

# Model

# SOP-50

# Orifice Flange Assemblies

## Description

Orifice Flange Assemblies are used in conjunction with Orifice Plates for flow measurement of smaller or medium size pipes at lower or medium pressure ranges. The flange connection is of an RF type and the differential pressure tapping system is with flange taps.



## Specifications

### ORIFICE BORE TYPE

Welding neck  
Slip-on  
Socket-weld  
Ring-joint welding neck

### NOMINAL DIAMETERS

25mm(1 inch) to 500mm(20 inches)

### FLANGE MATERIAL

A105, A182-F304, A182-F316, A182-F11,  
A182-F22, A350-LF2

### FLANGE RATINGS

JIS 10, 20, 30 etc.  
ANSI(or JPI) 150, 300, 600 etc.

### MATERIALS OF BOLTS AND NUTS

Stud bolts : A193-B7, A193-B8, A193-8M  
Nuts : A194-2H, A194-8, A194-8M  
Jack bolts and nuts : S25C, A307

### GASKET

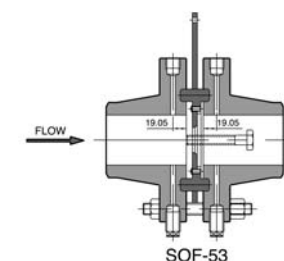
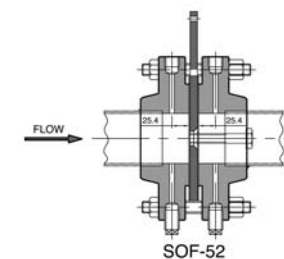
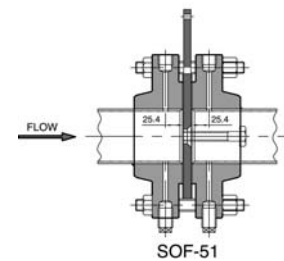
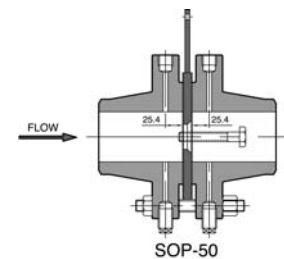
Thickness : 1.5mm, 4.5mm  
Material : Asbestos sheet gasket,  
Spiral wound gaskets

### PIPING CONNECTION METHOD

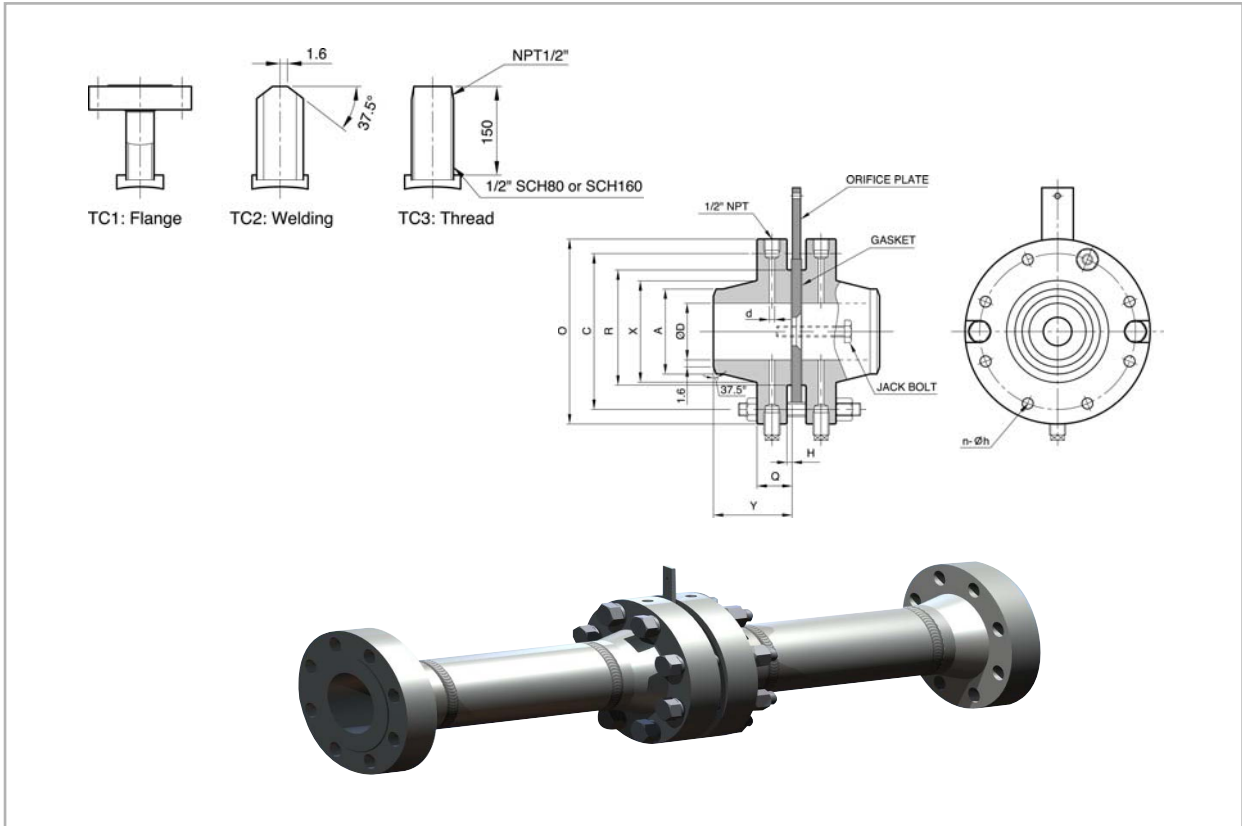
ANSI 150# : Insertion welding type(Slip-on-type)  
ANSI 300#,600# : Butt welding type(Welding neck)  
ANSI 600# : Butt welding neck(Ring-joint WN)

