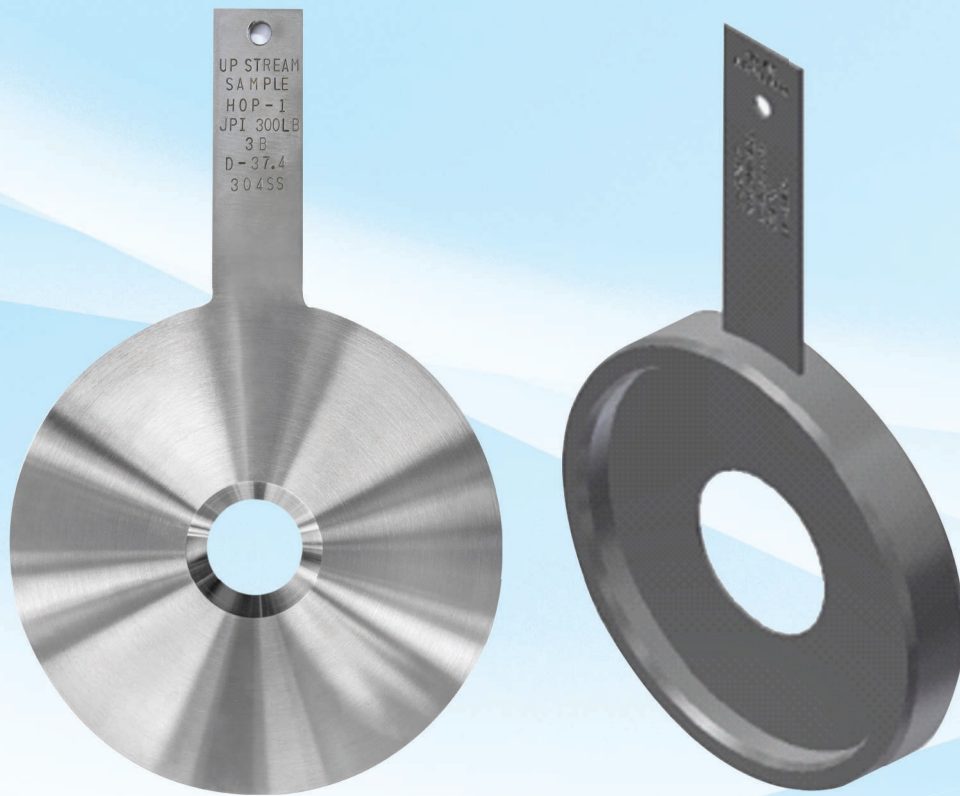




Differential Pressure Flow Element (Orifice Type)

Model : SOP-10, 20, 30

SOP-10

Orifice Plate



Specifications

ORIFICE BORE TYPE

Concentric Square Edged Orifice
Quadrant Edged Orifice
Eccentric Orifice
Segmental Orifice

FLOW CALCULATION STANDARDS

ISO 5167
AGA report #3
ASME MFC-3M (R.W Miller)
L.K.Spink
JIS Z 8762

FLANGE RATINGS

JIS 10, 20, 30 etc.
ANSI Class 150, 300, 600, 900 etc.

PRESSURE TAPS

Flange taps
Corner taps
Vena contract taps
1D and 1/2D (Radius) taps
Pipe taps

Applications

Concentric Orifice Plate

This type is generally the type most commonly used. Simple- structured with high precision, this orifice plate can be easily mounted and dismantled. In strict conformance with applicable standards, it is precisely finished to have required shape, size, surface roughness and flatness. For differential pressure measurement, it is combined with flange taps, corner taps or D-D/2 taps.

Introduction

Orifice plates are widely used for measurement as they provide the simplest and the most economical means of flow detection. Orifice plates are available in the concentric type that the round opening (bore) of the orifice plate is positioned concentrically with the center of the pipe and the opening edge (bore edge) is available either in the concentric square edge type (sharp. Square edge type) or in the quadrant edge type (round edge type). Orifice plates are also available in the eccentric type that the opening of the orifice is shifted from the center of the pipe. They also are available in the segmental type that the opening is a circular segmental segment and the orifice is comparable to a partially opened gate valve

PLATE THICKNESS

3, 6, 9, 12mm

TAB HANDLE

Welded to orifice plate

PLATE MATERIAL

Standard : 304LSS, 316LSS
Non-standard : Monel, etc.

DRAIN AND VENT HOLE

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4mm

MARKINGS

Upstream side of tab handle stamped
"UPSTREAM" and with bore type and size, line size, tag number, and flange rating.

