Orifice Plate & Flange Assemblies

Model : WZ 400 Series

DESCRIPTION

Orifice flange assemblies are widely used in conjunction with orifice meters for measuring the rate of flow of liquids and gases.
Orifice flange assemblies are comprised of flange, stud bolts, nuts, plug, gaskets, jack bolts, orifice plate. And they have tapping holes for differential pressure.
WEIZEN is apply the flange assemblies as ANSI, ASME, JPI, JIS, KS, MSS SP44, API Standards, etc.
And tapping holes per flange have two taps with 180˚ apart from each other. Therefore, you can change tapping angle by turning
the flange along with the bolt holes.

SPECIFICATION

■ Flange Type :
- Welding Neck (Raised Face)
- Welding Neck (Ring Type Joint)
- Slip-On (Raised Face)
- Socket-Weld (Raised Face)

■ Flange Rating
- ANSI (or JPI) Class
  150, 300, 600, 900, 1500, 2500
- JIS (or KS) Class
  10, 16, 20, 30, 40, 63

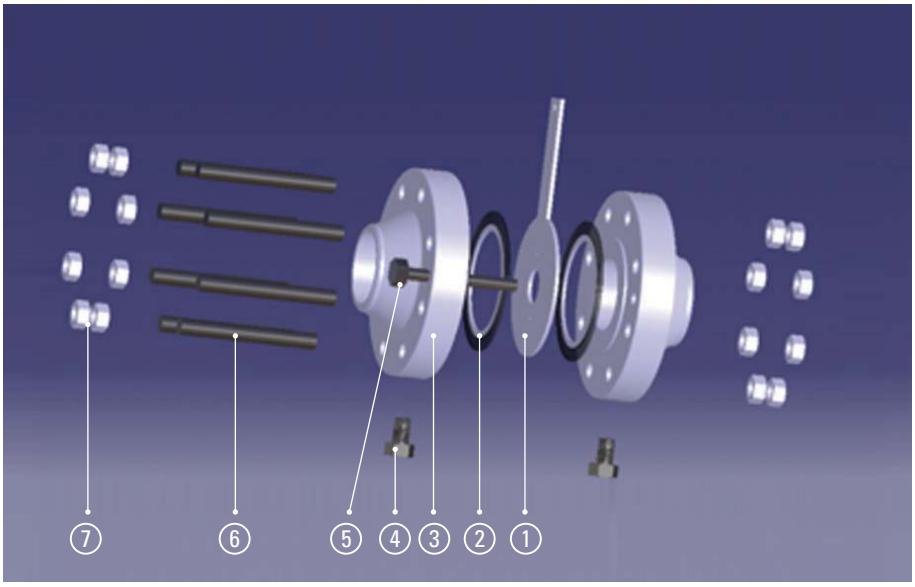
■ Material :
- Alloy Steel
A105, A350-LF2, F11, F12, F22, F91
- Stainless Steel
A182-F51, F304, F316, F321, F347

■ Gasket Thickness
- Sheet type : 1.5 mm
- Spiral Wound : 4.5 mm

■ Tapping
- Nos. : 2 Tapping equipped with a plug per flange.
- Orientation : 180˚ apart

■ Bolts & Nuts
- Bolts : A193-B7, B8, B8M, etc.
- Nuts : A194-2H, 8, 8M, etc.

SECTIONAL VIEW



No	Part	Q'ty
1	Orifice Plate	1
2	Gasket	2
3	Orifice Flange	2
4	Plug	2
5	Jack Bolts	2
6	Stud Bolts	n
7	Nuts	2n

FLANGE TYPE

■ Welding Neck Flanges :

The Welding Neck flange is normally referred to as the “high hub” flange. It is designed to transfer stress to the pipe, thereby reducing high stress concentrations at the base of the flange. The welding neck flange is the best designed butt-welded flange of those currently available because of its inherent structural valve. It is expensive because of the design.