### DIFFERENTIAL PRESSURE PIPING CONNECTION

Select referring to the model number construction table



# Dimension



FOR JIS 10K FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Diam of Raised Face F	Height of Raised Face E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of bolt	Bolt Size	
mm	inch											
1	25	125	38.1	34.0	50	80	70	1	4	70	4	M16
1 1/2	40	140	38.1	42.7	60	80	80	2	4	100	4	M16
2	50	155	38.1	48.6	66	83	85	2	4	105	4	M16
2 1/2	66	175	38.1	60.5	80	83	100	2	4	120	4	M16
3	80	185	38.1	76.3	98	86	120	2	4	140	4	M16
3 1/2	80	185	38.1	89.1	112	86	130	2	6	150	8	M16
4	100	195	38.1	101.6	122	86	140	2	6	160	8	M16
4 1/2	100	210	38.1	114.3	132	90	155	2	6	175	8	M16
5	125	250	38.1	139.8	160	95	185	2	8	210	8	M20
6	150	280	38.1	165.2	190	100	215	2	8	240	8	M20
8	200	330	38.1	216.3	238	110	265	2	12	290	12	M20
10	225	350	38.1	241.8	264	110	285	2	12	310	12	M20
12	300	445	38.1	318.5	346	120	370	3	12	400	16	M22
14	350	490	38.1	355.6	386	130	415	3	12	445	16	M22
16	400	560	38.1	406.4	442	130	475	3	12	510	16	M24

FOR JIS 30K FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Diam of Raised Face F	Height of Raised Face E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of bolt	Bolt Size	
mm	inch											
1	25	130	38.1	34.0	54	83	70	1	4	95	4	M16
1 1/2	40	140	38.1	43.1	64	84	80	2	4	105	4	M16
2	50	160	38.1	49.1	70	86	90	2	4	120	4	M20
2 1/2	66	165	38.1	61.0	86	86	105	2	4	130	8	M16
3	80	200	38.1	76.9	104	90	130	2	4	160	8	M20
3 1/2	80	210	38.1	89.7	118	90	140	2	6	170	8	M20
4	100	230	38.1	102.3	130	90	150	2	6	185	8	M22
4 1/2	100	240	38.1	115.1	142	92	160	2	6	195	8	M22
5	125	275	38.1	140.7	172	102	195	2	8	230	8	M22
6	150	325	38.1	166.2	204	102	235	2	8	275	12	M24
8	200	370	42	217.5	256	112	280	2	12	320	12	M24
10	225	450	48	268.7	314	118	345	2	12	390	12	M30
12	300	515	52	320.0	370	130	405	3	12	450	16	M30
14	350	560	54	257.2	412	144	450	3	12	495	16	M30
16	400	630	60	408.3	468	150	510	3	12	560	16	M36