SPECIAL MARKINGS

Special marking may be furnished to meet special requirement

Quarter-Circle Orifice Plate

The inlet edge of the quadrant edge orifice is rounded and usually the radius of the rounding is equal to the plate thickness. This orifice plate is principally used for measuring flow rates of low Reynolds Numbers. Flange taps or corner taps are used.

Eccentric Orifice Plate

For liquids containing solid particles that are liable to settle, or for vapors liable to deposit water condensate, this orifice plate is installed with its eccentric bore bottom flush with the bore bottom of the piping, so that the sedimentation of such inclusions is avoided. Likewise, for gases or vapors, it may be installed with its eccentric bore top flush with the bore top of the piping to avoid the stay of gas or vapor in its vicinity.

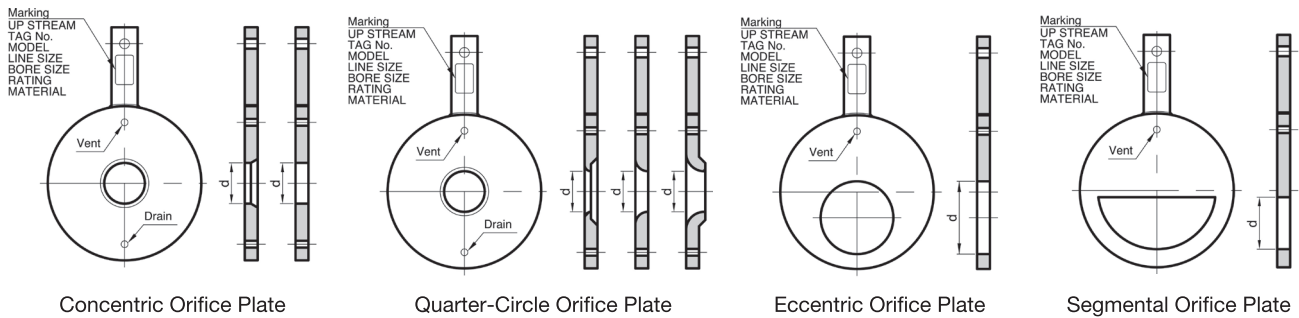
Flange taps or vena contracta taps are used with.

Segmental Orifice Plate

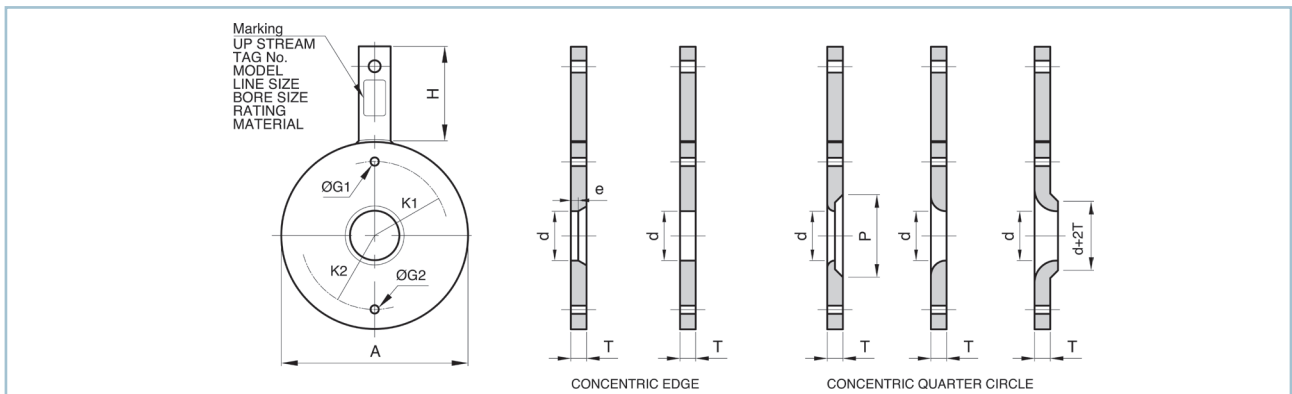
Segmental orifice plate are provided for measurements where solid are entrained in liquid flow stream.

Segmental bore may be placed either at the top or bottom of the pipe.

Flange taps or vena contracta taps are employed to take out fluid pressures.



