

# SHICO. ORIFICE FLANGE PLATES

MODEL : OPA Series

## ■ DIFFERENTIAL PRESSURE PRIMARY DEVICE STANDARD ORIFICE PLATES WITH ANNULAR CHAMBERS

This orifice plate is widely used for measuring liquid, steam, and gas in low or medium pressure lines having diameter of 25A-1,000A. Tapping of differential pressure is done by corner tap method with differential pressure tapping rings having annular chambers. One set is composed of differential pressure tapping rings, an orifice plate, and a gasket. Annular chambers are installed to average the differential pressure inside the rings.

## ■ SPECIFICATIONS

- **Type :** Concentric orifice such as "edge" and "quarter circle"
- **Calculation standard :** According to concentric edge ISO 5167, 1980
- **Nominal pipe size :** 25A to 300A  
These orifice plates with annular chambers can be manufactured for nominal pipe sizes up to 1000A.
- **Main material :** Ring : SS400, SF45, SUS304, SUS316 or Others  
Plate : SUS304, SUS316 or Others  
Differential pressure tapping tube : STPG, SUS304TP, or SUS316TP
- **Gasket :** Valqua : No. 1500 or No. 7000
- **Connection method :** Connection flange: KS or JIS 5, 10, 30K  
ANSI 150, 300, 400Lb  
Differential pressure tapping Tube : 15A sch 80  
End : PT $\frac{1}{2}$  external thread  
Use single-part orifice plate (type : OPE) for flange standard of JIS 40K, ANSI 600Lb or higher

## ■ ORDERING

CODE	Pipe size(mm) <sup>2</sup>
CODE	Enter pipe size in 4th - 7th digits
CODE	Material of orifice plates
S	SUS304
W	SUS316
V	Other
CODE	Material of ring
E	SS400
F	SF45
S	SUS304
W	SUS316
V	Other
CODE	Treatment
Y	None
A	Oil repulsion treatment
CODE	Flange standard
P	KS 5K
J	KS 10K
K	KS 20K
L	KS 30K
A	ANSI 150Lb
B	ANSI 300Lb
C	ANSI 400Lb
D	ANSI 600Lb
Z	Other

OPA-□-□-□-□-□-□

\* Note

1) Combination of orifice plates and rings

		Ring				
		E	F	S	W	V
Orifice plate	S	○	○	○	×	×
	W	×	×	×	○	×
	V	×	×	×	×	○

2) Standard manufacturing range is for pipe size up to 300mm.

3) With ring material SS400 : Pressure rating for (pipe) flange 20K Working temperature 350℃

4) With ring material SF45 : Pressure rating for (pipe) flange 20K Working temperature 350℃

5) Designate material SUS304 (code S) for orifice plates and rings in case of oil-repulsion treatment.



SAM HOI INDUSTRIAL CO., LTD.

#48-2, 66-BeonGil, Golden root-Ro, Juchon Myeon, Gimhae-city Gyeongnam, Korea

Tel. +82-55-321-0578 Fax. +82-55-321-0573

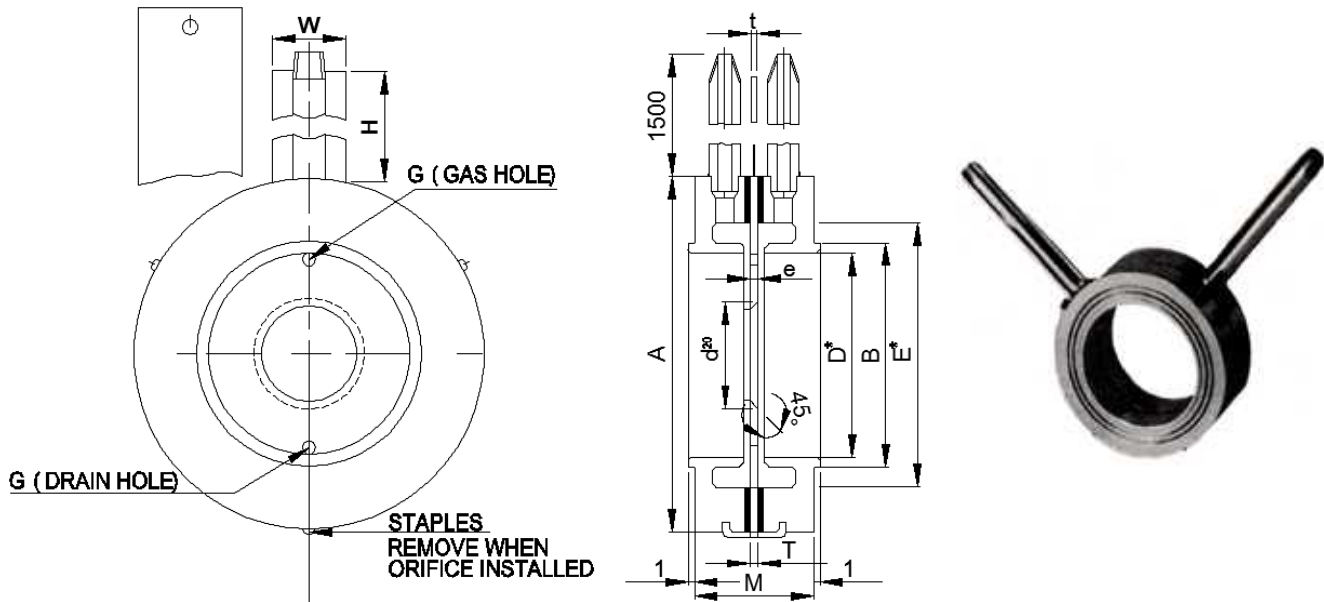
E-mail: shico007@chol.com Homepage : [www.shico.co.kr](http://www.shico.co.kr)

