

**ASVIN FLOW ELEMENTS
ORIFICE ASSEMBLIES,
NOZZLES & VENTURIES**

For Process Industries

Asian Industrial Valves and Instruments Who are the pioneers in the line of instruments for process industries has also been manufacturing flow instrument elements. Measurement of differential pressure is still acquiring evergrowing importance because of its increasing field applications, starting from physiological processes. Industrially, flow rate or quantity measurement is important for determining proportions of the materials flowing in or out of a process. **ASVIN** orifice flow assemblies are made from different material combination such as Forged flange to SA 105, Stainless Steel flanges to 316,304, & other Alloy steel to Hastelloy C, Monel, Inconel, SA 182 F11, SA 182 F12 etc., to suit the specification, working temperature, pressure and flow media. Under Primary device and secondary device in the field of fluid flow measurement, **ASVIN** Manufactures **Orifice Plate Assemblies, Integral Orifice plate Assemblies, Flow Nozzles, Venturies, Manometers, Blowdown Valves, Manifolds, Condensation Pots** etc., The related standards referred are ANSI B 2.1, ANSI B 16.20, ANSI B 16.5, AGA3, BS : 1042, IS : 2952, ISO : 5167,

Primary devices are elements for creating a certain pressure drop or limiting a flow rate.

1. Orifice plate

Square edged orifice plates - concentric or eccentric.
Special entrance - quarter of circle or conical entrance.
Segmental orifices - fixed or adjustable.

2. Venturi flow devices

Classical, Rectangular or Turncated

3. Flow nozzles

ISA: 1932 nozzle or Long radius nozzle (High or Low Ratio)

4. Pitot tube

5. Centrifugal force device due to 90° bend

6. Special Application

1. Orifice meter run 2. Integral orifices 3. Restriction orifices
4. Special in take devices 5. Flow straightness

7. Accessories

1. Manifolds - H type, T-type, 3 way & 5 way
2. Condensate pots

Elements in Primary device

1. Flanges 2. Pressure tap.
3. Upstream & downstream pipe etc,

Secondary device are elements for measuring differential pressure created by primary devices.

Element in Secondary devices are blowdown valves, manifolds, condensation pots etc.,

Orifice plate which can be used with the various following arrangements of pressure tappings.

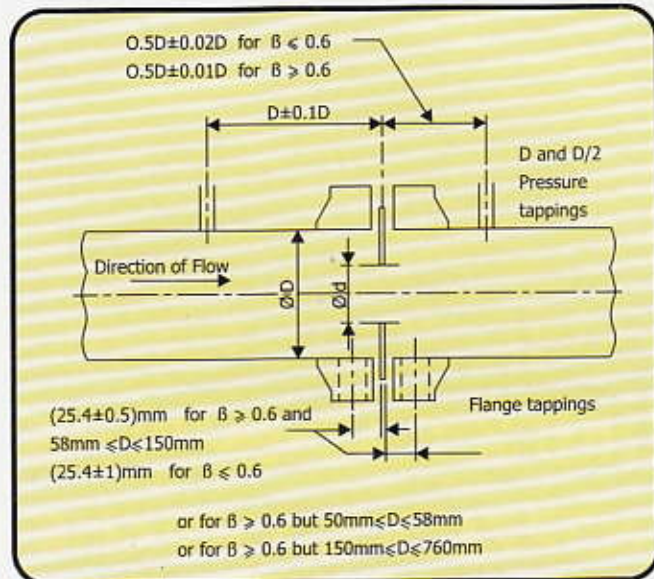


Fig. 1. Spacing of pressure tappings for orifice plates with D & D/2 or flange tapping.

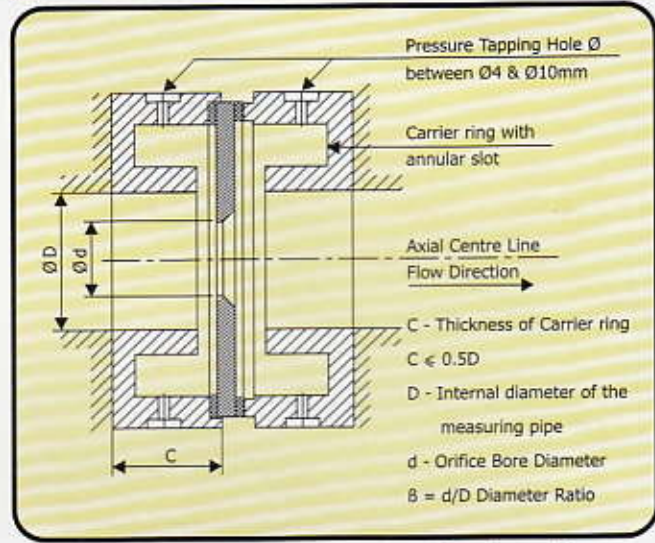


Fig. 2. Spacing of pressure tappings for orifice plate with corner tapping (carrier rings are provided between flanges).

