

Wedge Flowmeter DATASHEET

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Tel: (+351) 21 843 64 00
Fax: (+351) 21 843 64 09
geral@bhb.pt www.bhb.pt

IntraWedge WEDGE FLOW METER Type: IWM



Technical Information

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FLOW

THE EXPERT FOR LEVEL AND FLOW

1. General Description

A Wedge Flow Meter is preferably applied in difficult-to-meter line fluids, like air entrained liquids, particular entrained liquids, high viscous liquids or slurry liquids, which are abrasive or fibrous. It is also applicable for clean liquids, gas/air and steam.

It consists of a measurement pipe with pressure taps in front and behind the flow element, a wedge restriction being welded into the measurement pipe from the top side. The pressure is being measured in front of the wedge (high or dynamic pressure side) and behind the wedge (static or low pressure side). By determining the difference of these two measurements, which is called the differential pressure, the volume flow of the fluid can be calculated, as all other characteristics of the measuring points are constant.

As the wedge has the profile of an isosceles triangle, the form is the same from both sides. So the measurement is possible in both directions.

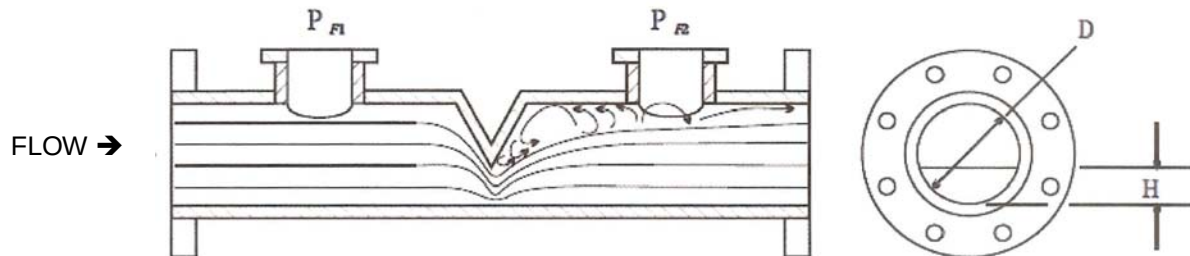
2. Main Features

- ◆ Simple principle of operation allows functionality on any fluid.
- ◆ Long life without maintenance.
- ◆ Minimal upstream and downstream requirements.
- ◆ Low permanent pressure loss.
- ◆ Sizes ½" to 48".
- ◆ Different H/D (opening) ratios
- ◆ Bidirectional measurement possible.

3. Measuring Principle

The line fluid is forced downward similar to a segmental orifice plate, but is guided along a slopping "wedge" shape rather than a sharp edge. The pressure taps are located upstream and downstream of the wedge and in all cases are equipped with sealed sensors.

The differential pressure produced by the device is a function of the wedge segment opening (H) and the diameter of the body, D.



4. Equations

The equivalent beta ratio is:

$$\beta_{\text{wedge}} = \frac{D}{D} = \left(\frac{1}{\pi} \left\{ \arccos \left[1 - \frac{2H}{D} \right] - 2 \left[1 - \frac{2H}{D} \right] \left(\frac{H}{D} - \left[\frac{H}{D} \right]^2 \right)^{1/2} \right\} \right)^{1/2}$$

Discharge coefficients are as follows for the line sizes indicated:

Line size:	Discharge coefficient:
0,5"	$C = 0,7883 + 0,107(1 - \beta_{\text{wedge}}^2)$
1...1,5"	$C = 0,6143 + 0,718(1 - \beta_{\text{wedge}}^2)$
1,5...24"	$C = 0,5433 + 0,2453(1 - \beta_{\text{wedge}}^2)$

The mass flow rate equation for incompressible flow is:

$$Q_M = N_{MG} \frac{Cd^2}{\sqrt{1-(d/D)^4}} \sqrt{F_P G_F} \sqrt{H_W}$$

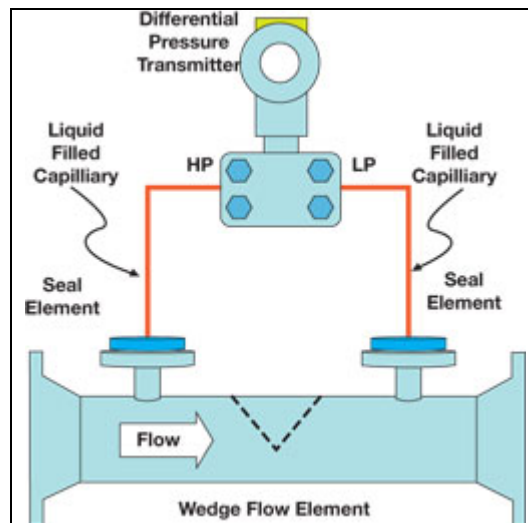
N_{MG} = dimensional constant

H_W = differential inches of water

G_F = specific gravity

F_P = thermal expansion factor

The calculations for compressible flow are similar but must take account to temperature and adiabatic expansion and compressibility factors.