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# SHICO. RING ORIFICE

MODEL : OPA Series

## EXTERNAL VIEW



\*d<sup>20</sup> : ORIFICE DIAM AT 20°C D : INSIDE DIA. OF RINGS } REFER TO ORIFICE CALCULATED SHEET  
E : INSIDE DIA OF GASKETS

## DIMENSIONS(mm) - 5K KS JIS

Nominal Pipe Size		Outside Dim of Rings and Plate A	Dia. of Gasket Stay B	Thickness of Edge e	Diameter of Hole G	Face to Face M	Thickness of Plate T	Width of Tab Handle W	High of Tab Handle H	Thickness of Tab Handle t
A	B									
25	1	65	33	0.2-0.4		75	2	25	95	2
32	1¼	78	42	0.3-0.5	1.6	75	2	25	95	2
40	1½	83	48	0.3-0.5	1.6	75	2	25	95	2
50	2	93	60	0.5-0.8	1.6	75	2	25	95	2
65	2½	118	73	0.5-0.8	1.6	75	3	32	95	2
80	3	129	88	0.5-0.8	1.6	75	3	32	95	2
90	3½	139	101	0.5-0.8	1.6	75	3	32	95	2
100	4	149	114	0.8-1.2	1.6	75	3	38	105	2
125	5	184	141	0.8-1.2	1.6	75	3	38	105	2
150	6	214	168	0.8-1.2	1.6	75	3	38	105	2
175	7	240	196	1.5-2.0	1.6	76	4	38	105	2
200	8	260	219	1.5-2.0	1.6	76	4	38	105	2
225	9	285	246	1.5-2.0	1.6	76	4	38	105	2
250	10	325	273	4	2.0	76	4	44	120	3
300	12	370	323	4	2.5	76	4	44	120	3



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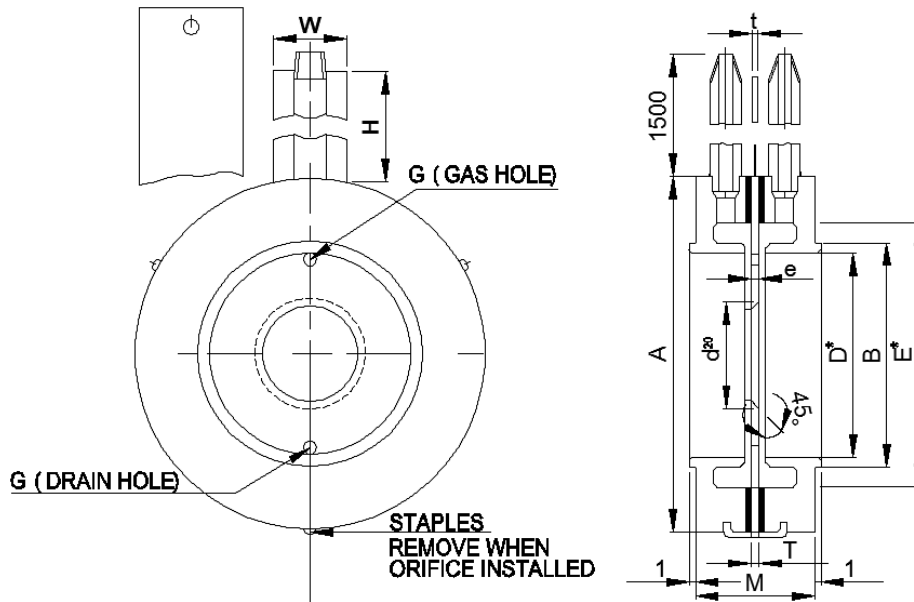
#48-2, 66-BeonGil, Golden root-Ro, Juchon Myeon, Gimhae-city Gyeongnam, Korea