Dimensions



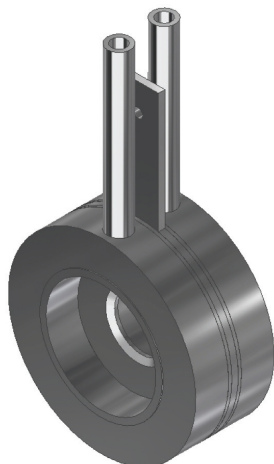
* d, K1, K2, G1, G2 : Refer to Specification Sheet

UNIT: mm

Nominal Dia	PLATE O.D.A						Plate Thk ¹ T	Edge e	Tap Handle	
	150#	300#	600#	900#	1500#	2500#			W	H
1/2 B	47.8	53.8	53.8	63.6	63.6	69.9	3.0	-	25	90
3/4 B	57.8	66.7	66.7	69.9	69.9	76.3	3.0	-	25	90
1 B	66.8	73.0	73.0	79.4	79.4	85.8	3.0	0.5	25	90
1-1/2 B	85.8	95.3	95.3	98.6	98.6	117.5	3.0	0.5	25	90
2 B	104.6	111.1	111.1	12.8	142.8	146.1	3.0	0.5	25	90
2-1/2 B	123.6	130.4	130.4	165.1	165.1	168.3	3.0	0.5	25	90
3 B	136.6	149.1	149.1	168.3	174.6	196.9	3.0	1.0	25	90
4 B	174.6	183.2	193.7	206.4	209.6	235.0	3.0	1.0	38	110
5 B	197.0	216.0	241.5	247.7	260.4	279.5	3.0	1.5	38	110
6 B	222.5	250.7	266.7	288.9	282.6	317.5	3.0	1.5	38	110
8 B	279.5	308.0	320.7	358.8	352.4	387.4	3.0	1.5	38	110
10 B	339.8	361.9	400.1	435.0	435.0	476.5	6.0	-	44	120
12 B	409.8	422.3	457.3	498.5	520.7	549.5	6.0	-	44	120
14 B	450.6	485.8	492.2	520.0	577.9	-	6.0	-	44	120
16 B	514.1	539.8	565.2	574.7	641.4	-	6.0	-	44	120
18 B	549.4	597.0	612.8	637.9	704.9	-	9.0	-	50	130
20 B	606.4	654.1	682.6	698.5	755.7	-	9.0	-	50	130
22 B	660.5	704.9	733.5	-	-	-	9.0	-	50	130
24 B	717.8	774.7	790.6	838.2	901.7	-	9.0	-	50	130

SOP-20

Orifice Plate with Ring



Specifications

ORIFICE BORE TYPE

Concentric Square Edged Orifice
Quadrant Edged Orifice
Minimum quadrant edged orifice diameter 4.5mm
Minimum quadrant edged radius 0.5mm

FLOW CALCULATION STANDARDS

ISO 5167
JIS Z8762
AGA3, 8
General Application
L.K Spink

FLANGE RATINGS

JIS 5, 10, 20 etc.
ANSI (or JPI) 150, 300 etc.
(Note: ANSI and JPI ring dimensions are identical)

PRESSURE TAPS

Corner taps

PLATE THICKNESSES

3, 6, 9, 12mm

TAP HANDLE

Welded to orifice plate

Introduction

Orifice Ring Assemblies are used for flow measurement of smaller or medium sized pipe at lower pressures. Each assembly consists of one orifice plate and two orifice rings.

Differential pressures are taken out in a corner tap system.

Orifice Blocks, which are of a unit-construction type and provide higher pressure ratings than the Orifice Ring Assemblies, also are available.

PRESSURE TAP NIPPLES

15mm (1/2 inch) Sch 40, 80
Length : 150mm
Tap Connections : PT 1/2 or NPT male,
Socket weld, Butt weld or Flange. (Flange rating to be the same as the of the process pipeline)

