Deltafluid
LA MESURE DE VOS EXIGENCES

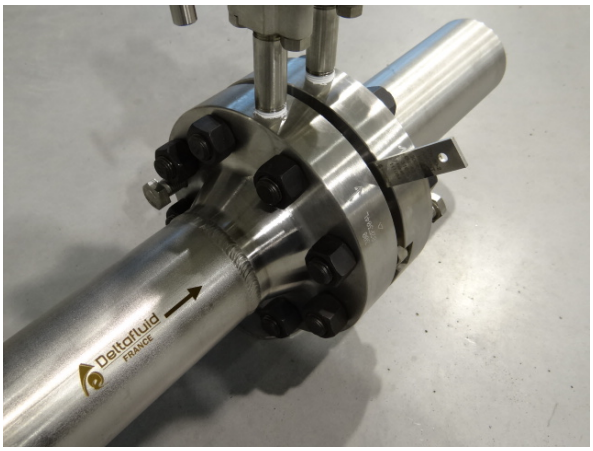
Tél. : +33 (0)5 59 30 85 20
Fax : +33 (0)5 59 30 85 21
E-mail : delta64@deltafluid.fr

RD 817 - Chemin Les Augas
64170 LACQ - FRANCE

Datasheet
25/25 flowmeter

Rev.1 Feb 2015

- ✓ Pre-assembled complete set including orifice plate mounted between orifice flanges
- ✓ Orifice plate design based on ISO5167, BS1042, ASME.MFC.3M or ISO TR15377 :2007 industry standards
- ✓ Accuracy, repeatability and reliability of the flow element
- ✓ No need of calibration
- ✓ Easy and quick installation and commissioning
- ✓ Very long life-time product
- ✓ Robust, cost-effective and maintenance-free system
- ✓ Opportunity to manufacture a complete flowmeter including up and downstream lengths, temperature sensor & multi-variable transmitter



Contents

Integrated 25/25 pressure taps on the flanges are widely used as a 25/25 flowmeter

Applications - standards

Standards	ISO5167, BS1042, ASME.MFC.3M, ISO TR15377 :2007
Fluid temperature	-110°C to +800°C
Type of fluid	Gas, steam, liquid (single-phase fluids)
Nominal diameters	ND50 to ND1000 according ISO5167-1 (from 2 up to 40 inches) ND15 up to ND50 according ISO TR 15377 :2007 (from 1/2 up to 2 inches)
Maximum operating pressure	Limited by the flange rating

Features

Ratio pressure loss	42% to 95% of $\Delta P^{(1)}$
Accuracy	<1% to 2,5% depending on the installation
Material orifice plate	Stainless steel, Inconel, Monel, Hastelloy, PTFE, Duplex, Superduplex, Titanium, Tantalum, PVC, etc
Type of orifice flanges	Welding neck, slip-on…
Type of pressure taps	Taps located in the flanges : high pressure tap is 25.4 mm (1 inch) upstream of the inlet face and the low tap is the same distance downstream of the outlet face of the orifice plate
Material orifice flanges	Stainless steel, Carbon steel, Inconel, Monel, Hastelloy, PTFE, Duplex, Superduplex, etc
Type of gaskets	Flat seal (spiral wound gasket, graphite, PTFE) or RTJ (mild steel, stainless steel, monel alloy…)

(1) Depending on the type of orifice plate and on the ß value – see relevant datasheet for details