Tel. +82-55-321-0578 Fax. +82-55-321-0573

E-mail: shico007@chol.com Homepage : [www.shico.co.kr](http://www.shico.co.kr)

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■ EXTERNAL VIEW



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E : INSIDE DIA OF GASKETS

■ DIMENSIONS(mm) - 10K KS JIS

Nominal Pipe Size		Outside Dim of Rings and Plate A	Dia. of Gasket Stay B	Thickness of Edge e	Diameter of Hole G	Face to Face M	Thickness of Plate T	Width of Tab Handle W	High of Tab Handle H	Thickness of Tab Handle t
A	B									
15	½	58	21	0.2-0.3		75	2	25	95	2
20	¾	63	27	0.2-0.4		75	2	25	95	2
25	1	74	33	0.2-0.4		75	2	25	95	2
32	1¼	84	42	0.3-0.5	1.6	75	2	25	95	2
40	1½	89	48	0.3-0.5	1.6	75	2	25	95	2
50	2	104	60	0.5-0.8	1.6	75	2	25	95	2
65	2½	124	73	0.5-0.8	1.6	75	3	32	95	2
80	3	134	88	0.5-0.8	1.6	75	3	32	95	2
90	3½	144	101	0.5-0.8	1.6	75	3	32	95	2
100	4	159	114	0.8-1.2	1.6	75	3	38	105	2
125	5	190	141	0.8-1.2	1.6	75	3	38	105	2
150	6	220	168	0.8-1.2	1.6	75	3	38	105	2
175	7	245	196	1.5-2.0	1.6	76	4	38	105	2
200	8	270	219	1.5-2.0	1.6	76	4	38	105	2
225	9	290	246	1.5-2.0	1.6	76	4	38	105	2
250	10	333	273	4	2.0	76	4	44	120	3
300	12	378	323	4	2.5	76	4	44	120	3



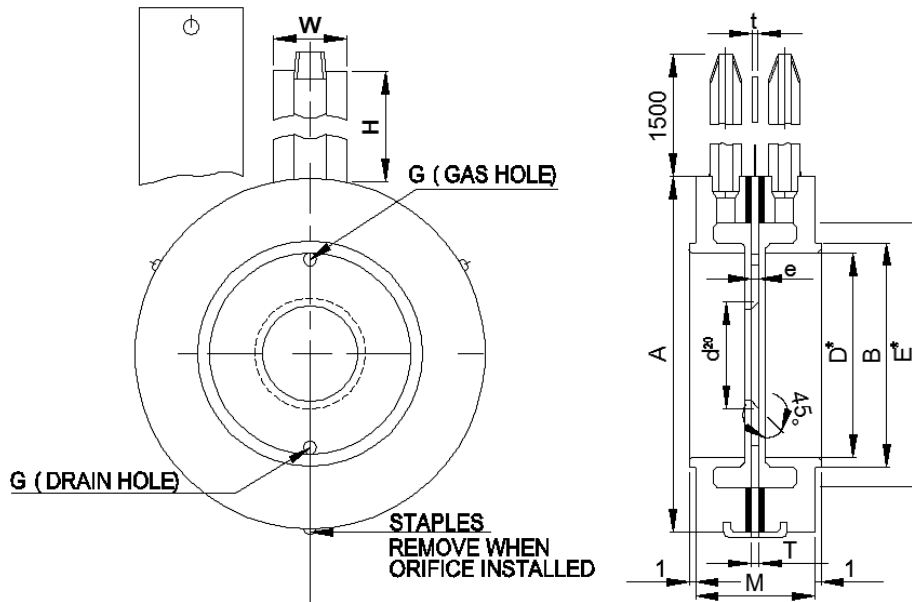
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#48-2, 66-BeonGil, Golden root-Ro, Juchon Myeon, Gimhae-city Gyeongnam, Korea