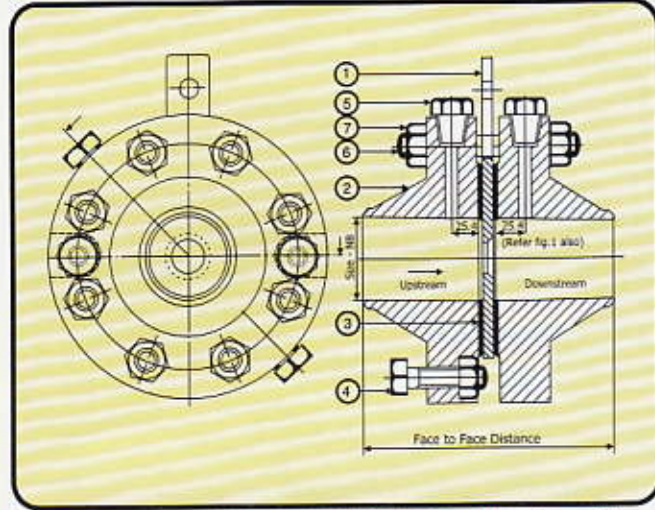
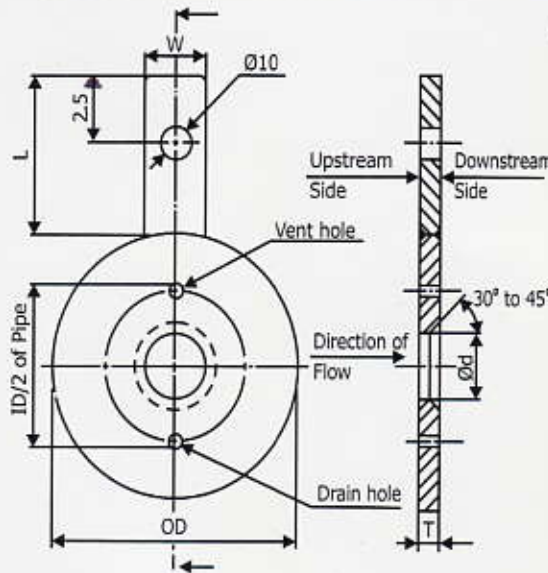
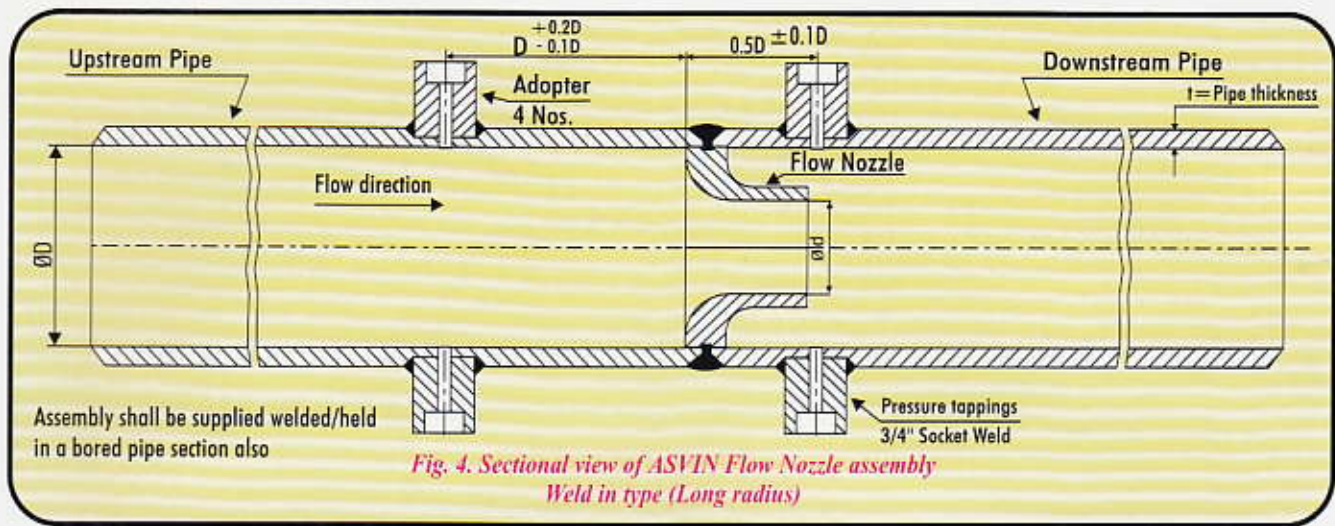


Fig. 3. Sectional view of ASVIN Orifice Plate Assembly flange tapping - weldneck flanges - concentric square edge orifice plate with jack screws.