■ Slip-On Flanges

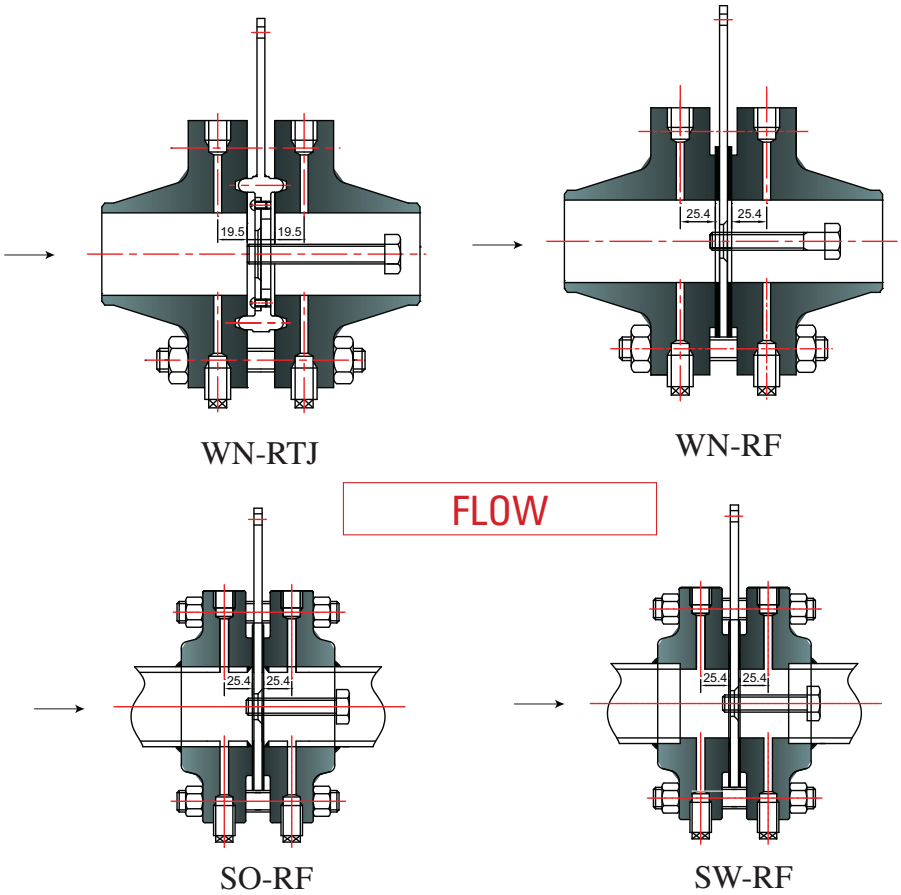
The Slip-On flanges has a low hub because the pipe slips into the flange prior to welding. It is welded both inside and out to provide sufficient strength and prevent leakage. Slip-On flanges are all bored slightly larger than the O.D of the machine Pipe.

They are preferred over welding neck flanges by many users due to their lower initial cost, but final installation cost is probably not much less than that of the welding neck flange because of the additional welding involved.

■ Socket Welding Flanges

The Socket Welding flange is similar to a Slip-On flange except it has a bore and a counter-bore dimension. The counter-bore is slightly larger than the O.D of the matching pipe. Allowing the pipe to be inserted into the flange similar to a Slip-On flange. The diameter of the smaller bore is the same as the I.D of the machine pipe. A restriction is built into the bottom of the bore which sets as a shoulder for the pipe to rest on. This eliminates any restriction in flow when using a socket welding flange.

SECTIONAL VIEW



WN-RTJ WN-RF

SO-RF SW-RF

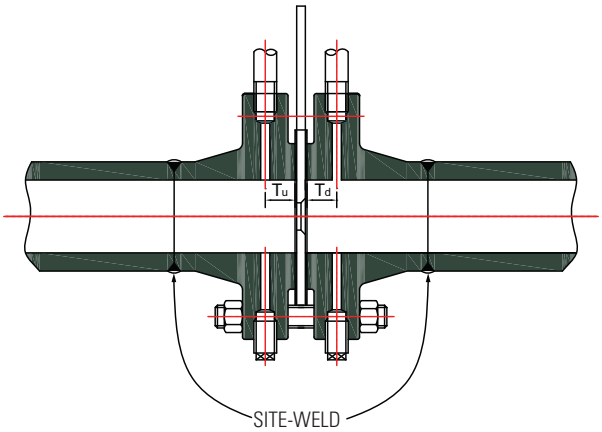
PRESSURE TAPPING

For each orifice plate, at least on upstream pressure tapping and one downstream tapping shall be installed in one or other of the standard locations, as flange, D and 1/2D[Radius] or corner tappings.

