

Orifice Plates



All types of Orifice Plates and
relative products

Orifice Plates for Raised Face Flanges

Series OPRFF

✓ Principle

OPRFF orifice plates are used as primary elements in flow measurement of liquid, gas and steam according to the differential pressure principle.

✓ Construction

Design and Calculation Standards:

ISO 5167, ASME MFC-3M, ASME MFC-14M, ISA RP 3.2,
Shell Flow Meter Engineering Handbook
R. W. Miller Handbook, AGA report no. 3

Sizes : 1" - 24" according to ANSI B 16.36 Flanges,
 $50 < D < 1000$ mm according to ISO 5167 and $50 < D < 900$ mm,
According to ASME MFC-3M

Pressure rating : 300 - 2500 lbs. RF (150# is not recommended by standards)
Also, Ring Type Joint (RTJ) and Flat Face (FF) are available, too.
Either API Flanges for higher pressure rating can be selected.

Plate thickness : 3 - 16 mm depending on plate size and pressure

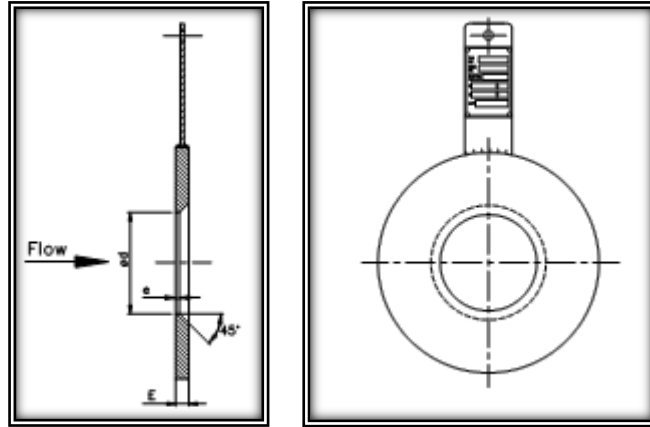
Bore (d) : $d > 12.5$ mm (based on Standard)

β (d/D) : $0.2 < \beta < 0.75$

Material : Stainless Steel (Especially AISI 316), Carbon Steel, Monel, Inconel,
Super Duplex, 6Mo and others on request.

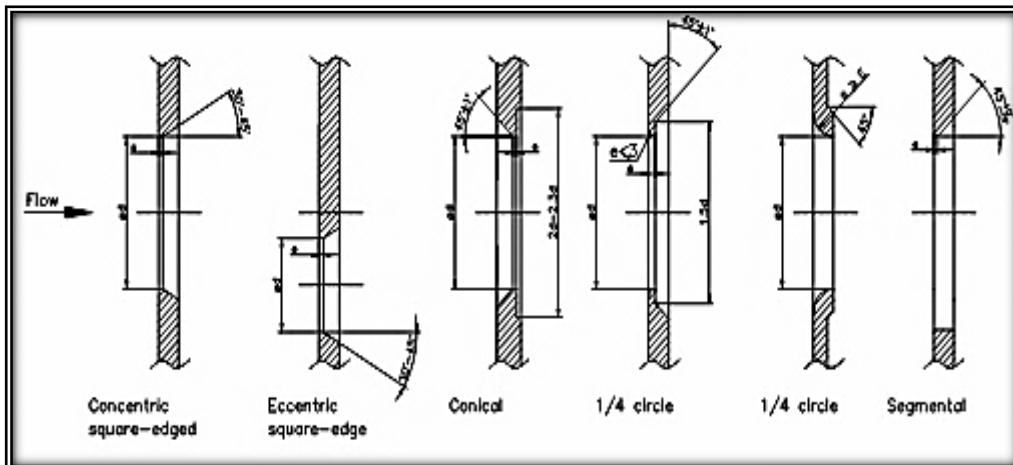
Vent or drain Hole: On request; ISO, API, ASME and IPS provide especial tables for weep holes.

Typical Draft



Mounting style : Between raised face flanges according To ANSI B16.36 or DIN 19214,
Or other standards on request.

Orifice Plate Shapes : Square edge concentric, square edge, Eccentric, Concentric,
conical, Quarter circle (or 1/4 Circle), segment.



Handle : With name plate in AISI 316 with the following inscription:
TAG no., serial no., pressure rating, inner pipe diameter,
bore size, material and UPSTREAM mark.

NOTE : For Restriction Applications, please see the OPRES catalog.

✓ **Technical Data**

Accuracy : $\pm 0.6\%$ for $\beta < 0.6$ and equal to β for β values above 0.6

Permanent Pressure lost

: Depending on β , for β equal to 0.6 then approximately 60 % of the measured differential pressure.

Limits for Reynolds No. in pipe:

$Re > 1260 \times \beta^2 \times D$ according to ISO 5167,

$2000 < Re < 10^8$ according to ASME MFC-3M

Especial Application and Options are available:

- Pipe in mounted Orifice Plates
- Integrated Orifice Assemblies
- PRG, Polymer or Transparent Material for construction



Some Samples of Orifice Plate:



Brief comparison between flow measuring devices

Device	Rangeability ¹	Accuracy ²	Advantages	Disadvantages
Orifice	3.5:1	2-4% of full span	-low cost -extensive industrial practice	-high pressure loss -plugging with slurries
Venturi	3.5:1	1% of full span	-lower pressure loss than orifice -slurries do not plug	-high cost -long length
Flow nozzle	3.5:1	2% full span	-good for slurry service -intermediate pressure loss	-higher cost than orifice plate -limited pipe sizes
Elbow meter	3:1	5-10% of full span	-low pressure loss	-very poor accuracy
Annubar	3:1	0.5-1.5% of full span	-low pressure loss -large pipe diameters	-poor performance with dirty or sticky fluids
Turbine	20:1	0.25% of measurement	-wide range ability -good accuracy	-very expensive -strainer needed, especially for slurries
Positive displacement	10:1 or greater	0.5% of measurement	-high range ability -good accuracy	-high pressure drop -damaged by flow surge or solids

Notes:

1. Range ability is the ratio of full span to smallest flow that can be measured with sufficient accuracy.
2. Accuracy applies to a calibrated instrument.