FOR JIS 16/20K FLANGES

UNIT : mm

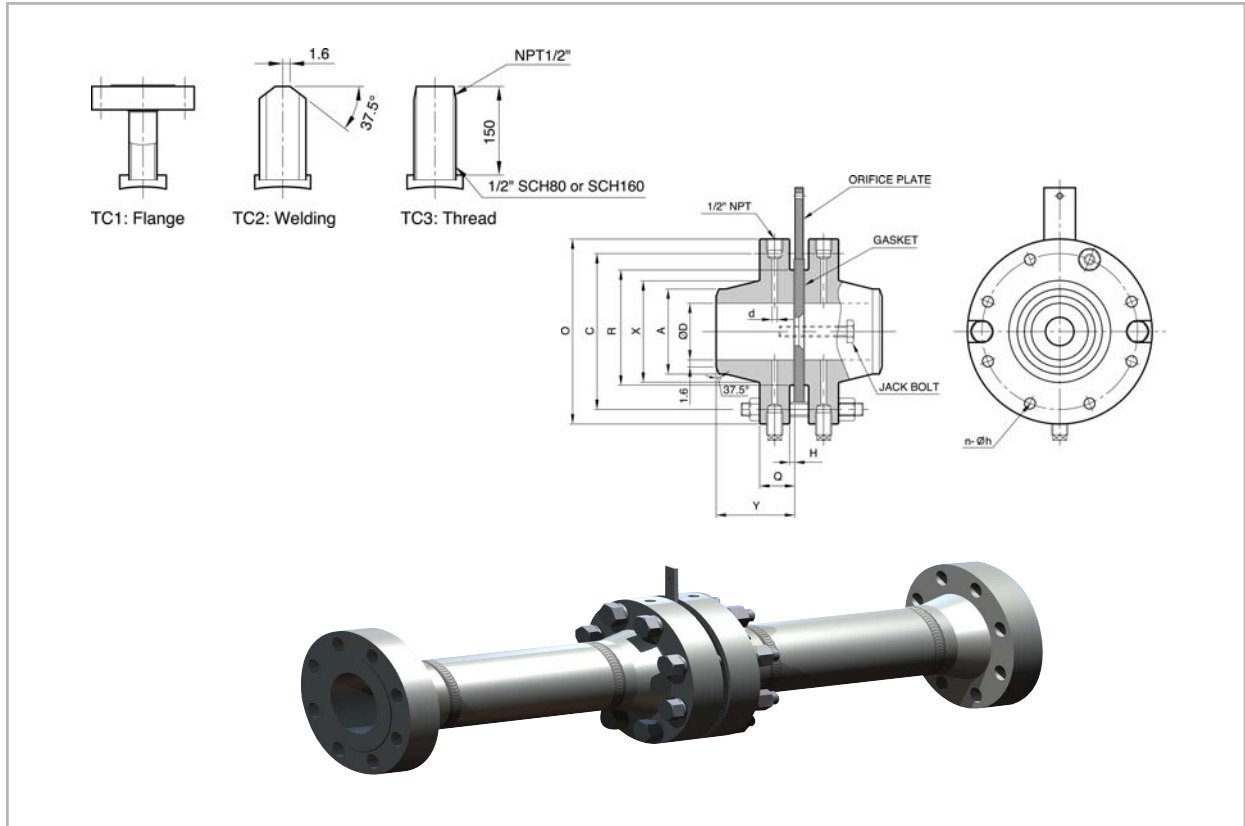
Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Diam of Raised Face F	Height of Raised Face E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of bolt	Bolt Size	
mm	inch											
1	25	125	38.1	34.0	50	80	70	1	4	90	4	M16
1 1/2	40	135	38.1	42.7	60	80	80	2	4	100	4	M16
2	50	140	38.1	48.6	66	83	85	2	4	105	4	M16
2 1/2	66	155	38.1	60.5	80	83	100	2	4	120	8	M16
3	80	170	38.1	76.3	98	86	120	2	4	140	8	M16
3 1/2	80	200	38.1	89.1	112	86	135	2	6	160	8	M20
4	100	210	38.1	101.6	124	86	145	2	6	170	8	M20
4 1/2	100	225	38.1	114.3	138	90	160	2	6	185	8	M20
5	125	270	38.1	139.8	170	95	195	2	8	225	8	M22
6	150	365	38.1	165.2	202	100	230	2	8	260	12	M22
8	200	350	38.1	216.3	252	110	275	2	12	305	12	M22
10	225	430	38.1	241.8	312	115	345	2	12	380	12	M24
12	300	480	38.1	318.5	364	120	395	3	12	430	16	M24
14	350	540	40	355.6	408	132	440	3	12	480	16	M30
16	400	605	46	406.4	456	138	495	3	12	540	16	M30
18	450	675	48	457.2	522	148	560	3	12	605	20	M30