A single orifice plate may be used with several sets of pressure tap tappings suitable for different types of standard orifice meters, but to mutual interference, several tappings on the same side of the orifice plate shall be offset by at least 30˚

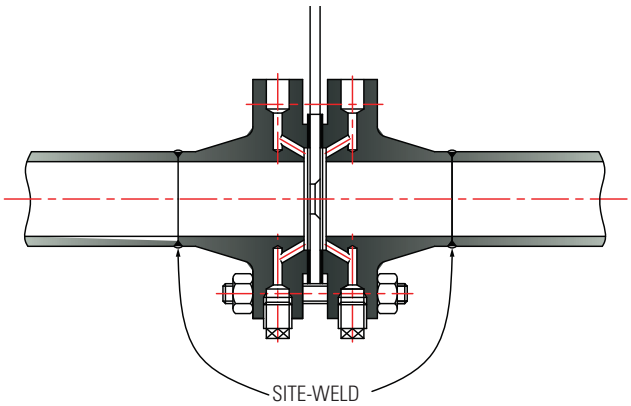
■ Flange Tappings

for Orifice Plates with flange tappings the location Tu of the upstream is nominally 1" (25.4mm) and is measured from the face of the Orifice Plate. The location Td of the downstream is nominally 1" (25.4mm) and is measured from the face of the orifice plate.



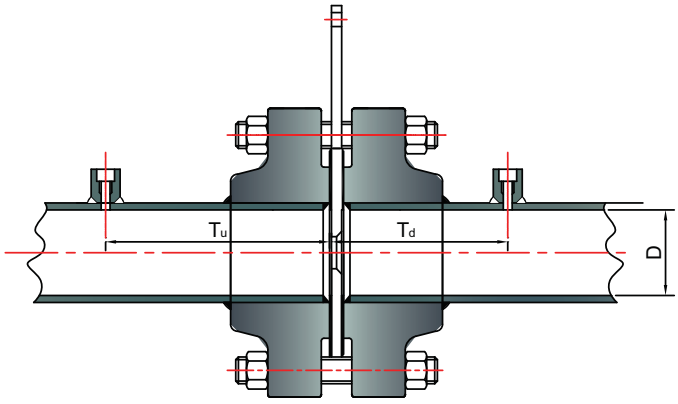
■ Corner Tappings

for Orifice Plates with corner tappings on lines smaller than 2 inch, the pressure tappings may be either single tapping or annular slots. Former may be located in the flanges [figure on the left] and latter may be located in the ring carrier rings [see model : WZ 200].



■ Radius Tappings

for Orifice Plates with radius tappings [also called "D and D/2"], the spacing Tu of the upstream pressure tapping is nominally equal to D. The spacing Td of the downstream pressure tapping is nominally equal to D/2 boss Tu and Td spacing are measured from the upstream face of the orifice plate.. This tapping is a modification of, and has largely replaced, the Vena Contractor taps. It yields equally accurate results and has the advantage that the downstream connection is easier to locate.

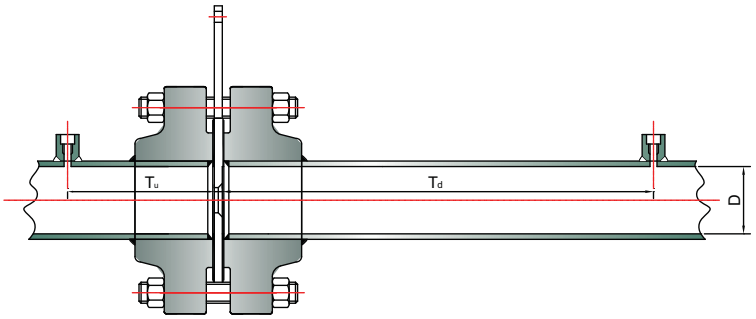


PRESSURE TAPPING

As the following tappings are not applicable to the ISO-5167 CODE, it applies ASME research report on fluid meters for Vena Contractor tapping and applies R.W. Miller Report for Pipe Tapping.