DRAIN AND VENT HOLE

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4mm

SPECIAL MARKINGS

Special marking may be furnished to meet special requirements

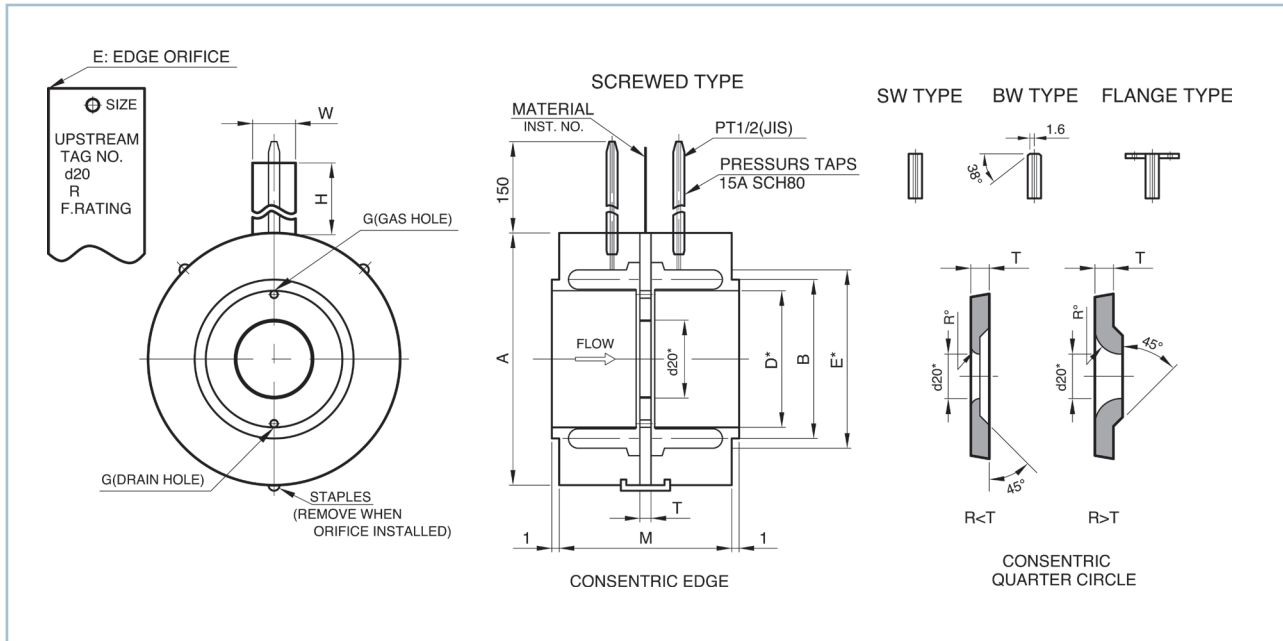
MATERIALS

Ring and Pressure Tap Nipple : 304LSS, 316LSS
Plate : 304LSS, 316LSS, Monel, etc.
Tab Handle : 304LSS, 316LSS, etc..