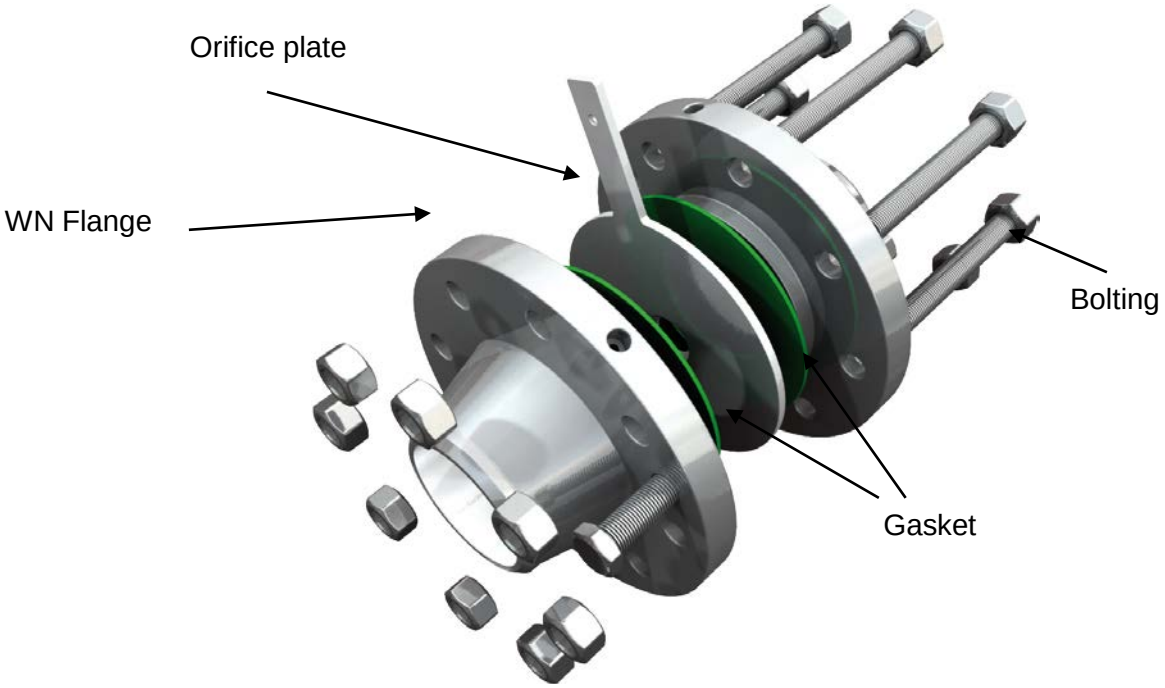
Mounting

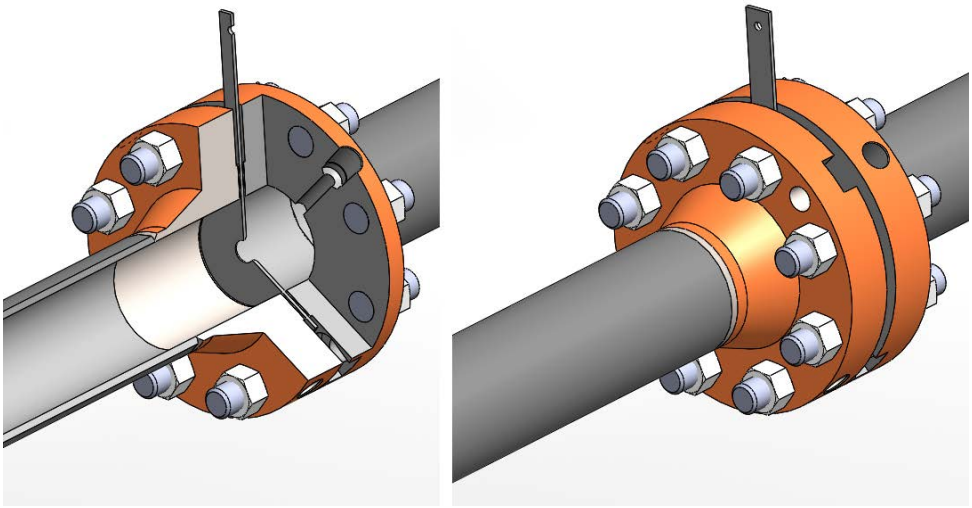
Piping connection	25/25 flowmeter mounted between straight sections (variable lengths regarding β and obstacles located up and downstream – see table 1 here-after)
Centering of orifice bore relative to piping	Distance e between the centerline of the orifice and the centerline of the pipe in the direction parallel to the pressure tapping : $e \leq 0{,}002\ 5D / (0{,}1 + 2{,}3\ \beta^4)$
Process connection	Pipes with flanges (RF or RTJ) or butt welding