■ Pipe Tappings

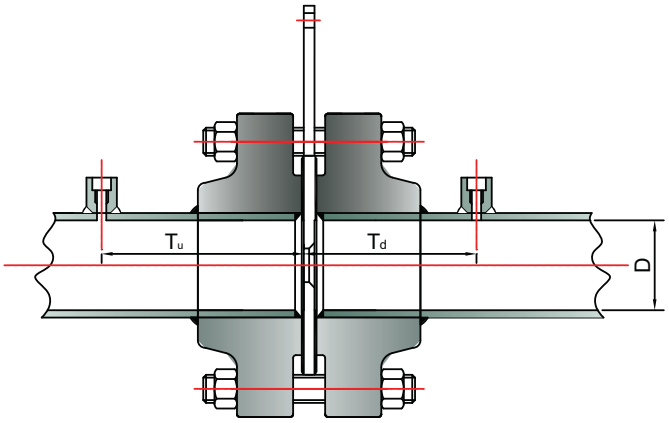
for Orifice Plates with 2-1/2D & 8D tappings, the spacing T_U of the upstream pressure tapping is nominally equal to 2-1/2D and is measured from the upstream face of the orifice plate. The spacing T_D of the downstream pressure is nominally equal to 8D and is measured from the downstream face of the orifice plate.



■ Vena Contractor Tappings

the center of the inlet tap [TU distance] is 1D preceding the upstream face of the Orifice plate. The distance [T_D] of the downstream pressure tap from the upstream face of the orifice plate depends upon the diameter ratio, β-ratio , of the orifice to be used as shown by the red colored line of below graph. Location and tolerance are function of β-ratio. These distances are

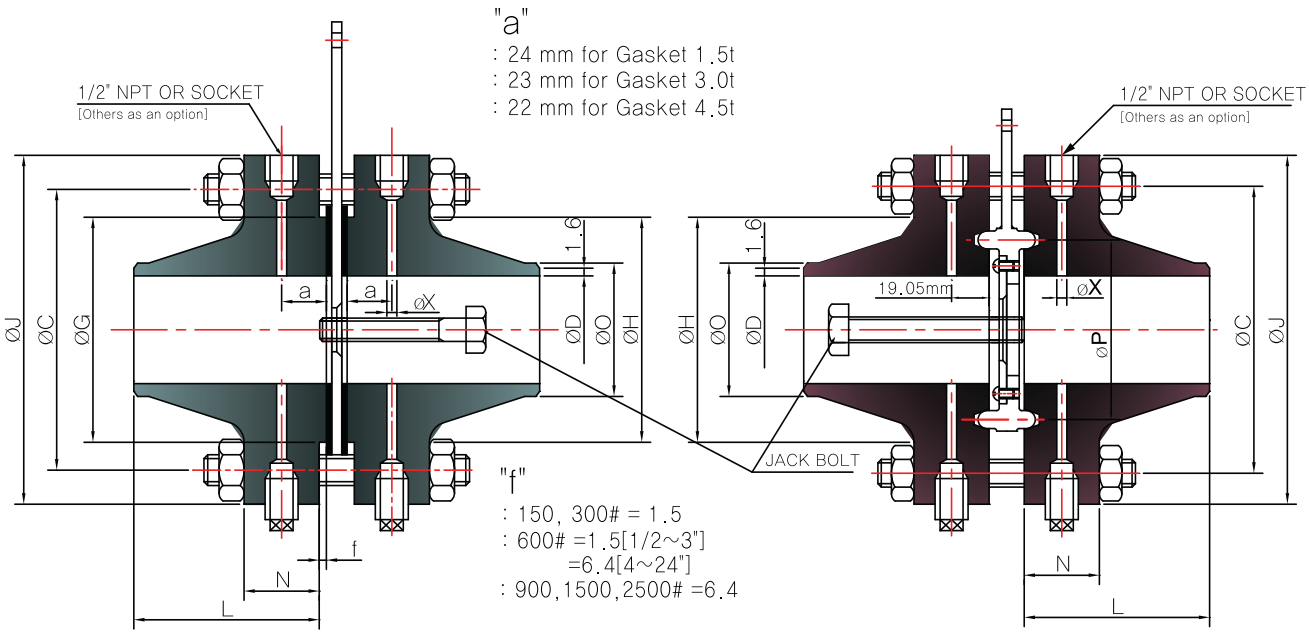
subject to a tolerance varying linearly from ±2.0D at β=020 to ±0.05D a β=0.75.