GASKET

Material : Non-Asbestos, Teflon
Thickness : 1.5mm, 2.0mm, 3.0mm

Dimensions



* d20 : ORIFICE DIA.AT 20°C : REFER TO ORIFICE CALCULATED SHEET

D : INSIDE DIA OF RING

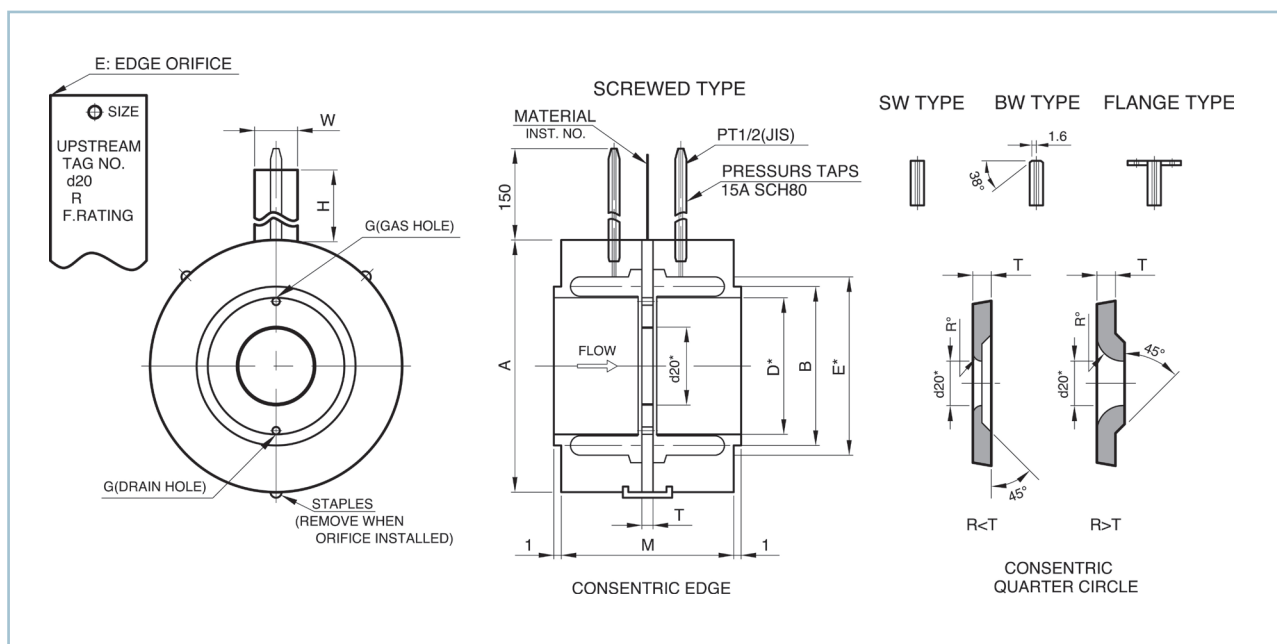
E : INSIDE DIA OF GASKET

► Ring Orifices for JIS 10K Flange

UNIT: mm

Normal Pipe Size	Outside Diam of Rings and Plate A	Diam of Gasket and Stay B	Thickness of Edge e	Diam of Hole B	Face to Face M	Thickness of Plate T	Width of Plate W	Hight of Tab Handle H	Thickness of Tab Handle T
15 A	58	21	0.2-0.3	-	75	2	25	95	2
20 A	63	27	0.2-0.4	-	75	2	25	95	2
25 A	74	33	0.2-0.4	-	75	2	25	95	2
32 A	84	42	0.3-0.5	1.6	75	2	25	95	2
40 A	89	48	0.3-0.5	1.6	75	2	25	95	2
50 A	104	60	0.5-0.8	1.6	75	2	25	95	2
65 A	124	73	0.5-0.8	1.6	75	2	32	95	2
80 A	134	88	0.5-0.8	1.6	75	3	32	95	2
90 A	144	101	0.5-0.8	1.6	75	3	32	95	2
100 A	159	114	0.8-1.2	1.6	75	3	38	105	2
125 A	190	141	0.8-1.2	1.6	75	3	38	105	2
150 A	220	168	0.8-1.2	1.6	75	3	38	105	2
175 A	245	196	1.5-2.0	1.6	76	4	38	105	2
200 A	270	219	1.5-2.0	1.6	76	4	38	105	2
225 A	290	246	1.5-2.0	1.6	76	4	38	105	2
250 A	333	273	e=T	2.0	76	4	44	120	3
300 A	378	323	e=T	2.5	76	4	44	120	3

Dimensions



* d_{20} : ORIFICE DIA.AT 20°C : REFER TO ORIFICE CALCULATED SHEET

D : INSIDE DIA OF RING

E : INSIDE DIA OF GASKET

► Ring Orifices for ANSI #150 Flange

UNIT: mm

Normal Pipe Size	Outside Diam of Rlngs and Plate A	Diam of Gasket and Stay B	Thickness of Edge e	Diam of Hole B	Face to Face M	Thickness of Plate T	Width of Plate W	Hight of Tab Handle H	Thickness of Tab Handle T
1/2 B	-	-	-	-	-	-	-	-	-
3/4 B	-	-	-	-	-	-	-	-	-
1 B	66.7	33	0.2-0.4	-	75	2	25	95	2
1-1/4 B	76.2	42	0.3-0.5	1.6	75	2	25	95	2
1-1/2 B	85.7	48	0.3-0.5	1.6	75	2	25	95	2
2 B	104.8	60	0.5-0.8	1.6	75	2	25	95	2
1-1/2 B	123.8	73	0.5-0.8	1.6	75	2	32	95	2
3 B	136.5	88	0.5-0.8	1.6	75	3	32	95	2
3-1/2 B	161.9	101	0.5-0.8	1.6	75	3	32	95	2
4 B	174.6	114	0.8-1.2	1.6	75	3	38	105	2
5 B	196.9	141	0.8-1.2	1.6	75	3	38	105	2
6 B	222.3	168	0.8-1.2	1.6	75	3	38	105	2
8 B	279.4	219	1.5-2.0	1.6	76	4	38	105	2
10 B	339.7	273	e=T	2.0	76	4	44	120	3
12 B	409.6	323	e=T	2.5	76	4	44	120	3

SOP-30, 31

Holding Ring Type



Specifications

ORIFICE BORE TYPE

Concentric Square Edged Orifice
Quadrant Edged Orifice

FLOW CALCULATION STANDARDS

ISO 5167
AGA 3,8
General Application
L.K.Spink
ASME-MFC-3M
JIS Z 8762

FLANGE RATINGS

ANSI Class 300, 600, 900 etc.
Ring type joint(RTJ)

PRESSURE TAPS

Flange taps

PLATE THICKNESSES

3, 6, 9, 12mm

RING TYPE

Oval
Octagonal

DRAIN AND VENT HOLE

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4mm

Introduction

The Holder Ring Assembly is a combination of a holder ring and an orifice plate designed for ring-type-joint(RTJ) flanges of ANSI or JPI Specifications.

The holder ring has a function of holding the orifice plate and also a function as a gasket to prevent leakage of the process fluid.