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E : INSIDE DIA OF GASKETS

DIMENSIONS(mm) - 16K, 20K, KS JIS

Nominal Pipe Size		Outside Dim of Rings and Plate A	Dia. of Gasket Stay B	Thickness of Edge e	Diameter of Hole G	Face to Face M	Thickness of Plate T	Width of Tab Handle W	High of Tab Handle H	Thickness of Tab Handle t
A	B									
15	½	58	21	0.2-0.3		75	2	25	95	2
20	¾	63	27	0.2-0.4		75	2	25	95	2
25	1	74	33	0.2-0.4		75	2	25	95	2
32	1¼	84	42	0.3-0.5	1.6	75	2	25	95	2
40	1½	89	48	0.3-0.5	1.6	75	2	25	95	2
50	2	104	60	0.5-0.8	1.6	75	2	25	95	2
65	2½	124	73	0.5-0.8	1.6	75	3	32	95	2
80	3	140	88	0.5-0.8	1.6	75	3	32	95	2
90	3½	150	101	0.5-0.8	1.6	75	3	32	95	2
100	4	165	114	0.8-1.2	1.6	75	3	38	105	2
125	5	203	141	0.8-1.2	1.6	75	3	38	105	2
150	6	238	168	0.8-1.2	1.6	75	3	38	105	2
200	8	283	219	1.5-2.0	1.6	76	4	38	105	2
250	10	356	273	4	2.0	76	4	44	120	3
300	12	406	323	4	2.5	76	4	44	120	3



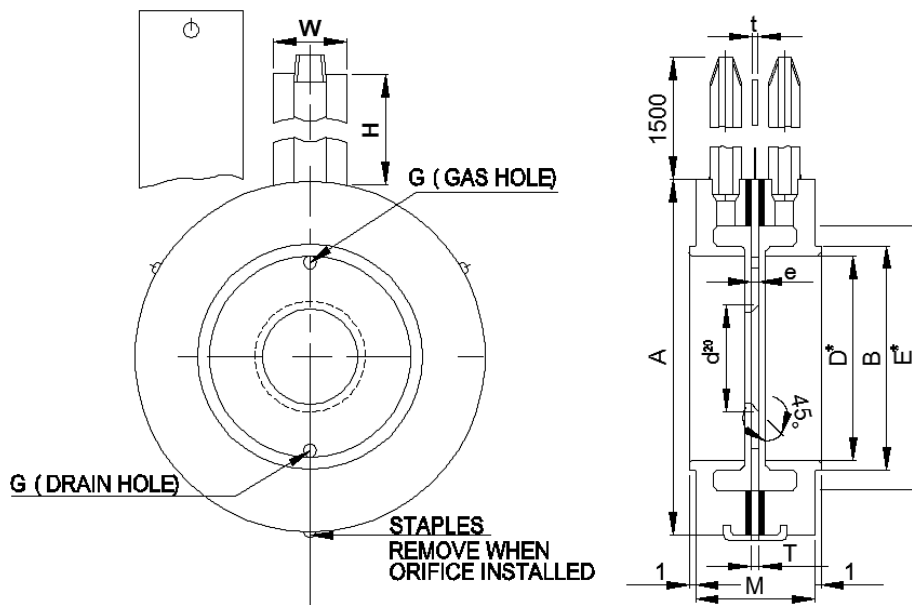
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### EXTERNAL VIEW



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E : INSIDE DIA OF GASKETS

### DIMENSIONS(mm) - 150Lb A.N.S.I

Nominal Pipe Size		Outside Dim of Rings and Plate A	Dia. of Gasket Stay B	Thickness of Edge e	Diameter of Hole G	Face to Face M	Thickness of Plate T	Width of Tab Handle W	High of Tab Handle H	Thickness of Tab Handle t
A	B									
1	25	66.7	33	0.2-0.4		75	2	25	95	2
1¼	32	76.2	42	0.3-0.5	1.6	75	2	25	95	2
1½	40	85.7	48	0.3-0.5	1.6	75	2	25	95	2
2	50	104.8	60	0.5-0.8	1.6	75	2	25	95	2
2½	65	123.8	73	0.5-0.8	1.6	75	3	32	95	2
3	80	136.5	88	0.5-0.8	1.6	75	3	32	95	2
3½	90	161.9	101	0.5-0.8	1.6	75	3	32	95	2
4	100	174.6	114	0.8-1.2	1.6	75	3	38	105	2
5	125	196.9	141	0.8-1.2	1.6	75	3	38	105	2
6	150	222.3	168	0.8-1.2	1.6	75	3	38	105	2
8	200	279.4	219	1.5-2.0	1.6	76	4	38	105	2
10	250	339.7	273	4	2.0	76	4	44	105	3
12	300	409.6	323	4	2.5	76	4	44	105	3



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## ORIFICE OPTIONAL SPECIFICATIONS

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**Concentric Bore Orifice Plates** : Square inlet and outlet edges(beveled outlet edge if required).