FOR JIS 40K FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Diam of Raised Face F	Height of Raised Face E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of bolt	Bolt Size	
mm	inch											
1	25	130	38.1	34.4	54	83	70	1	4	95	4	M16
1 1/2	40	140	38.1	43.1	64	84	80	2	4	105	4	M16
2	50	160	38.1	49.1	70	86	90	2	4	120	4	M20
2 1/2	66	200	38.1	61.0	86	86	105	2	4	130	8	M16
3	80	210	38.1	76.9	104	90	130	2	4	160	8	M20
3 1/2	80	230	38.1	89.7	118	90	140	2	6	170	8	M20
4	100	250	38.1	102.3	130	90	150	2	6	185	8	M22
4 1/2	100	250	38.1	115.1	152	92	165	2	6	205	8	M22
5	125	300	40	140.7	192	104	200	2	8	250	8	M24
6	150	355	44	166.2	220	108	240	2	8	295	12	M30
8	200	405	50	217.5	270	120	290	2	12	345	12	M30
10	225	475	56	268.7	330	126	355	2	12	410	12	M30
12	300	540	60	320.0	380	138	410	3	12	470	16	M36
14	350	585	64	357.2	426	154	455	3	12	515	16	M36
16	400	645	70	408.3	476	160	515	3	12	570	16	M36
18	450	675	48	457.2	522	148	560	3	12	605	20	M30

# Dimension



FOR ANSI 300 FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub	Pitch Diam of Groove	Depth of Groove E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of Bolt	Bolt Size
1½	155.6	38.1	48.6	69.9	85.8	68.26	6.4	4	114.3	4	3/4
2	165.1	39.7	60.5	84.1	87.3	82.55	7.9	4	127.0	8	5/8
2½	190.5	39.7	76.3	100.0	90.5	101.60	7.9	4	149.2	8	3/4
3	209.6	39.7	89.1	117.5	90.5	123.83	7.9	6	168.3	8	3/4
3½	228.6	39.7	101.6	133.4	90.5	131.76	7.9	6	184.2	8	3/4
4	254.0	39.7	114.3	146.1	93.6	149.23	7.9	6	200.0	8	3/4
5	279.4	42.9	139.8	117.8	106.3	180.93	7.9	8	235.0	8	3/4
6	317.5	44.5	165.2	206.4	106.3	211.14	7.9	8	269.9	12	3/4
8	381.0	49.3	216.3	260.4	119.1	269.88	7.9	12	330.2	12	7/8
10	444.5	55.6	267.4	320.7	125.4	323.85	7.9	12	387.4	16	1
12	520.7	58.8	318.5	374.7	138.2	381.00	7.9	12	450.9	16	11/8
14	584.2	62.0	365.5	425.5	150.9	419.10	7.9	12	514.4	20	11/8