This metallic sealing system is applicable to a fluid of high temperature and high pressure.

The pressure tapping system normally is of the flange tap type.

MARKINGS

Upstream side of tab handle stamped with "UPSTREAM" and with bore type and size, Tag number, quadrant edge radius and flange rating.

SPECIAL MARKINGS

Special marking may be furnished to meet Specific requirement

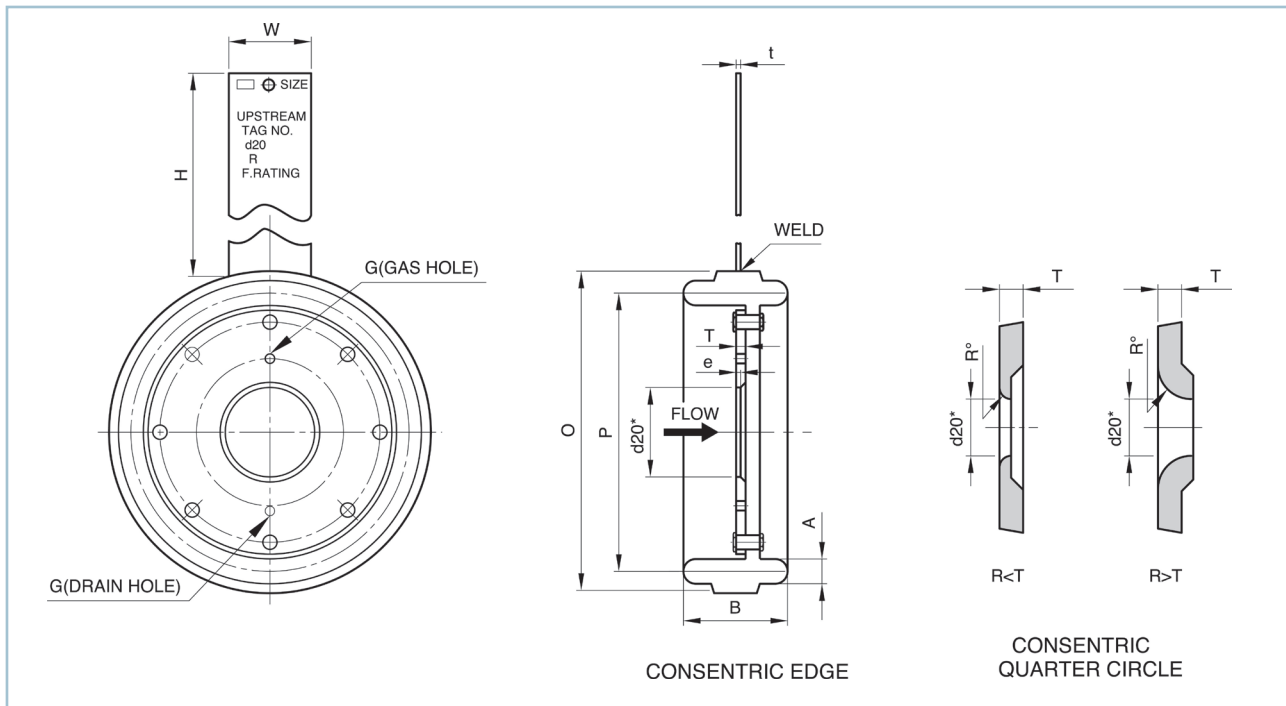
MATERIALS

Standard : 304LSS, 316LSS
Non-standard : Monel, etc.

NOMINAL PIPE SIZES AVAILABLE

Orifice Bore Type	Inch	DN (mm)
Concentric Square Edge	1-1/2" ~ 14"	40 ~ 350
Quadrant Edge	1-1/2" ~ 6"	40 ~ 150