Refer to table below for optional concentric bore orifice plates.

Nominal Line Size		For Use Raised Face Flanges ANSI Class						Materials				Reference
mm	inch	150	300	400	600	900	1500	SUS304	SUS316	SS400	SB41	
15	1/2	×	×	×	×	×	×	×	×	×	×	
20	3/4	×	×	×	×	×	×	×	×	×	×	
25	1					×	×			×	×	
40	1 1/2					×	×			×	×	
50	2					×	×			×	×	
65	2 1/2					×	×			×	×	
80	3					×	×			×	×	
100	4					×	×			×	×	
125	5					×	×			×	×	
150	6					×	×			×	×	
200	8					×	×			×	×	
250	10					×	×			×	×	
300	12					×	×			×	×	
350	14					×	×			×	×	
400	16					×						
450	18					×						
500	20					×						
600	24	×	×	×	×	×		×	×			
700	28	×	×	×	×	×		×	×			
800	32	×	×	×	×	×		×	×			
900	36							×	×			
1000	40							×	×			
1050	42							×	×			
1200	48							×	×			
1250	50							×	×			
1300	52							×	×			
1350	54							×	×			
1500	60							×	×			

1. Standard plates are identified in shaded area : X=Option available ; Blank Space = Refer to notes in blank spaces.

2. For SUS304 and SUS316 : nominal plate thickness is 3.175mm(0.125in) for 15 and 20mm (1/2 and 3/4in) line sizes;

9.525mm(0.375in) for 600through 750mm(24 through 30in) line sizes; and 6.35. 9.525 or 12.7mm(0.250, 0.375 or 0.500 in as specified) for 900 through 1500mm (36through 60in) line sizes.

3. Alloy 20, Hastelloy C, Monel, and titanium plates are offered 3.175mm(0.125in) thick.

### Quadrant or Conical Inlet-Edged Orifice Plate(Optional)    Eccentric-Bore Orifice Plate(Optional)

Typically used when the pipe Reynolds Number is greater than 200 and less than 10,000 Provides a more constant and predictable discharge coefficient at lower Reynolds Number than a concentric bore, square-edge plate. Offered for 25, 40, 50, 65, 80, 100 and 150mm nominal line sizes. Materials available are SUS304, SUS316, SS400 and SB41.

Nominal plate thickness is 3.175, 6.35 or 9.525mm.

Flow process conditions dictate plate thickness value.

Typically used for dirty liquids or gases; or liquids containing vapor(bore above pipeline flow axis) and vapors containing liquids (bore below pipeline flow axis).

Pipe Reynolds Number application is usually greater than 10,000. Offered for 100, 150, 200, 250, 300 and 350mm nominal line sizes. Available in SUS304, SUS316, Alloy 20, Hastelloy C, Monel and titanium. For stainless steel plates, nominal plate thickness is 3.175mm for line sizes through 200mm and 6.35mm for the 250 through 350mm sizes. For all other materials, the plate thickness is 3.175mm. Orifice bore is located so that one edge is not more than 1% of the pipeline diameter from the wall.



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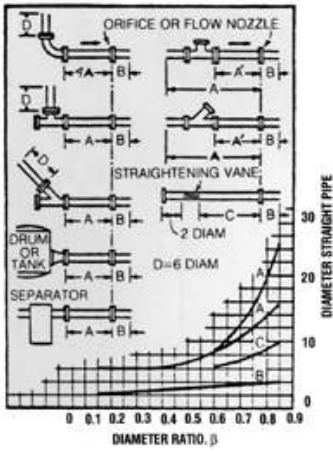
Tel. +82-55-321-0578 Fax. +82-55-321-0573