SECTIONAL VIEW

β Ratio	Downstream location
0.30	0.76D (1±0.25)
0.35	0.73D (1±0.25)
0.40	0.70D (1±0.25)
0.45	0.67D (1±0.25)
0.50	0.63D (1±0.25)
0.55	0.59D (1±0.25)
0.60	0.55D (1±0.25)
0.65	0.50D (1±0.25)
0.70	0.45D (1±0.25)
0.75	0.40D (1±0.25)

DIMENSION



ANSI B16,36 FORGED 150# WN-RF

Unit : mm

Nom. Pipe Size [inch]	Outside Dia-meter	Thick -ness	Raised Face	Length Thru Hube	Diam. at Base of Hub	Diam. of Hub at Bevel	Diam. of Tap Holes	Bolt Circle	Diam. of Bolt Holes	No. of Bolts	Bolt Size & Length	Jack Bolt & Length	O.D of Orifice Plate
	J	N	G	L	H	O	X	C					
1/2	89.0	38.1	35.1	74.7	30.2	21.3	6.4	60.5	15.7	4	1/2" x 140	1/2" x 75	47.8
3/4	98.6	38.1	42.9	77.7	38.1	26.7	6.4	69.9	15.7	4	1/2" x 140	1/2" x 75	57.2
1	108.0	38.1	50.8	79.5	49.3	33.5	6.4	79.2	15.7	4	1/2" x 140	1/2" x 75	66.5
1 1/2	127.0	38.1	73.2	82.6	65.0	48.3	6.4	98.6	15.7	4	1/2" x 140	1/2" x 75	85.9
2	152.4	38.1	91.9	85.6	77.7	60.5	6.4	120.7	19.1	4	5/8" x 150	5/8" x 75	104.8
1 1/2	177.8	38.1	104.6	85.6	90.4	73.2	6.4	139.7	19.1	4	5/8" x 150	5/8" x 75	123.8
3	190.5	38.1	127.0	85.6	108.0	88.9	9.5	152.4	19.1	4	5/8" x 150	5/8" x 75	136.5
4	228.6	38.1	157.2	90.4	134.9	114.3	12.7	190.5	19.1	8	5/8" x 150	5/8" x 75	174.6
6	279.4	38.1	215.9	100.1	192.1	168.4	12.7	241.3	22.4	8	3/4" x 165	3/4" x 75	222.3
8	342.9	38.1	269.7	111.3	246.1	219.2	12.7	298.5	22.4	8	3/4" x 165	3/4" x 75	279.5
10	406.4	38.1	323.9	119.5	304.8	273.1	12.7	362.0	25.4	12	7/8" x 180	7/8" x 115	339.8
12	482.6	38.1	381.0	120.7	365.3	233.9	12.7	431.8	25.4	12	7/8" x 180	7/8" x 115	409.6
14	533.4	38.1	412.8	127.0	400.1	355.6	12.7	476.3	28.4	12	1" x 195	7/8" x 115	450.9
16	596.9	38.1	469.9	127.0	457.2	406.4	12.7	539.8	28.4	16	1" x 195	7/8" x 115	514.4
18	635.0	39.6	533.4	139.7	505.0	457.2	12.7	577.9	31.8	16	1 1/8" x 210	1" x 115	549.3
20	698.5	42.9	584.2	144.5	558.8	508.0	12.7	635.0	31.8	20	1 1/8" x 220	1" x 115	606.4
24	812.8	47.8	692.2	152.4	663.4	609.6	12.7	749.3	35.1	20	1 1/4" x 240	1" x 115	717.6

