specification) provides information as to which measuring tube can be combined with which valve. The valves are connected to the flowmeter on site.

**Limit contact:** All type P measuring tubes can be equipped with REED contacts which require a magnetic float (the operating range code takes this into regard). Optionally, MIN contacts (normally closed) or MAX contacts (normally open) are available.

## Electrical Specifications:

**Limit contact /** REED, bistable (potential-free)

**Voltage /** 230 V max.

**Switching current /** 2 A max.

**Switching load /** 40 VA or 40 W

**Temperature /** -10...+70°C

**Protection class /** IP65

**Self-capacity /** 0 nF

**Self-inductivity /** 0 mH

**Connecting cable /** LIYY 2 x 0,34 mm<sup>2</sup>, 1 m long

**Housing /** Polystyrene

**Weight /** 35 g



**Table 1: Water/Fluids**

Flow table		Operating range code (measuring tube and float combination)							
Water / Fluids 20°C		Measuring Tube			Float				
max. Flow [l/h]	pressure drop *) [mbar]	-x	x	xx	-xx	x	x	x	
		Length Code	Diameter Code	Meas. tube conus Code	Material Code	Diameter Code	Flow ID Code	Insertion Code	
0.025	1	L	6	13	TT	A 1)	L	N	
0.04	1	L	6	14					
0.63	2	L	6	17					
0.1	2	L	6	21					
0.16	3	L	6	22					
0.25	4	L	6	23					
0.4	1	L	6	24	TT; PD	B	L		
0.63	1	L	6	27					
1	2	L	6	31					
1.6	3	L	6	32					
2.5	4	L	6	33					
4	2	L	7	34					
6.3	2	L	7	37					
10	3	L	7	41	D	L			
16	4	L	7	42					
25	5	L	7	43	PD	0	2	M	
40	5	L	7	44					
63	10	L	7	47					
63	10	P	0	51					
100	16	P	0	52		SS	3	M 2); N	
100	16	P	0	51					
160	24	P	0	52		PD	1	2	M
160	15	P	1	53					
250	16	P	1	54					
400	18	P	1	57					
630	26	P	1	61					
250	15	P	1	53	SS		3	M 2); N	
400	16	P	1	54					
630	18	P	1	57					
1000	26	P	1	61	PD		2	2	M
1000	11	P	2	62					
1600	13	P	2	63	SS	3	M 2); N		
1600	26	P	2	62					
2500	30	P	2	63	PD	4	2	M	
2500	16	P	4	64					
4000	18	P	4	67					
6300	21	P	4	71					
4000	40	P	4	64		SS	3	M 2); N	
6300	44	P	4	67					
10000	53	P	4	71					

Operating range Code	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-
Tube length (Type)	300 mm	L					
	300 mm	P					
Tube diameter	10. . .81 mm		X				
Tube cone				XX			
Float material	st. Steel				SS		
	Titanium				TT		
	PTFE				PF		
	PVDF				PD		
Float Ø	1.6. . .54 mm					X	
Flow ID	for Fluids						L
	for Water						2
	for Water						3
Float insertion	w/o Magnet						N
	with Magnet						M 2)

\*) The specified pressure drop is merely a standard value and may be different depending on the diameter used.  
 1) Max. viscosity 2 mPas\*  
 2) For option limit switch



**Table 2: Air/Gas**

Flow table		Operating range code (measuring tube and float combination)						
Air / Gas 20°C, 1 bar abs.		Measuring Tube			Float			
max. Flow [l/h]	pressure drop <sup>1)</sup> [mbar]	-X	X	XX	-XX	X	X	X
		Length Code	Diameter Code	Meas. tube conus Code	Material Code	Diameter Code	Flow ID Code	Insertion Code
1.9	1	L	6	13	TT	A	G	N
3	1	L	6	14				
4.4	2	L	6	17				
6.5	2	L	6	21				
10	3	L	6	22				
14	4	L	6	23				
23	2	L	6	24	PD; TT	B	G	
33	2	L	6	27				
50	2	L	6	31				
70	3	L	6	32				
100	4	L	6	33				
180	3	L	7	34				
250	3	L	7	37				
400	3	L	7	41	C	G		
630	4	L	7	42				
1000	5	L	7	43				
1600	5	L	7	44	D	G		
2400	10	L	7	47				
1600	4	P	0	51	PF	0	6	
2500	6	P	0	52				
2400	8	P	0	51	PD	0	7	
3800	11	P	0	52				
6000	6	P	1	53	PD	1	7	
9300	7	P	1	54				
14500	8	P	1	57				
23000	10	P	1	61				
400	5	P	1	53	PF	1	6	
6300	5	P	1	54				
10000	6	P	1	57				
16000	8	P	1	61				
35000	11	P	2	62	PD	2	7	
55000	13	P	2	63				
25000	8	P	2	62	PF	2	6	
40000	10	P	2	63				
88000	29	P	4	64	PD	4	7	
140000	32	P	4	67				
220000	34	P	4	71				
63000	13	P	4	64				
100000	14	P	4	67	PF	4	6	
160000	17	P	4	71				

Operating range Code		[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-
Tube length (Type)	300 mm	L					
	300 mm	P					
Tueb diameter	10. . .81 mm		X				
Tueb cone				XX			
Float material	Titanium				TT		
	PTFE				PF		
	PVDF				PD		
Float diameter Ø	1.6. . .54 mm					X	
Flow ID	for Gas						G
	for Air						6
	for Air						7
Float insertion	w/o Magnet						N
	with Magnet						M <sup>1)</sup>

<sup>\*)</sup> The specified pressure drop is merely a standard value and may be different depending on the diameter used.