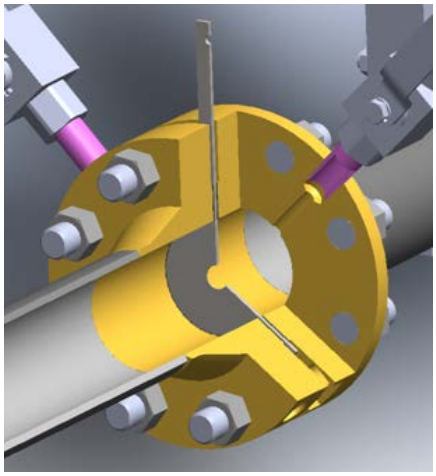
Limits of use

Flange taps	$d \geq 12.5$ mm $0.1 \leq \beta \leq 0.75$ $Re_D \geq 5000$ & $Re_D \geq 170\ \beta^2\ D$

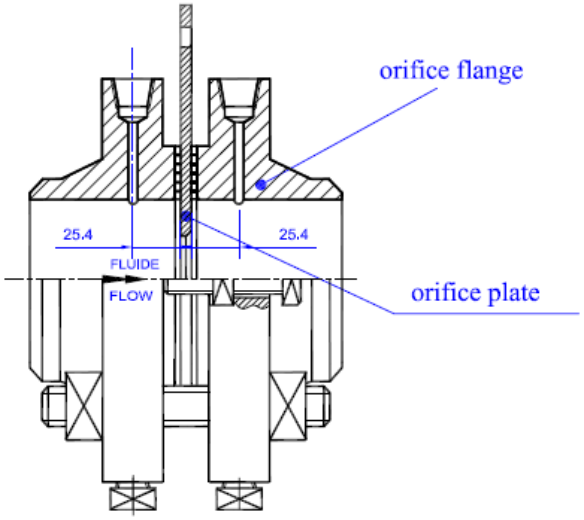
Orifice plate between Welding-Neck flanges with 25/25 pressure taps (1 inch/1 inch)



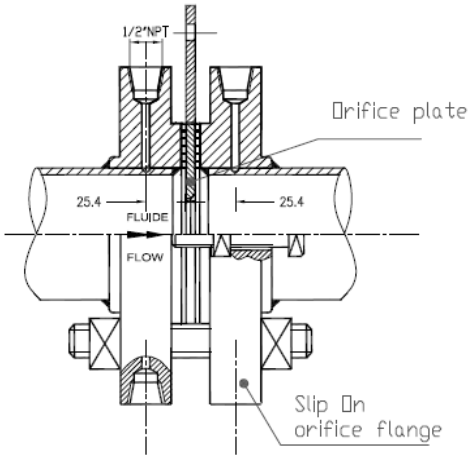




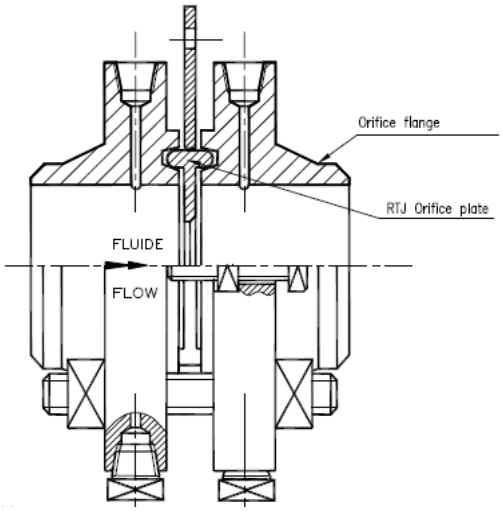
Orifice plate between Welding-Neck flanges with 25/25 pressure taps (1 inch/1 inch)



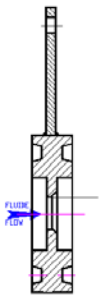
Orifice plate between Slip-On flanges with 25/25 pressure taps (1 inch/1 inch)



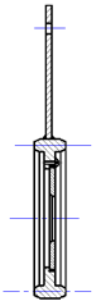
RTJ male orifice plate between Welding-neck flanges with 25/25 pressure taps (1 inch/1 inch)



The orifice plate is placed in the RTJ (ring tongue joint) orifice carrier. Made of a soft material, the RTJ orifice carrier is to be mounted between RTJ flanges and is used to ensure proper sealing. The set orifice place and orifice carrier can also be made of a single piece material.