ANSI B16,36 FORGED 300# WN-RF

Unit : mm

Nom. Pipe Size [inch]	Outside Dia-meter	Thick -ness	Raised Face	Length Thru Hube	Diam. at Base of Hub	Diam. of Hub at Bevel	Diam. of Tap Holes	Bolt Circle	Diam. of Bolt Holes	No. of Bolts	Bolt Size & Length	Jack Bolt & Length	O.D of Orifice Plate
	J	N	G	L	H	O	X	C					
1/2	95.3	38.1	35.1	76.2	38.1	21.3	6.4	66.5	15.7	4	1/2" x 140	1/2" x 75	53.8
3/4	117.3	38.1	42.9	79.5	47.8	26.7	6.4	82.6	17.5	4	5/8" x 150	1/2" x 75	66.7
1	124.0	38.1	50.8	82.6	53.8	33.5	6.4	88.9	17.5	4	5/8" x 150	5/8" x 75	73.0
1 1/2	155.4	38.1	73.2	85.9	69.9	48.3	6.4	114.3	20.6	4	3/4" x 165	5/8" x 75	95.3
2	165.1	38.1	91.9	85.9	84.1	60.5	6.4	127.0	17.5	8	5/8" x 150	5/8" x 75	111.1
2 1/2	1950.5	38.1	104.6	88.9	100.1	73.2	6.4	149.4	20.6	8	3/4" x 165	5/8" x 75	130.4
3	209.6	38.1	127.0	88.9	117.3	88.9	9.5	168.1	20.6	8	3/4" x 165	5/8" x 75	149.1
4	254.0	38.1	157.2	91.9	146.1	114.3	12.7	200.2	20.6	8	3/4" x 165	5/8" x 75	181.2
6	317.5	38.1	215.9	100.1	206.2	168.4	12.7	269.7	22.4	12	3/4" x 165	3/4" x 75	250.7
8	381.0	41.2	269.7	111.3	260.4	219.2	12.7	330.2	25.4	12	7/8" x 185	3/4" x 75	308.0
10	444.5	47.8	323.9	117.3	320.5	273.1	12.7	387.4	28.4	16	1" x 210	7/8" x 115	362.0
12	520.7	50.8	381.0	130.0	374.7	323.9	12.7	450.9	31.8	16	1 1/8" x 230	1" x 115	422.3
14	584.2	53.8	412.8	142.7	425.5	355.6	12.7	514.4	31.8	20	1 1/8" x 235	1" x 115	485.9
16	647.7	57.2	469.9	146.1	482.6	406.4	12.7	571.5	35.1	20	1 1/4" x 260	1" x 115	539.8
18	711.2	60.5	533.4	158.8	533.4	457.2	12.7	628.7	35.1	24	1 1/4" x 265	1" x 115	597.0
20	774.7	63.5	584.2	162.1	587.2	508.0	12.7	685.8	35.1	24	1 1/4" x 270	1" x 115	654.1
24	914.4	69.9	692.2	168.1	701.5	609.6	12.7	812.8	41.1	24	1 1/2" x 310	1" x 140	774.7

