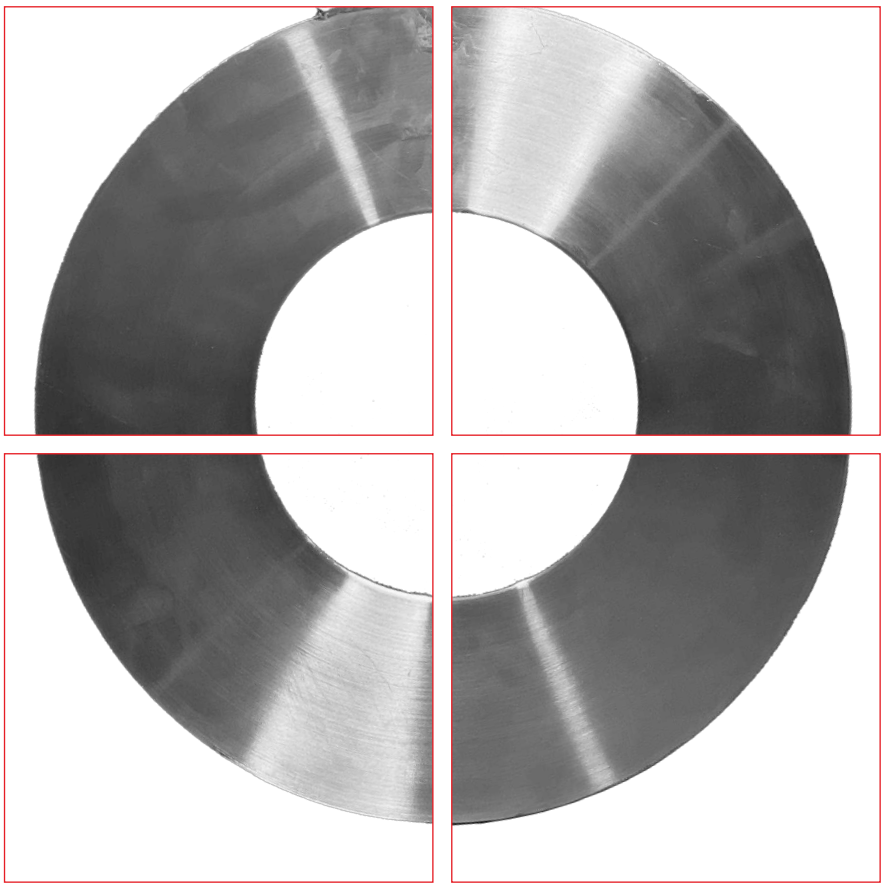
ORIFIC PLATE CATALOGUE

MODEL: FIV-OP



2024

FARTAK IMEN VISION

Supplier and Manufacturer of Oil and Gas Equipment

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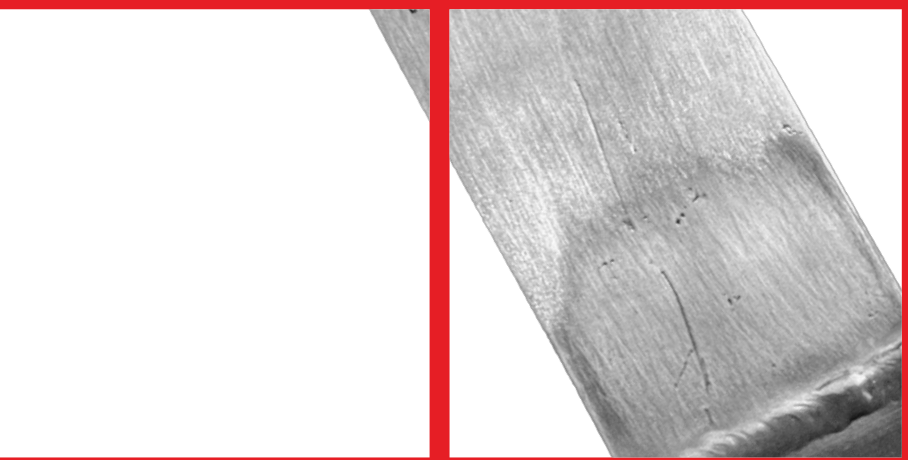
NO. 8, MARJAN ALLEY, MOTAHARI ST., TEHRAN, IRAN

ABOUT COMPANY

Fartak Imen Vision is a company that mainly specializes in supplying oil & gas equipment. With extensive experience spanning many years. Our company has had the honor of involvement and participation in many significant oil & gas projects to provide the utmost quality and efficiency for national interests. Having employed a capable team of sales, engineering, and technical experts, Fartak Imen Vision has always dedicated time and effort to constantly broadening its range of abilities and services and improving delivery quality to perfection. One of the priorities of the company is to supply state-of-the-art high-quality European products from reliable well-known companies.

