

# INSTRUCTION

for

## EPSILON Flow Meter

### Liquid and Gas

#### Application

EPSILON flow meter measures liquid or gas flow according to the differential pressure principle. The fluid must be in one phase and the pipe shall run full in the measuring section.

Changes of flow shall be slowly i.e. without pulsations.

#### Storage

Before installation the flow meter must be kept clean and protected against corrosion and physical damage.

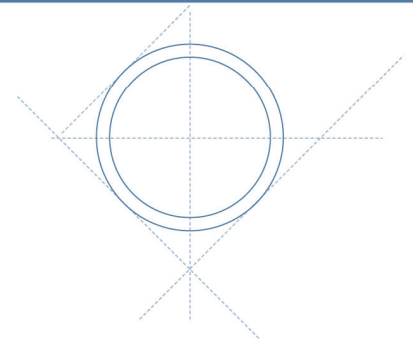
#### Pipe Run

The EPSILON flow meter shall be mounted between 2 flanges. The 2 adjacent pipe sections shall form a straight cylindrical pipe of constant cross-sectional area without any obstructions.

The inner pipe diameter  $D$  must not vary more than 0,3% of  $D$  used in the bore calculation.

The EPSILON differential pressure producer is a combination of a flow conditioner and an orifice plate making the EPSILON very suitable for short straight pipe runs.

The required minimum straight lengths of pipe vary according to beta and the nature of obstruction - bends, reducers etc. From the table below it can be seen how many times the inner pipe diameter  $D$  is required.



$\beta$	On upstream (inlet) side of the primary device			On downstream (outlet) side
	Single 90° bend or tee (flow from one branch only)	Two or more 90° bends in the same plane	Two or more 90° bends in different planes	All fittings included in this table
0,25	1	2	2	1
0,30	1	2	2	1
0,35	1	2	2	1
0,40	1	2	4	1
0,45	2	3	5	1
<b>0,50</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>1</b>
0,55	4	6	7	1
<b>0,60</b>	<b>5</b>	<b>8</b>	<b>10</b>	<b>2</b>

Highlighted values are standard beta values.

It is recommended to use full bore valves upstream of the flow meter. The valves shall be fully open.

The inside surface of the measuring pipe shall be clean, free from pitting and deposit for at least a length of 2 times D upstream and 1 times D downstream of the differential pressure producer.

The inner roughness shall be below the limits given in the table below.

Upper limits of relative roughness of the upstream pipe-line for EPSILON

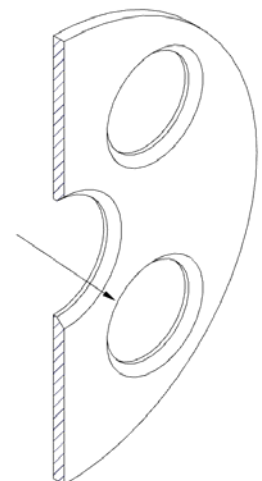
$\beta$	$\leq 0,3$	0,32	0,34	0,36	0,38	0,4	0,45	0,5	0,6
Corner taps 104k/D	25	18,1	12,9	10,0	8,3	7,1	5,6	4,9	4,2

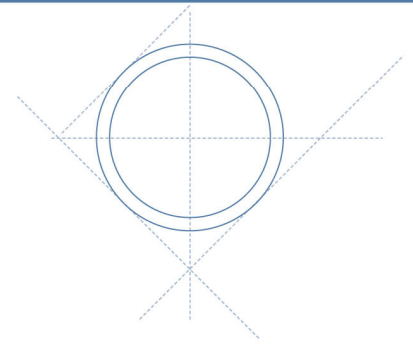
## Installation

The EPSILON flow meter must be centred carefully in the pipe line. The flow meter is suitable for both horizontal and vertical pipe lines. The EPSILON shall be installed in the pipe line respecting the flow arrow on the flow meter.

## Gas

The electronics shall be mounted horizontal in centre line or better above the pipe line.





## **Liquid**

The electronics shall be mounted horizontal in centre line or better below the pipe line.

Flange gaskets must suit the fluid and the service conditions.