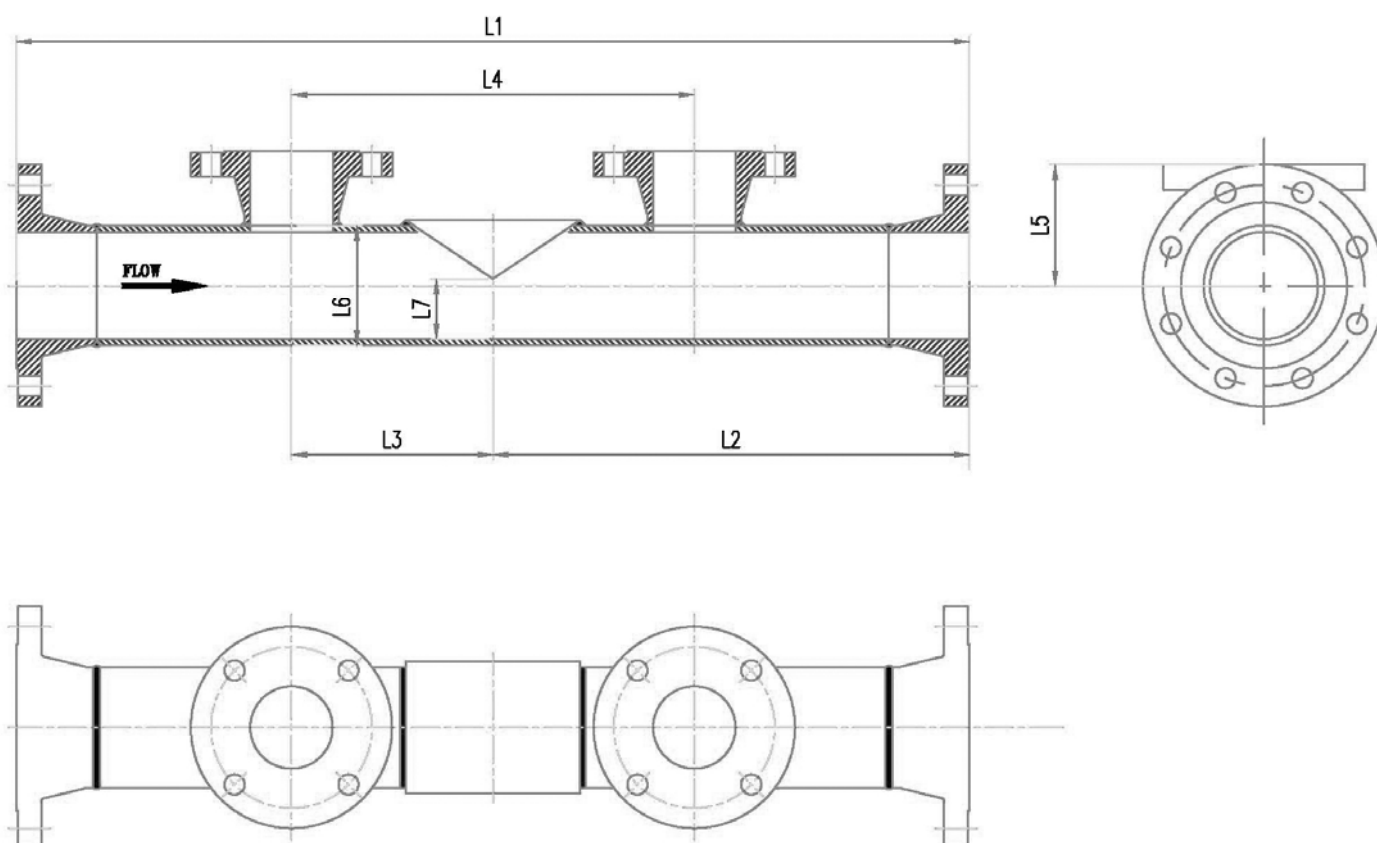
Solids and other debris easily pass under the restriction of the wedge meter. The inherent ruggedness of the restriction resists damage to its measuring edge.

5. Dimensions

Table of standard dimensions:

Line size		L1		L2		L3		L4		L5		L6		L7	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50	2	700	28	350	14	116	4,63	232	9,26	180	7,19	50	2	tba	tba
75	3	850	34	425	17	190	7,56	380	15,12	195	7,75	75	3	tba	tba
100	4	900	36	450	18	190	7,50	380	15,00	210	8,25	100	4	tba	tba
150	6	1000	40	500	20	225	9,00	450	18,00	235	9,31	150	6	tba	tba
200	8	1050	42	525	21	260	10,25	520	20,50	260	10,31	200	8	tba	tba
250	10	1125	45	565	22,5	295	11,75	590	23,50	285	11,38	250	10	tba	tba
300	12	1175	47	590	23,5	335	13,25	665	26,50	310	12,38	300	12	tba	tba
350	14	1225	49	615	24,5	350	14,00	700	28,00	325	13,00	350	14	tba	tba
400	16	1225	49	615	24,5	385	15,25	765	30,50	350	14,00	400	16	tba	tba
450	18	1300	52	650	26	420	16,75	840	33,50	375	15,00	450	18	tba	tba
500	20	1400	56	700	28	465	18,50	925	37,00	400	16,00	500	20	tba	tba
600	24	1550	62	775	31	525	21	1050	42,00	450	18,00	600	24	tba	tba

(Larger sizes on demand)



Contactos/Contacts:

Comercial/Commercial:

Fernando Mena Costa
e-mail: fcosta@bhb.pt
Tel: (+351) 21 843 64 00
Fax: (+351) 21 843 64 09

Assistência/Service:

Patricia Costa
e-mail: ppcosta@bhb.pt
Tel: (+351) 21 843 64 00