Among the accomplishments of the company, is the addition of the calibration laboratory which has acquired the ISO/IEC 17025 certification from the National Accreditation of Iran (NACI) opening the opportunity for calibration services to customers.



FARTAK IMEN VISION

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PRODUCT OVERVIEW

Orifice plates are one of the many ways to measure flow. Alongside this, they offer several other applications such as reducing pressure and restricting flow. Many differential pressure transmitters use orifice plates as their primary element to measure differential pressure, this is possible due to Bernoulli's equation which relates flow to differential pressure.

Orifice plates can be used for liquid, gas, and steam fluids and come in different types, each being suitable and preferred for a range of specific applications. Some orifice plates have extra options to be used for specific circumstances. Therefore it's important to proceed with caution while determining the dimensions of an orifice plate accurately after having a successful evaluation of the process conditions.

Figure 1. An Universal type orifice plate Size 10" CL300 - Bore diameter 160.2 mm

CONSTRUCTION STANDARD

The Fartak imen vision orifice plates are designed according to the ISO 5167-2, ISO/TR 15377, and ASME standards. These standards ensure that the orifice plates have the proper geometry and method of use to accurately determine the flow rate of fluids within a conduit. In addition, ISO/TR 15377 provides guidelines for the use of conical entrance orifice plates, quarter-circle orifice plates, and eccentric orifice plates in various industrial settings such as power plants, gas handling facilities, and processing installations. These orifice plates are essential components in the proper functioning of these facilities and are designed to meet the highest safety and performance standards.

One important consideration when selecting an orifice plate is the bore diameter, which is calculated using the relevant sizing software.

APPLICATION

- Power generation
- Oil production and refining
- Water treatment and distribution
- Gas processing and transmission
- Chemical and petrochemical industries

FEATURES

- Max. operating temperature and pressure limited by material and flange
- Rangeability 1:3 :5
- Suitable for clean or dirty liquid, gas and steam flow measurement
- Accuracy ≤ ±0.5% of actual flow rate
- Repeatability of measurement of 0.1%
- Orifice sizing on request

ORIFICE PLATE DIMENSIONAL DRAWING

Orifice plates can be designed with different sealing faces, such as raised faces (RF) or ring-type joints (RTJ). The RF sealing option is the most common and suitable for under uncritical pressure and temperature conditions, which is designed in two types with handle and without handle. Also available with a spiral finish.

On the other hand, RTJ is used under high temperature and pressure conditions. Orifice plates designed with RTJ can be easily fitted between flanges with a ring-type joint. The plate's cross-section profile is designed to fit inside the groove of the RTJ flanges and is used for flange sealing purposes.

1. UNIVERSAL TYPE ORIFICE PLATE

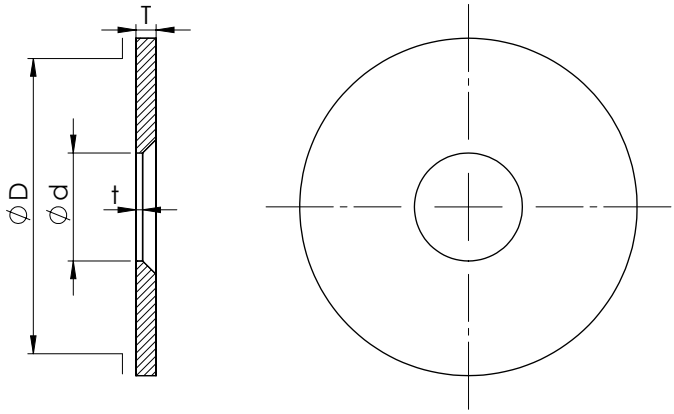


Figure 2. Universal type orifice plate

Table 1. Universal type dimensions	
line size in (mm)	**Outside diameter (D) in (mm)**
2 (50.8)	2.437 (61.8998)
2 ½ (63.5)	2.812 (71.4248)
3 (76.2)	3.437 (87.2998)
4 (101.6)	4.406 (111.912)
6 (152.4)	6.437 (163.5)
8 (203.2)	8.437 (214.3)
10 (254)	10.687 (271.45)
12 (304.8)	12.593 (319.862)
14 (355.6)	14.000 (355.6)
16 (406.4)	16.000 (406.4)
18 (457.2)	18.000 (457.2)
20 (508)	20.000 (508.0)
24 (609.6)	24.000 (609.6)