FOR ANSI 600 FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub	Pitch Diam of Groove	Depth of Groove E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of Bolt	Bolt Size
1½	155.6	38.1	48.6	69.9	85.8	68.26	6.4	4	114.3	4	3/4
2	165.1	39.7	60.5	84.1	87.3	82.55	7.9	4	127.0	8	5/8
2½	190.5	39.7	76.3	100.0	90.5	101.60	7.9	4	149.2	8	3/4
3	209.6	39.7	89.1	117.5	90.5	123.83	7.9	6	168.3	8	3/4
3½	228.6	42.9	101.6	133.4	93.6	131.76	7.9	6	184.2	8	7/8
4	273.1	46.1	114.3	152.4	109.6	149.23	7.9	6	215.9	8	7/8
5	330.2	52.4	139.8	188.9	122.2	180.98	7.9	8	266.7	8	1
6	355.6	55.6	165.2	222.3	125.4	211.14	7.9	8	292.1	12	1
8	419.1	63.5	216.3	273.1	141.3	269.88	7.9	12	349.3	12	11/8
10	508.0	71.5	267.4	342.9	160.4	323.85	7.9	12	431.8	16	11/4
12	558.8	74.5	318.5	400.1	163.6	381.00	7.9	12	489.0	16	11/4
14	603.3	77.8	365.5	431.8	173.0	419.10	7.9	12	527.1	20	13/8

FOR ANSI 900 FLANGES

UNIT : mm

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub	Pitch Diam of Groove	Depth of Groove E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of Bolt	Bolt Size
1½	177.8	38.1	48.6	69.9	89.0	68.26	6.4	4	123.8	4	1
2	215.9	46.1	60.5	104.8	109.6	95.25	7.9	4	163.1	8	7/8
2½	244.5	49.7	116.9	123.8	112.8	107.95	7.9	4	190.6	8	1
3	241.3	46.1	89.1	127.0	109.6	123.83	7.9	6	190.5	8	7/8
4	292.1	52.4	114.3	158.8	122.2	149.23	7.9	6	235.0	8	11/8
5	349.3	58.8	139.8	190.5	135.0	180.98	7.9	8	279.4	8	11/4
6	381.0	63.5	165.2	235.0	147.6	211.14	7.9	8	317.5	12	11/8
8	469.9	71.5	216.3	298.5	169.9	269.88	7.9	12	393.7	12	13/8
10	546.1	77.8	267.4	368.3	192.1	323.85	7.9	12	469.9	16	13/8
12	609.1	87.4	318.5	419.1	208.0	381.00	7.9	12	533.4	16	13/8
14	641.4	96.9	356.6	450.9	223.8	419.10	11.1	12	558.8	20	11/2

FOR ANSI 1500 FLANGES

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diam of Hub X	Length Through Hub	Pitch Diam of Groove	Depth of Groove E	Diam of Tab Holes d	Diam of Bolts Circle c	Number of Bolt	Bolt Size
1½	100.8	38.1	118.6	69.9	89.0	68.26	6.11	11	112.8	11	1
2	215.9	46.1	60.5	104.8	109.6	95.25	7.9	4	165.1	8	7/8
2½	244.5	49.3	76.3	123.8	112.8	107.95	7.9	4	190.5	8	1
3	266.7	55.6	89.1	133.4	125.4	136.30	7.9	6	203.2	8	11/8
4	311.2	62.0	114.3	161.9	131.8	161.93	7.9	6	241.3	8	11/4
5	374.7	81.0	139.8	196.9	163.5	193.68	7.9	8	292.1	8	11/2
6	393.7	92.1	165.2	228.6	181.0	211.14	9.55	8	317.5	12	13/8
8	482.6	103.2	216.3	292.1	223.8	269.88	11.1	12	393.7	12	15/8
10	584.2	119.1	267.4	368.3	265.1	323.85	11.1	12	482.6	12	17/8
12	673.1	138.2	318.5	450.9	296.9	381.00	14.3	12	571.5	16	2
14	749.3	149.3	356.6	495.3	314.4	419.10	15.9	12	635.0	16	21/4

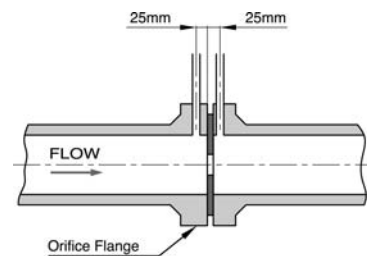
# ORIFICE FLANGE ASSEMBLIES

## Basic Principle

Pressure connection holes in the pipe should be 1/2 inch for 3-inch and larger lines, 3/4 inch for 3-inch lines, and 1/4 inch for 2-inch lines. When flange taps are used, insert a drill of the proper size through the connection holes in the flanges and drill through the pipe. When connections in the pipe are used, weld half-couplings to the pipe at the proper locations, insert a drill through them, and drill through the pipe. Round off the edges of the holes slightly to be sure that no burrs remain in the pipe.