The inner diameter of the flange gaskets must be greater than the inner pipe diameter.

It is advised that the outer diameter of the gaskets is equal to the diameter of the bolt circle minus the diameter of a bolt.

## **Electronics, Differential pressure transmitter**

When the EPSILON flow meter is supplied as a complete unit, the differential pressure transmitter is calibrated to the required flow rate.

## **Power supply**

The electronics shall be powered with 24 Vdc with max. 2 % ripple. The max load Must exceed 500 Ohm.

The 2 wire connection is connected to + and – respectively.

## **Output signal**

As standard the output signal is analogue 4 – 20 mA, linear to flow.

Other output signals and communication standards are available.

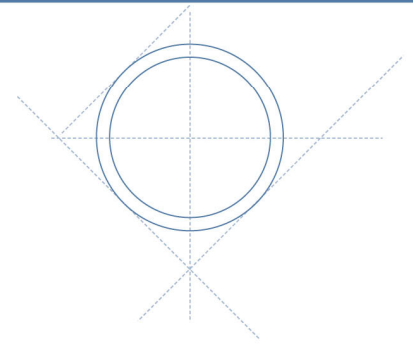
## **Damping of output signal**

The output signal from the electronics is damped suitable for flow measurement, further adjustment should not be necessary.

## **Setting of a new flow rate**

Is a new flow rate required a new differential pressure calculation has to be performed.

The differential transmitter is re-ranged by using a hand-held communicator connected to test terminals on the transmitter.

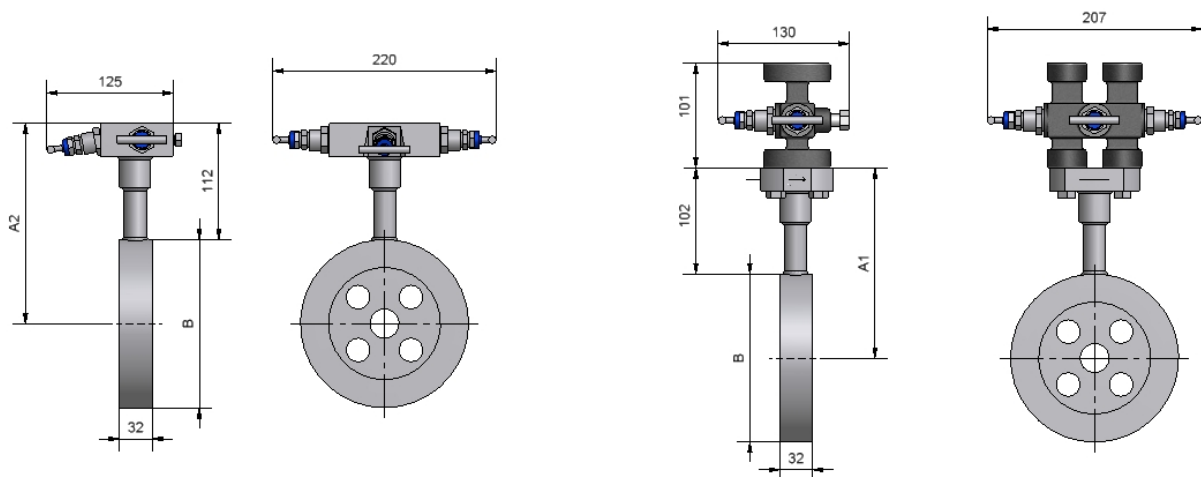


## Other Requirements

For explosion proof applications special requirements are applicable.  
 Digital communication is possible for certain types.  
 For full details see transmitter instruction manual.

## Instrument Connection

The flow meter can be supplied with a 3 valve manifold valve or an integrated 3 valve or 5 valve manifold with the differential pressure transmitter in order to isolate and equalise.



## Maintenance

The EPSILON flow meter no special maintenance. It is however important that the flow meter suffers no mechanical damages.

## References

ISO 5167, DIN 1952, DIN 19205 part 1, ASME MFC-3M, Shell Flow Meter Engineering Handbook, R.W. Miller : Flow Measurement Engineering Handbook.