RTJ female orifice plate

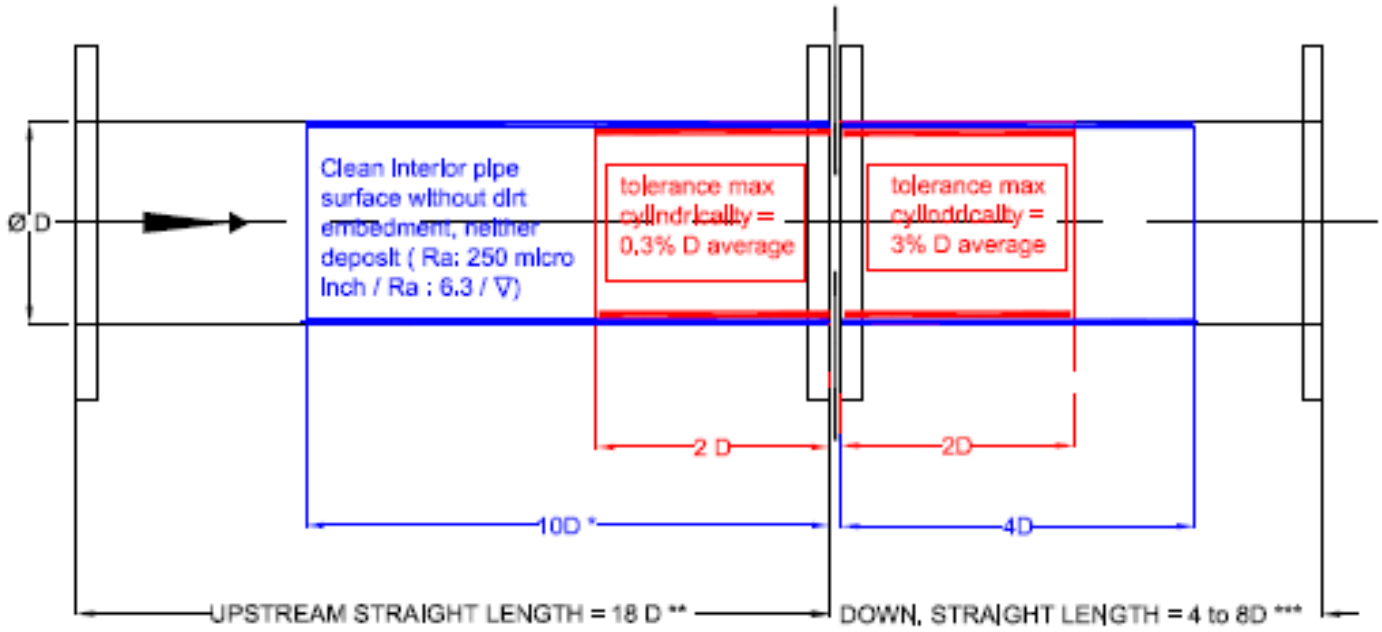


RTJ male orifice plate

Installation requirements

Pipe alignment	Straight pipe if deviation from a straight line < 0,4% over its length
Upstream pipe roughness	Ra to be respected on a length ≥10D See diagram here under See ISO5167-2 standard
Circularity of the upstream pipe	D ≤ D ± 0,3% D on a length ≤ 2D
Circularity of the downstream pipe	D ≤ D ± 3% D on a length ≤ 2D
Temperature sensor location	On the downstream pipe, distance between the temperature sensor and the primary device between 5D and 15D

Diagram : Roughness and cylindricality criterion



* for straight lengths between 2D to 10D, no additional uncertainty in the discharge coefficient is involved provided that the maximum tolerance on cylindricality does not exceed 0,3%D

** minimum distance from the primary element to the nearest upstream fitting with a 19-tube bundle flow straightener

*** minimum length between the primary element and the nearest downstream fitting depending on the d/D value

Examples of assemby

Photo 1 : 25/25 flowmeter with orifice welding neck flanges, upstream and downstream required straight lengths, temperature sensor, remote manifold and differential pressure multivariable transmitter.