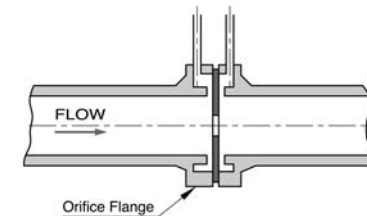
### Flange Tap

Both upstream and downstream are located at a distance of 25mm from the orifice plate. This is also true of smaller pipes.



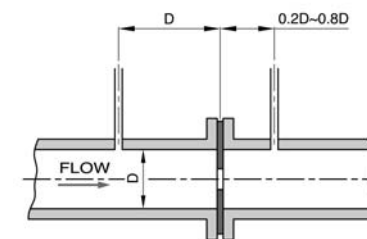
### Corner Tap

Tapping for differential pressure is made at immediately upstream and downstream positions of the orifice. This system is used primarily for small pipes. (Smaller 2")



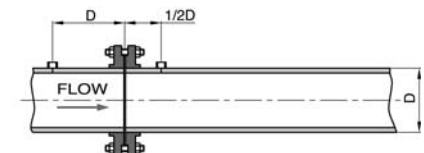
### Vena Tap

The tap for the upstream side is located at a distance approximately equal to the pipe diameter. The downstream is located at the lowest pressure position.



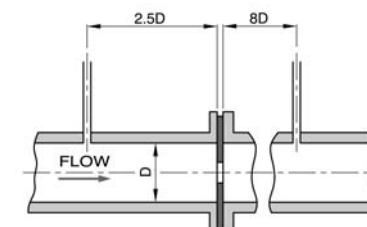
### Radius Tap

ID and 1/2D taps. This type of connection is a modification that has largely been replaced. The Vena Contracta taps, yields equally accurate results and have the advantage of the downstream connection being 1D above the upstream face of the orifice plate. But location of the upstream connection between 1/2D and 2D introduces only a small range of error. The downstream connection is located 1/2D downstream from the upstream face of the orifice plate.



### Pipe Tap

The differential pressure is small. This tapping system is not very popular.



■ ORIFICE PLATE & FLANGE ASSEMBLY

SOP - 50 A 1 A 1 A 1 A

**GASKETS MATERIAL**

- A = Non Asbestos 1.5t
- B = Teflon 1.5t
- C = Spiral Wound
- OP = etc.

**BOLT / NUT MATERIAL**

- 1 = B7 / 2H
- 2 = B8 / 8
- OP = etc.

**PLATE MATERIAL**

- A = 304 SS
- B = 316 SS
- C = Titanium
- D = Monel
- OP = etc.

**FLANGE MATERIAL**

- 1 = Carbon Steel
- 2 = 304 SS
- 3 = 316 SS
- 4 = etc
- OP = .

**FLANGE RATING**

- A = JIS 10K
- B = JIS 20K
- C = JIS 30K
- D = ANSI #150
- E = ANSI #300
- F = ANSI #600
- G = ANSI #900
- OP = etc.

**TAP NIPPLE**

- 1 = None
- 2 = NPT 1/2" / 75L + 150L
- OP = etc.

**LINE SIZE**

- A = 15A(1/2")
- B = 20A(3/4")
- C = 25A(1")
- D = 32A(1-1/2")
- E = 50A(2")
- F = 65A(2-1/2")
- G = 80A(3")
- H = 100A(4")
- I = 125A(5")
- J = 150A(6")
- K = 200A(8")
- OP = etc.

**TYPE(BASE MODEL)**

- 50 = Orifice Flange Assembly(Welding Neck Type)
- 51 = Orifice Flange Assembly(Socket-Welding Type)
- 52 = Orifice Flange Assembly(Slip-On Type)
- 53 = Orifice Flange Assembly(RTJ Type)

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