ANSI B16,36 FORGED 600# WN-RF

Unit : mm

Nom. Pipe Size [inch]	Outside Dia-meter	Thick -ness	Raised Face	Length Thru Hube	Diam. at Base of Hub	Diam. of Hub at Bevel	Diam. of Tap Holes	Bolt Circle	Diam. of Bolt Holes	No. of Bolts	Bolt Size & Length	Jack Bolt & Length	O.D of Orifice Plate
	J	N	G	L	H	O	X	C					
1/2	95.3	38.1	35.1	76.2	38.1	21.3	6.4	66.5	15.7	4	1/2" x 140	1/2" x 75	53.8
3/4	117.3	38.1	42.9	79.5	47.8	26.7	6.4	82.6	17.5	4	5/8" x 150	1/2" x 75	66.7
1	124.0	38.1	50.8	82.6	53.8	33.5	6.4	88.9	17.5	4	5/8" x 150	5/8" x 75	73.0
1 1/2	155.4	38.1	73.2	85.9	69.9	48.3	6.4	114.3	20.6	4	3/4" x 165	5/8" x 75	95.3
2	165.1	38.1	91.9	85.9	84.1	60.5	6.4	127.0	17.5	8	5/8" x 150	5/8" x 75	111.1
2 1/2	190.5	38.1	104.6	88.9	100.1	73.2	6.4	149.4	20.6	8	3/4" x 165	5/8" x 75	130.4
3	209.6	38.1	127.0	88.9	117.3	88.9	9.5	168.1	20.6	8	3/4" x 165	5/8" x 75	149.1
4	273.1	44.5	157.2	108.0	152.4	114.3	12.7	216.0	25.4	8	7/8" x 190	3/4" x 100	193.8
6	355.6	54.2	215.9	123.7	222.3	168.4	12.7	292.1	28.4	12	1" x 220	3/4" x 110	266.7
8	419.1	62.0	269.7	139.8	273.1	219.2	12.7	349.3	31.8	12	1 1/8" x 250	1" x 120	320.7
10	508.0	69.9	323.9	158.8	242.9	273.1	12.7	431.8	35.1	16	1 1/4" x 280	1" x 140	400.1
12	558.8	72.9	381.0	161.8	400.1	233.9	12.7	489.0	35.1	20	1 1/4" x 285	1" x 140	457.3
14	603.3	76.3	412.8	171.5	431.8	355.6	12.7	527.1	38.1	20	1 3/8" x 305	1" x 150	492.2
16	685.8	82.6	469.9	184.2	495.3	406.4	12.7	603.3	41.1	20	1 1/2" x 335	1" x 155	565.2
18	743.0	89.0	533.4	190.6	546.1	457.2	12.7	654.1	44.5	20	1 5/8" x 360	1" x 165	612.8
20	812.8	95.3	584.2	196.9	609.6	508.0	12.7	723.9	44.5	24	1 5/8" x 375	1" x 180	682.6
24	939.8	108.0	692.2	209.6	717.6	609.6	12.7	838.2	50.8	24	1 7/8" x 425	1" x 195	790.6

ANSI B16,36 FORGED 900# WN-RF

Unit : mm

Nom. Pipe Size [inch]	Outside Dia-meter	Thick -ness	Raised Face	Length Thru Hube	Diam. at Base of Hub	Diam. of Hub at Bevel	Diam. of Tap Holes	Bolt Circle	Diam. of Bolt Holes	No. of Bolts	Bolt Size & Length	Jack Bolt & Length	O.D of Orifice Plate
	J	N	G	L	H	O	X	C					
1/2	120.7	44.5	35.1	82.6	38.1	21.3	6.4	82.6	22.4	4	3/4" x 175	5/8" x 100	63.6
3/4	130.0	44.5	42.9	89.0	44.5	26.7	6.4	88.9	22.4	4	3/4" x 175	5/8" x 100	69.9
1	149.4	44.5	50.8	89.0	52.3	33.5	6.4	101.6	25.4	4	7/8" x 190	5/8" x 100	79.4
1 1/2	177.8	44.5	73.2	95.3	69.9	48.3	6.4	124.0	28.4	4	1" x 200	5/8" x 100	98.6
2	215.9	44.5	91.9	108.0	104.6	60.5	6.4	165.1	25.4	8	7/8" x 190	5/8" x 100	142.9
2 1/2	244.3	47.5	104.6	111.0	124.0	73.2	6.4	190.5	28.4	8	1" x 205	5/8" x 105	165.1
3	241.3	44.5	127.0	108.0	127.0	88.9	9.5	190.5	25.4	8	7/8" x 190	3/4" x 100	168.3
4	292.1	50.9	157.2	120.7	158.8	114.3	12.7	235.0	31.8	8	1 1/8" x 225	3/4" x 110	206.4
6	381.0	62.0	215.9	146.1	235.0	168.4	12.7	317.5	31.8	12	1 1/8" x 250	1" x 120	288.9
8	469.9	69.9	269.7	168.5	298.5	219.2	12.7	393.7	38.1	12	1 3/8" x 290	1" x 140	358.8
10	546.1	76.3	323.9	190.6	368.3	273.1	12.7	469.9	38.1	16	1 3/8" x 305	1" x 150	435.0
12	609.6	85.6	381.0	206.6	419.1	323.9	12.7	533.4	38.1	20	1 3/8" x 325	1" x 155	498.5
14	641.4	92.3	412.8	219.3	450.9	355.6	12.7	558.8	41.1	20	1 1/2" x 350	1" x 165	520.7
16	704.9	95.3	469.9	222.3	508.0	406.4	12.7	616.0	44.5	20	1 5/8" x 370	1" x 180	574.7
18	787.4	108.0	533.4	235.0	565.2	457.2	12.7	685.8	50.8	20	1 7/8" x 425	1" x 195	638.2
20	857.3	114.4	584.2	254.1	622.3	508.0	12.7	749.3	53.8	20	2" x 450	1" x 205	689.5
24	1041.4	146.1	692.2	298.5	749.3	609.6	12.7	901.7	66.5	20	2 1/2" x 560	1" x 250	838.2