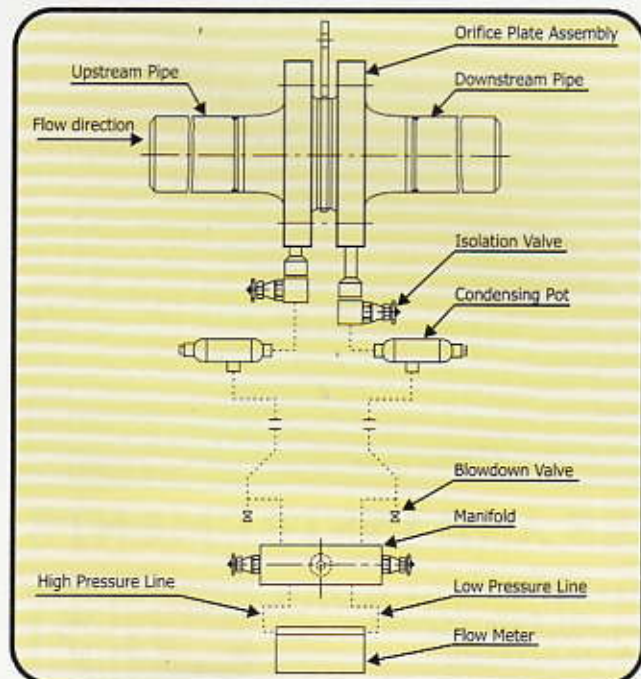
ITEM No.	DESCRIPTION	MATERIAL	QTY IN Nos
1	ORIFICE PLATE	SS316 / MONEL / HASTELLOY C / INCONEL	1
2	FLANGE	SA105 / SS304 / SS316 / A182F11 / F12 / MONEL	2
3	GASKET	CAF / TEFLON/METALLIC	2
4	JACK SCREW	HIGH TENSILE STEEL / A193 Gr. B7/SS 304	2
5	PLUG	SA105 / SS304 / SS316 / A182F11 / F12 / MONEL	4
6	STUD	HIGH TENSILE STEEL / A193 Gr. B7 / SS	-
7	NUT	HIGH TENSILE STEEL / A194 Gr. 2H / SS	-



The dimensions in mm of ASVIN concentric square edge orifice plates

Size NB mm	OD Rating #							T' 150 to 2500 #	
	150	300	400	600	900	1500	2500	<315°C	>315°C
25	66.7	73.0	73.0	73.0	79.4	79.4	85.7	3.18	6.35
40	85.7	95.3	95.3	95.3	98.4	98.4	117.5		
50	104.8	111.1	111.1	111.1	142.9	142.9	146.1		
80	136.5	149.2	149.2	149.2	168.3	174.6	196.9		
100	174.6	181.0	177.8	193.7	206.4	209.6	235.0		
150	222.3	250.8	247.7	266.7	288.9	282.6	317.5	12.7	9.52
200	279.4	308.0	304.8	320.7	358.8	352.4	387.4		
250	339.7	362.0	358.8	400.1	435.0	435.0	476.3		
300	409.6	422.3	419.1	457.2	498.5	520.7	549.3		
350	450.8	485.8	482.6	492.1	520.7	577.9	—		
400	514.4	539.8	536.6	565.2	574.7	641.4	—	6.35	
450	549.3	596.9	593.7	612.8	638.2	704.9	—		
500	606.4	654.1	647.7	682.6	698.5	755.7	—		
550	660.4	704.9	701.7	733.4	—	—	—		
600	717.6	774.7	768.4	790.6	838.2	901.7	—		

Fig. 5. Details of ASVIN Square edged, concentric type Orifice Plate



To check the validity of the flow rate

The maximum flow rate is given by,

$$q_m = CE \epsilon \pi/4 d^2 \sqrt{(2 \Delta p \cdot \rho)}$$

$$q_v = CE \epsilon \pi/4 d^2 \sqrt{(2 \Delta p / \rho)}$$

where,

q_m = Mass flow rate in kg / sec.

q_v = Volume flow rate in M^3 / sec.