2. PADDLE TYPE ORIFICE PLATE

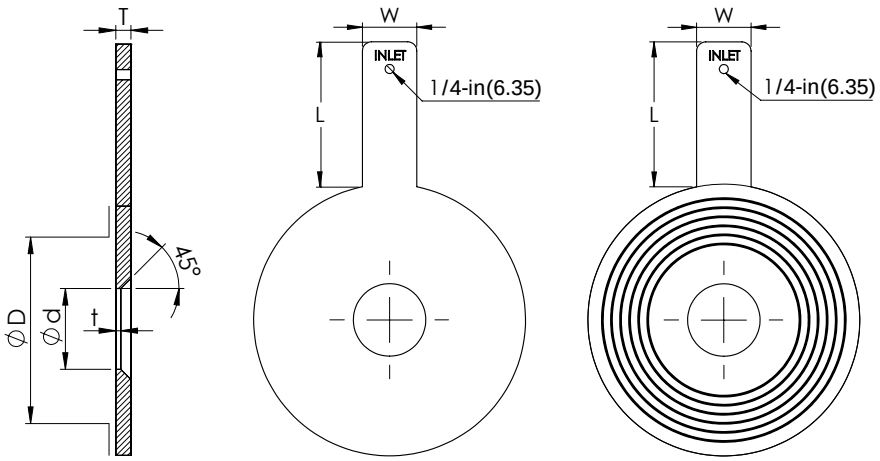


Figure 3. Paddle type orifice plate

Table 2. Paddle type dimensions in inches

line size in (mm)	Outside diameter (D) in (mm)						Handle length (L) in (mm)	Handle Width (W) in (mm)
	150#	300#	600#	900#	1500#	2500#		
2 (50.8)	4.125 (104.8)	4.375 (111.1)	4.375 (111.1)	5.625 (142.9)	5.625 (142.9)	5.750 (146.1)	4.0 (101.6)	1.00 (25.4)
2 ½ (63.5)	4.875 (123.8)	5.125 (130.2)	5.125 (130.2)	6.500 (165.1)	6.500 (165.1)	6.625 (168.3)	4.0 (101.6)	1.00 (25.4)
3 (76.2)	5.375 (136.5)	5.875 (149.2)	5.875 (149.2)	6.625 (168.3)	6.875 (174.6)	7.750 (196.9)	4.0 (101.6)	1.00 (25.4)
4 (101.6)	6.875 (174.6)	7.125 (181.0)	7.625 (193.7)	8.125 (206.4)	8.250 (209.6)	9.250 (235.0)	4.0 (101.6)	1.00 (25.4)
6 (152.4)	8.750 (222.3)	9.875 (250.8)	10.500 (266.7)	11.375 (289.0)	11.125 (282.6)	12.500 (317.5)	4.0 (101.6)	1.00 (25.4)
8 (203.2)	11.000 (279.4)	12.125 (308.0)	12.625 (320.7)	14.125 (358.8)	13.875 (352.4)	15.250 (387.4)	4.0 (101.6)	1.00 (25.4)
10 (254)	13.375 (339.7)	14.250 (362.0)	15.750 (400.1)	17.125 (435.0)	17.125 (435.0)	18.750 (476.3)	6.0 (152.4)	1.5 (38.1)
12 (304.8)	16.125 (409.6)	16.625 (422.3)	18.000 (457.2)	19.625 (498.5)	20.500 (520.7)	21.625 (549.3)	6.0 (152.4)	1.5 (38.1)
14 (355.6)	17.750 (450.86)	19.125 (485.8)	19.375 (339.7)	20.500 (520.7)	22.750 (577.9)	-	6.0 (152.4)	1.5 (38.1)
16 (406.4)	20.250 (514.4)	21.250 (539.8)	22.250 (565.2)	22.625 (574.7)	25.250 (641.4)	-	6.0 (152.4)	1.5 (38.1)
18 (457.2)	21.500 (546.1)	23.375 (593.7)	24.000 (609.6)	25.000 (635.0)	27.625 (701.7)	-	6.0 (152.4)	1.5 (38.1)
20 (508)	23.750 (603.25)	25.625 (650.9)	26.750 (679.5)	27.375 (695.3)	29.625 (752.5)	-	6.0 (152.4)	1.5 (38.1)
24 (609.6)	28.125 (714.375)	30.375 (771.5)	31.000 (787.4)	32.875 (835.0)	35.500 (901.7)	-	6.0 (152.4)	1.5 (38.1)