Photo 2 : 25/25 flowmeter with orifice flanges, upstream and downstream required straight lengths, temperature sensor, direct mounted manifold and differential pressure multivariable transmitter

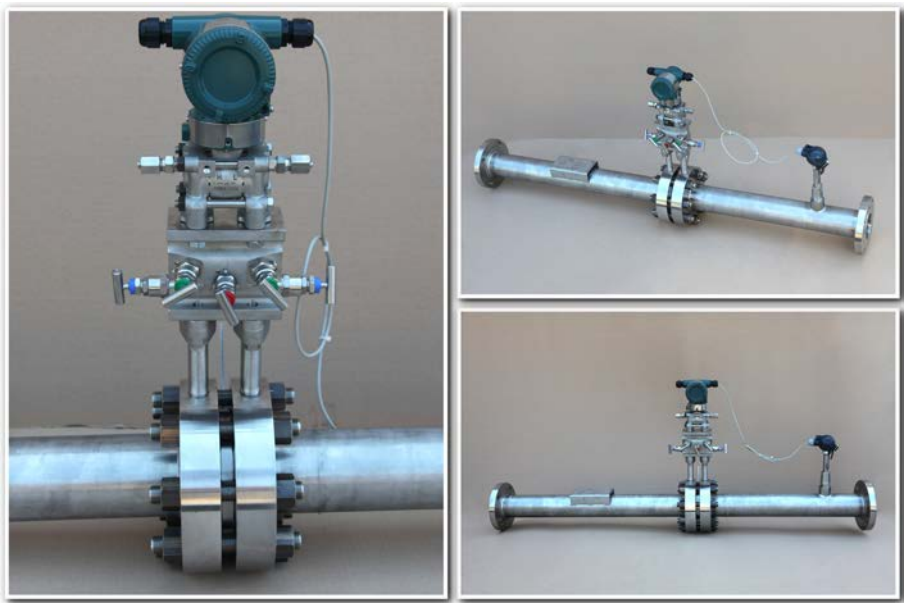


Photo 3 : 25/25 flowmeter with orifice flanges, upstream and downstream pipes, direct mounted manifold and differential pressure transmitter

Delta 25/25 -	MAIN CODE												
25/25 flowmeter	XX	XXX	X	XX	XX	XXX	XXXXX	XXX	XX	XXX	XXX	X	XX
Type of upstream face													
Sharp Edge	SE												
Conical Entrance	CO												
Quarter Circle	QC												
Eccentric	EC												
Segmental	SG												
Multi holes	MH												
Type of face													
Raising Face		RF*(1)											
Ring Torque Joint		RTJ											
for RTJ :													
Male			M										
Female			F										
in 1 piece or in 2 pieces													
Monobloc				MO									
Screwed*(2)				SC									
Type of finishing													
Polished 1 face					P								
Polished 2 faces					2P								
Others - SPECIFY					O								
Nominal diameter													
DN15 - 1/2"						1							
DN20 - 3/4"						0,75							
DN25 - 1"						1							
DN32 - 1"1/4						1,25							
DN40 - 1"1/2						1,5							
DN50 -2"						2							
DN65 - 2"1/2						2,5							
DN80 - 3"						3							
DN100 - 4"						4							
DN125 - 5"						5							
DN150 - 6"						6							
DN200 - 8"						8							
DN250 - 10"						10							
DN300 - 12"						12							
DN350 - 14"						14							
DN400 - 16"						16							
DN450 - 18"						18							
DN500 - 20"						20							
DN600 - 24"						24							
Rating													
150#							A150						
300#							A300						
600#							A600						
900#							A900						
1500#							A1500						
2500#							A2500						
PN10							D10						
PN16							D16						
PN25							D25						
PN40							D40						
PN63							D63						
PN100							D100						