C = Coefficient of discharge

E = Velocity approach factor, $(1-\beta^4)^{-1/2}$

ϵ = Expansibility factor.

d = Orifice bore diameter of primary device at operating condition, in meter.

Δp = Differential pressure, in pascal.

(1 atm = 1.0332 kg/cm² = 14.6959 psi = 760mm hg or torr
= 10332.276mm water = 101325 pascal or N/m² = 1.013Bar)

ρ = Mass density of fluid at operating condition, in kg/m³

β = Diameter ratio = d/D

D = Upstream internal pipe diameter at operating condition, in meter.

All the final values can be supplied by ASVIN, if all the input datas are provided as per ordering information.

Limits of use for Orifice plate

	Corner taps	Flange taps	D & D/2 taps
d (mm)	≥ 12.5	≥ 12.5	≥ 12.5
D (mm)	$50 \leq D \leq 1000$	$50 \leq D \leq 760$	$50 \leq D \leq 760$
B(d/D)	$0.23 \leq B \leq 0.80$	$0.2 \leq B \leq 0.75$	$0.2 \leq B \leq 0.75$

SELECTION OF TAPPING FOR A DEFINED ELEMENT

Type of Primary Element	Tapping
Square edged orifice	Corner, Flange, D & D/2
Quarter Circle orifice	Corner, Flange
Conical orifice	Corner
Eccentric orifice	Corner
ISA (1932) Nozzle	Corner
Long radius Nozzle	D & D/2
Flow Nozzle, Venturi (Classical, Rectangular or Truncated)	Throat tapping
Cast venturi (15°)	Throat tapping
15° Machined Venturi	Throat tapping
15° Fabricated Venturi	Throat tapping

Ordering information

- Line size and pipe schedule. (D = inner diameter)
- Material of construction.
- Type of taps - Flange, Corner or D & D/2.
- Quantity of flow - Max, Normal & Min,
- Density of fluid at operating condition.
- Nature of fluid-Liquid or Gaseous.
- Operating pressure & temperature.
- Viscosity of fluid at operating condition. (a or b below)
 - Absolute / Dynamic viscosity in pa.s or kg/m.s.
(1pa.s = 10 poise = 1000 cp = 0.672 lbs/fts.)
 - Kinematic viscosity in m^2 / sec .
(1 stroke = 1 cm^2/sec)
- Differential pressure or scale range of transmitter.
- Specific heat ratio, K (cp/cv)

ASVIN - Range of Products

VALVES

- ☞ SAFETY / PRESSURE RELIEF VALVES
- ☞ PRESSURE REDUCING VALVES / STATION
- ☞ PRESSURE CUM VACUUM RELIEF VALVES
- ☞ BREATHER VALVES
- ☞ EXCESS FLOW VALVES
- ☞ UNDERGROUND SAFETY VALVES FOR WATER TANK / WATER FLOW CANAL AS PER BS - 4558 : 1983
- ☞ NON-RETURN VALVES
- ☞ BALL VALVES
- ☞ DIAPHRAGM VALVES
- ☞ NEEDLE VALVES / MANIFOLDS / THROTTLING VALVES
- ☞ FLUSH BOTTOM VALVES

TANK EQUIPMENTS

- ☞ TANK BLANKETTING VALVES
- ☞ EMERGENCY PRESSURE RELIEF VALVES (Air Vent)
- ☞ GAUGE HATCHES (Lock Down / Spring Loaded)
- ☞ VACUUM BREAKERS

INSTRUMENTS

- ☞ LEVEL GAUGES (Tubular / Reflex / Transparent)
- ☞ LEVEL INDICATORS (Magnetic / Float & Chord)
- ☞ ORIFICE ASSEMBLIES / FLOW NOZZLES / VENTURIES
- ☞ MANOMETERS
- ☞ LEVEL SWITCHES
- ☞ THERMOWELLS
- ☞ CONDENSING POTS
- ☞ CONSTANT HEAD CHAMBERS
- ☞ AIR / MOISTURE SEPERATORS

PIPE LINE EQUIPMENTS

- ☞ STEAM TRAPS
- ☞ STRAINERS (T / Y / Basket / Simplex / Duplex type)
- ☞ FLAME / DETONATION ARRESTERS
- ☞ SIGHT GLASSES
(Full View / Double Window / Flapper / Rotating Wheel)
- ☞ RUPTURE DISC

Available with all reputed Third party Inspection Agencies, Viz.

ABS, BHEL, Bax Council, Bureau Veritas, Controller of Explosives, DNV, EIL, IBR, IRS, Lloyds, MECON, NPC, RITES, SGS, TPL etc.,



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