Dimensions

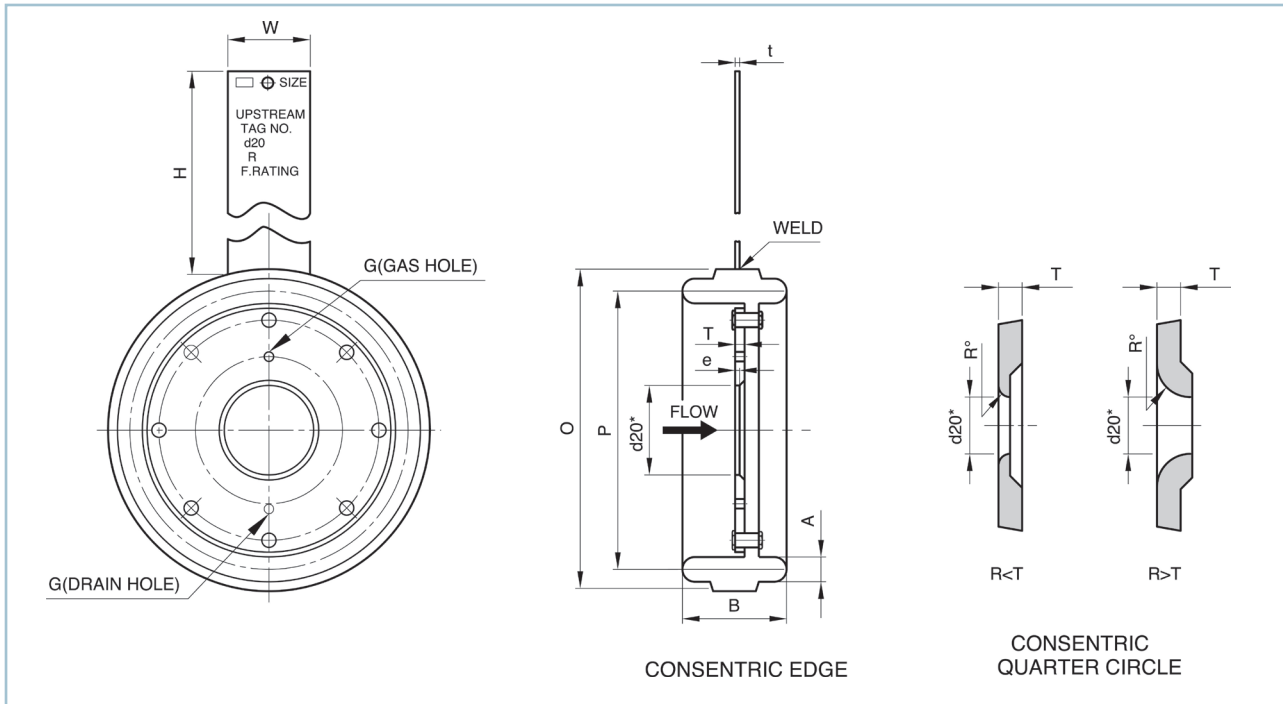


► For ANSI 1500(Oval type, octagonal type)

UNIT: mm

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Diam of Hole G	Thickness of Plate T	Tap Handle		
	Outside Diam O	Pitch Diam P	Width A	Height B				Width A	Height B	Thickness t
1-1/2 B	82	68.26	7.94	25.0	0.3~0.5	1.6	2	25	110	2
2 B	112	95.25	11.11	29.0	0.5~0.8	1.6	2	25	110	2
2-1/2 B	125	107.95	11.11	30.0	0.5~0.8	1.6	3	32	120	2
3 B	154	139.53	11.11	30.0	0.5~0.8	1.6	3	32	120	2
4 B	179	161.93	11.11	30.0	0.8~1.2	1.6	3	38	125	2
5 B	211	193.68	11.11	30.0	0.8~1.2	1.6	3	38	150	2
6 B	230	211.14	12.70	31.6	0.8~1.2	1.6	3	38	150	2
8 B	292	269.88	15.88	34.9	1.5~2.0	1.1	4	38	150	2
10 B	346	323.85	15.88	34.9	$e=T$	2.0	4	44	190	3
12 B	409	381.00	22.22	40.5	$e=T$	2.5	4	44	190	3
14 B	451	419.10	25.40	44.4	$e=T$	2.5	4	44	220	3