Delta 25/25 -	MAIN CODE												
25/25 flowmeter	XX	XXX	X	XX	XX	XXX	XXXXX	XXX	XX	XXX	XXX	X	XX
Plate material													
Stainless steel 304								SS4					
Stainless steel 316								SS6					
Inconel								INC					
Monel								MON					
Hastelloy								HLY					
PTFE								PTF					
Duplex								DPX					
Superduplex								SDX					
Others - SPECIFY								O					
Orifice flanges													
Welding neck									WN				
Slip on									SO				
Others									O				
Flanges material													
ASTM A105										105			
A350LF2										350			
Carbon steel*(3)										CST			
Stainless steel 304										SS4			
Stainless steel 316										SS6			
Inconel										INC			
Monel										MON			
Hastelloy										HLY			
PTFE										PTF			
Duplex										DPX			
Superduplex										SDX			
Other										O			
Pipe Schedule													
5-5S											5		
10-10S											10		
20											20		
30											30		
40S-Std											STD		
40											40		
60											60		
XS-80S											XS		
80											80		
100											100		
120											120		
140											140		
160											160		
XXS											XXS		
Gaskets													
Flat												F	
Graphite												G	
Spiral wound												S	
PTFE												P	
Others												O	
Boltings material													
Carbon steel													CS
Stainless steel													SS
Others													O

*(1) OP-XX-RF can be assembled with simple or double & male or female facing depending on the flange

*(2) Plate support material to be specified

*(3) Type of carbon steel to be specified

OPTIONAL CODE	XX	XX	X	X
Manifold				
3-way direct mounting	3D			
3-way remote mounting	3R			
5-way direct mounting	5D			
5-way remote mounting	5R			
DP Transmitter				
Standard		SD		
Multivariable		MV		
Temperature sensor*(1)				
With temperature sensor			Y	
Without temperature sensor			N	
Piping*(2)				
Upstream				U
Downstream				D
*(1) Type of temperature sensor to be specified				
*(2) Process connection to be specified				

Table 1 - Straight lengths

Required straight lengths between orifice plates and fittings – without flow conditioners

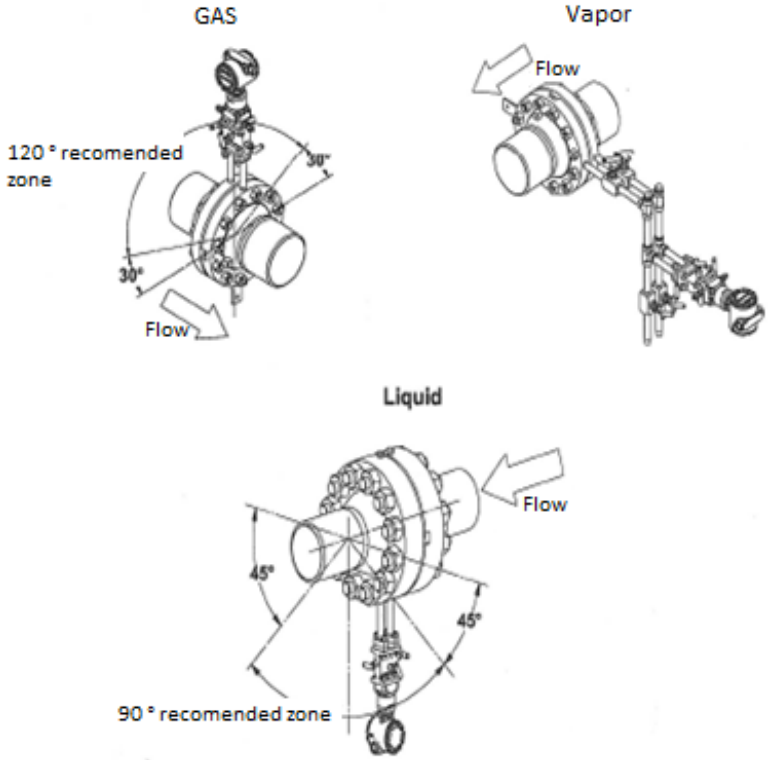
Values expressed as multiples of internal diameter, D