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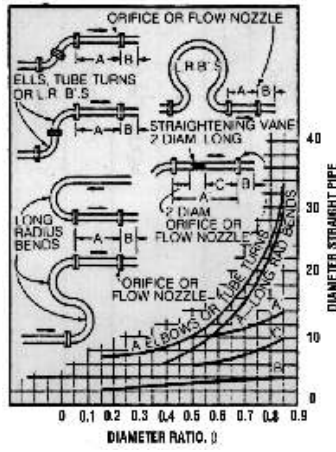
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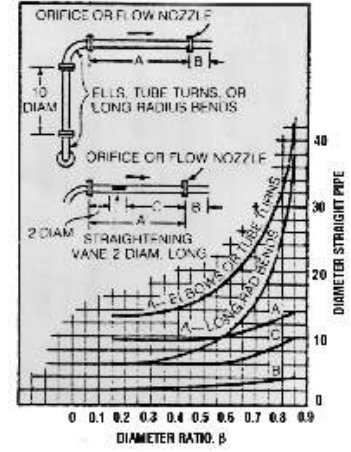
## PIPING REQUIREMENTS FOR ORIFICE, FLOW NOZZLES AND VENTURI TUBES



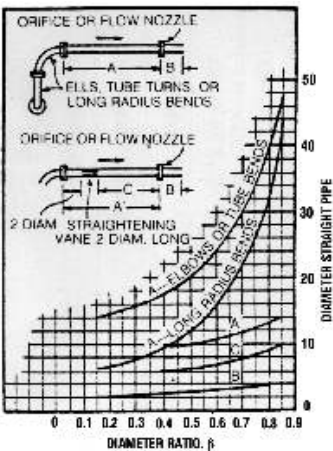
(A) FOR ORIFICES AND FLOW NOZZLES ALL FITTING IN SAME PLANE



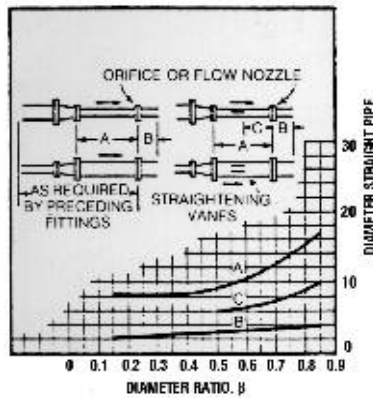
(B) FOR ORIFICES AND FLOW NOZZLES ALL FITTING IN SAME PLANE



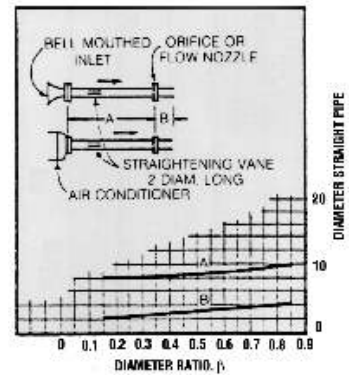
(C) FOR ORIFICES AND FLOW NOZZLES FITTING IN DIFFERENT PLANES



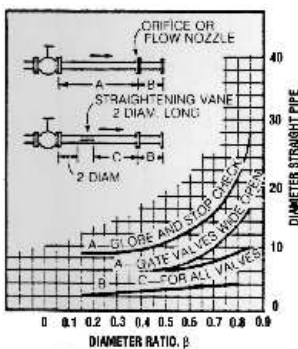
(D) FOR ORIFICES AND FLOW NOZZLES FITTINGS IN DIFFERENT PLANE



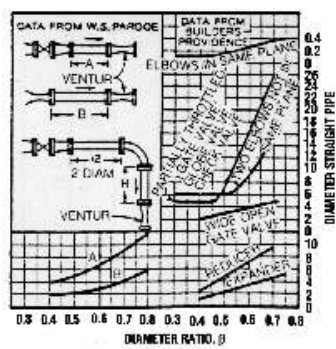
(E) FOR ORIFICES AND FLOW NOZZLES WITH REDUCERS AND EXPANDERS



(F) FOR ORIFICES AND FLOW NOZZLES VALVE AND REGULATORS



(G) IN ATMOSPHERIC INTAKE



(H) FOR VENTURI TUBES

NOTE 1 : ALL CONTROL VALVES MUST BE INSTALLED ON OUTLET SIDE OF PRIMARY ELEMENT

NOTE 2 : IN DIAGRAM H THE DISTANCES SHOWN ARE DOUBLE THOSE AT WHICH THERE SEEMED TO BE NO EFFECT



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