Dimensions



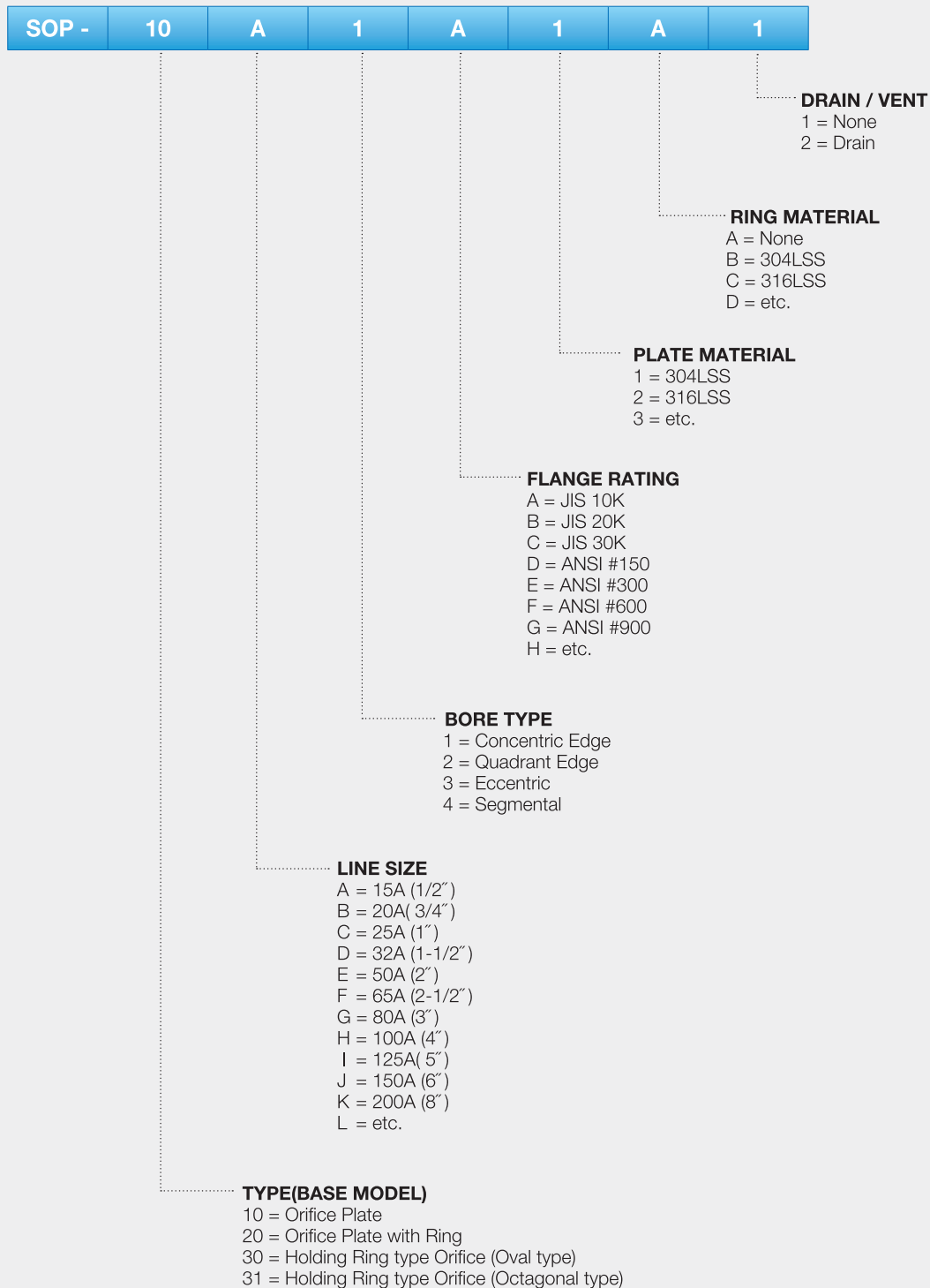
► For ANSI 2500(Oval type, octagonal type)

UNIT: mm

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Diam of Hole G	Thickness of Plate T	Tap Handle		
	Outside Diam O	Pitch Diam P	Width A	Hight B				Width A	Hight B	Thickness t
1/2 B	50.9	42.9	8.0	24	0.2~0.4	-	4	25	110	4
3/4 B	58.8	50.8	8.0	24	0.2~0.4	-	4	25	110	4
1 B	68.3	60.3	8.0	28	0.3~0.5	1.6	4	25	130	4
1-1/4 B	83.3	72.2	11.1	28	0.3~0.5	1.6	4	25	130	4
1-1/2 B	93.7	82.6	11.1	30	0.3~0.5	1.6	4	25	130	4
2 B	112.7	101.6	11.1	32	0.5~0.8	1.6	6	25	140	4
2-1/2 B	123.8	111.1	12.7	34	0.5~0.8	1.6	6	32	140	6
3 B	139.7	127.0	12.7	34	0.5~0.8	1.6	6	32	150	6
4 B	173.1	157.2	15.9	34	0.8~1.2	1.6	6	38	150	6
5 B	209.6	190.5	19.1	34	0.8~1.2	1.6	6	38	170	6
6 B	247.7	228.6	19.1	36	0.8~1.2	1.6	6	38	170	6
8 B	301.6	279.4	22.2	40	1.5~2.0	2.0	8	44	200	8
10 B	371.5	342.9	28.6	46	2.0~3.0	2.5	8	44	220	8
12 B	438.2	406.4	31.8	48	2.0~3.0	2.5	8	44	230	8

Ordering Information

■ ORIFICE PLATE & RING ASSEMBLY



■ When placing an order, selected ordering number should be indicated on the purchase order sheet.



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