Diameter ratio d/D	UPSTREAM SIDE OF PRIMARY ELEMENT												DOWN STREAM OF PRIMARY ELEMENT
β	single 90° bend or two 90° bends in any plane (S>30D)	Two 90° bends in the same plane: S-config. 30D>S>10D	Two 90° bends in the same plane: S-config. 10D>S	Two 90° bends in perpen-dicular planes 30D>S>5D	Two 90° bends in perpen-dicular planes 5D>S	Simple 90° tee with or without an extension	Simple 45° bend or 2 bends in the same plane : S-config (S>2D)	Concentric reducer 2D to D over a length of 1,5D to 3D	Concentric expander 0,5D to D over a length D to 2D	Full bore ball valve or gate valve fully open	Abrupt symetrical reduction	Thermometer pocket or well of Ø < 0,03 D	Fittings (columns 2 to 11) and the densitometer pocket
1	2	3	4	5	6	7	8	9	10	11	12	13	12
<0,2	6 3	10	10	19 18	34 17	3	7	5	6	12 6	30 15	5 3	4 2
0,40	16 3	10	10	44 18	50 25	9 3	30	5	12 8	12 6	30 15	5 3	6 3
0,50	22 9	18 10	22 10	44 18	75 34	19 9	30 18	8 5	20 9	12 6	30 15	5 3	6 3
0,60	42 13	30 18	42 18	44 18	65 25	29 18	30 18	9 5	26 11	14 7	30 15	5 3	7 3,5
0,67	44 20	44 18	44 20	44 20	60 18	36 18	44 18	12 6	28 14	18 9	30 15	5 3	7 3,5
0,75	44 20	44 18	44 22	44 20	75 18	44 18	44 18	13 8	36 18	24 12	30 15	5 3	8 4

Notes:
The minimum straight lengths required are the lengths between various fittings located upstream and downstream of the orifice plate and the orifice plate itself.
Straight lengths shall be measured from the upstream face of the orifice plate.
First column for each fitting gives lengths corresponding to « zero additional uncertainty » values (cf standard ISO 5167.1)
Second column for each fitting gives lengths corresponding to “0,5% additional uncertainty” values (cf standard ISO 5167.1).
S represents the distance between two accessories

Orientation of the primary element

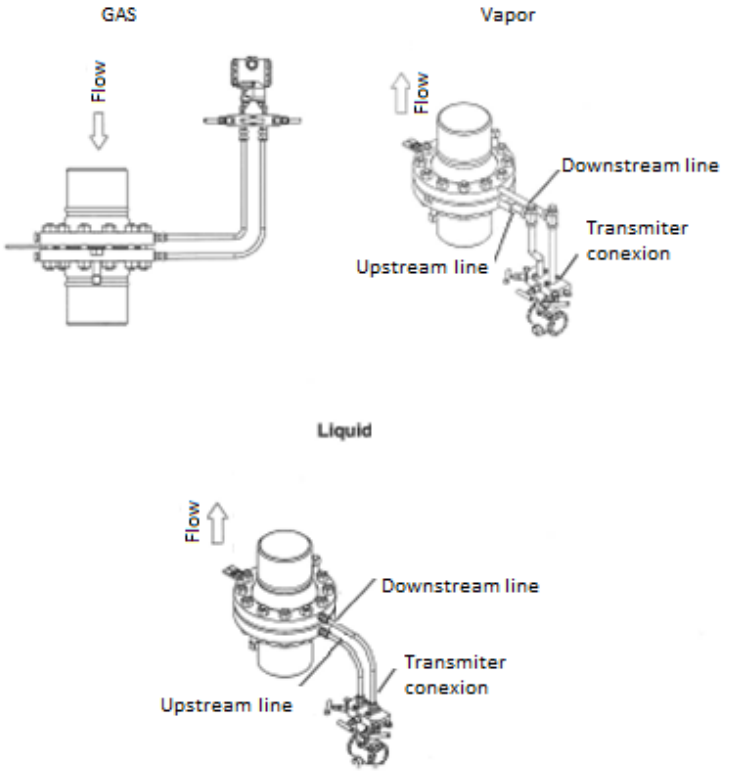
Horizontal line



With liquid applications, the transmitter must be mounted below the pipe. This ensures that air bubbles rise back to the process pipe and thus do not influence the measurement.

With gas applications, the transmitter must be mounted above the pipe. This ensures that any condensate flows back into the process pipe and thus does not influence the measurement

Vertical line



* Align the Upstream line with the downstram line before plugging to the transmitter

With steam applications, two condensate pots should be used. They must be mounted on the same level so that the pipes between the transmitter and the condensate pots must be completely filled with water. The transmitter must be placed below the pipe.