<sup>1)</sup> For option limit switch



# Ordering Codes:

<b>Order number</b>	<b>SM-12N.</b>	<b>[ ]-[ ]-[ ]-[ ]-[ ]-[ ]-[ ]-[ ]</b>	<b>1.</b>	<b>1.</b>	<b>1.</b>	<b>0.</b>	<b>0.</b>	<b>0</b>
<b>SM-12N Variable Area Flowmeter with Conical Glass</b>								
<b>Operating range code from Table 1 or Table 2:</b>								
<b>Process connection /</b>								
1 = female thread G (Code G0)								
2 = female thread NPT (Code T0)								
3 = flange EN-1092 B1 PN40 (Code D4)								
4 = flange ASME B16.5 150 lbs (Code A1)								
5 = on request: Clamp ISO 2852 (Code S4)								
<b>Process connection material /</b>								
1 = AISI 316L - stainless steel 1.4404 (Code SS)								
<b>Armature material /</b>								
1 = AISI 304 - stainless steel 1.4301 (Code SS)								
<b>Valve /</b>								
0 = without valve (Code NNN)								
1 = with valve, brass housing (Code VM) <sup>(1)</sup>								
2 = with valve, stainless steel housing 1.4571 (Code VA) <sup>(1)</sup>								
<b>Limit contact /</b>								
0 = without contact								
1 = MIN contact (NC, opening when the float reaches the setpoint) <sup>(2)</sup>								
2 = MAX contact (NO, closing when the float reaches the setpoint) <sup>(2)</sup>								
<b>Options (multiple specifications possible) /</b>								
0 = none								
1 = with isolated switching amplifier for limit contact 24 VDC								
2 = with isolated switching amplifier for limit contact 230 VAC								
3 = oil and grease free for applications with oxygen								
4 = with flow table for conversion								

<sup>(1)</sup> The valves are connected to the flowmeter on site (not for FDA).  
Other restrictions see table 3 (model specification).

<sup>(2)</sup> Only for tube P0 to P4 and float insertion code M (with magnet)



**Table 3: Model specification**

SM-12N without valve	Process connection				Connection material	Armature material	Valve	Measuring tube (length + diameter)
	Female thread		Flange					
	G	NPT	EN 1092-2 B1 PN40	ASME B16.5 150 lbs				
Diameter	Code	Code	Code	Code	Code	Code	Code	Code
1/2"	G0	T0	D4	A1	SS	SS	NNN	L6; L7; P0; P1
3/4"	G0	T0	-	-	SS	SS	NNN	L6; L7; P0; P1
1"	G0	T0	D4	A1	SS	SS	NNN	L6; L7; P0; P1; P2
1 1/2"	G0	T0	D4	A1	SS	SS	NNN	P2; P4
2"	-	-	D4	A1	SS	SS	NNN	P2; P4
2"	G0	T0	-	-	SS	SS	NNN	P4
2 1/2"	G0	T0	-	-	SS	SS	NNN	P4

SM-12N with valve	Process connection				Connection material	Armature material	Valve	Measuring tube (length + diameter)
	Female thread		Flange					
	G	NPT	EN 1092-2 B1 PN40	ASME B16.5 150 lbs				
Diameter	Code	Code	Code	Code	Code	Code	Code	Code
1/2"	G0	-	-	-	SS	SS	VM / VA	L6; L7; P0
1"	G0	-	-	-	SS	SS	VM / VA	P1
1 1/2"	G0	-	-	-	SS	SS	VM / VA	P2

**Table 4: Installation lengths and weights**

Conn. diameter	Process connection	Measuring tube	Length L [mm]	Weight [kg]
DN 15 (1/2")	Female thread	L6; L7; P0; P1	375	1.7
	Clamp		375	1.9
	Flange		425	2.5
DN 20 (3/4")	Female thread		375	1.7
DN 25 (1")	Female thread	L6; L7; P0; P1	375	1.7
		P2		2.6
	Clamp	L6; L7; P0; P1	375	2.0
		P2		2.8
	Flange	L6; L7; P0; P1	425	3.3
		P2	3.9	
DN 40 (1 1/2")	Female thread	P2	375	2.6
		P4		7.1
	Flange	P2	425	5.2
		P4		8.7
DN 50 (2")	Female thread	P4	375	7.1
	Flange	P2	425	6.6
P4		11.1		
DN 65 (2 1/2")	Female thread	P4	375	7.1