ANSI B16,36 FORGED 1500# WN-RF

Unit : mm

Nom. Pipe Size [inch]	Outside Dia-meter	Thick -ness	Raised Face	Length Thru Hube	Diam. at Base of Hub	Diam. of Hub at Bevel	Diam. of Tap Holes	Bolt Circle	Diam. of Bolt Holes	No. of Bolts	Bolt Size & Length	Jack Bolt & Length	O.D of Orifice Plate
	J	N	G	L	H	O	X	C					
1/2	120.7	44.5	35.1	82.6	38.1	21.3	6.4	82.6	22.4	4	3/4" x 175	5/8" x 100	63.6
3/4	130.0	44.5	42.9	89.0	44.5	26.7	6.4	88.9	22.4	4	3/4" x 175	5/8" x 100	69.9
1	149.4	44.5	50.8	89.0	52.3	33.5	6.4	101.6	25.4	4	7/8" x 190	5/8" x 100	79.4
1 1/2	177.8	44.5	73.2	95.3	69.9	48.3	6.4	124.0	28.4	4	1" x 200	5/8" x 100	98.6
2	215.9	44.5	91.9	108.0	104.6	60.5	6.4	165.1	25.4	8	7/8" x 190	5/8" x 100	142.9
2 1/2	244.3	47.5	104.6	111.0	124.0	73.2	6.4	190.5	28.4	8	1" x 205	5/8" x 105	165.1
3	266.7	54.2	127.0	123.7	133.4	88.9	9.5	203.2	31.8	8	1 1/8" x 235	5/8" x 105	174.6
4	311.2	60.2	157.2	130.4	162.1	114.3	12.7	241.3	35.1	8	1 1/4" x 260	3/4" x 125	209.6
6	393.7	89.0	215.9	177.9	228.6	168.4	12.7	317.5	38.1	12	1 3/8" x 330	1" x 160	282.6
8	482.6	98.3	269.7	219.3	292.1	219.2	12.7	393.7	44.5	12	1 5/8" x 375	1" x 180	352.4
10	584.2	114.4	323.9	260.4	368.3	273.1	12.7	482.6	50.8	12	1 7/8" x 435	1" x 200	435.0
12	673.1	130.4	381.0	288.8	450.9	233.9	12.7	571.5	53.8	16	2" x 480	1" x 220	520.7
14	749.3	139.8	412.8	304.9	495.3	355.6	12.7	635.0	60.5	16	2 1/4" x 525	1" x 230	577.9
16	825.5	152.5	469.9	317.6	552.5	406.4	12.7	704.9	66.5	16	2 1/2" x 580	1" x 255	641.4
18	914.4	168.5	533.4	333.6	596.9	457.2	12.7	774.7	73.2	16	2 3/4" x 635	1" x 275	704.9
20	984.3	184.2	584.2	362.0	641.4	508.0	12.7	831.9	79.2	16	3" x 695	1" x 300	755.7
24	1168.4	209.6	692.2	412.8	762.0	609.6	12.7	990.6	91.9	16	3 1/2" x 795	1" x 335	901.7