28.125 (714.375)

Table 3. Paddle type dimensions by DIN

line size Per DIN	Outside diameter (D) in (mm)						Handle length (L) in (mm)	Handle Width (W) in (mm)
	PN 10	PN 16	PN 25	PN 40	PN 63/64	PN 100		
DN 50	4.21 (107)	4.21 (107)	4.21 (107)	4.21 (107)	4.45 (113)	4.69 (119)	1.5 (40)	6.3 (160)
DN 65	5 (127)	5 (127)	5 (127)	5 (127)	5.43 (138)	5.67 (144)	1.5 (40)	6.3 (160)
DN 80	5.6 (142)	5.6 (142)	5.6 (142)	5.6 (142)	5.82 (148)	6.06 (154)	1.5 (40)	6.3 (160)
DN 100	6.38 (162)	6.38 (162)	6.61 (168)	6.61 (168)	6.85 (174)	7.09 (180)	1.5 (40)	6.3 (160)
DN 125	7.56 (192)	7.56 (192)	7.64 (194)	7.63 (194)	8.27 (210)	8.54 (217)	1.5 (40)	6.3 (160)
DN 150	8.58 (218)	8.58 (218)	8.82 (224)	8.82 (224)	9.72 (247)	10.12 (257)	1.5 (40)	6.3 (160)
DN 200	10.74 (273)	10.74 (273)	11.18 (284)	11.42 (290)	12.17 (309)	12.76 (324)	1.5 (40)	6.3 (160)
DN 250	12.91 (328)	12.95 (329)	13.39 (340)	13.86 (352)	14.33 (364)	15.39 (391)	1.5 (40)	6.3 (160)
DN 300	14.88 (378)	15.11 (384)	15.75 (400)	16.42 (417)	16.69 (424)	18.03 (458)	1.5 (40)	6.3 (160)
DN 350	17.24 (438)	17.48 (444)	17.99 (457)	18.66 (474)	19.13 (486)	20.16 (512)	1.5 (40)	6.3 (160)
DN 400	19.25 (489)	19.49 (495)	20.24 (514)	21.49 (546)	21.38 (543)	22.52 (572)	1.5 (40)	6.3 (160)
DN 450	21.22 (539)	21.85 (555)	22.24 (565)	22.48 (571)	Not applicable	Not applicable	1.5 (40)	6.3 (160)
DN 500	23.39 (594)	24.29 (617)	24.57 (624)	24.72 (628)	25.87 (657)	27.72 (704)	1.5 (40)	8.0 (200)
DN 600	27.36 (695)	28.9 (734)	28.78 (731)	29.41 (747)	30.08 (764)	32.01 (813)	1.5 (40)	8.0 (200)

3. RTJ TYPE ORIFICE PLATE

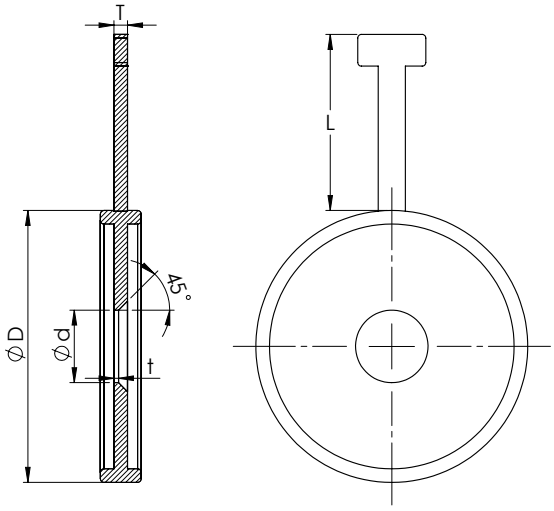


Figure 4. Paddle type orifice plate

able 4. RTJ type dimensions

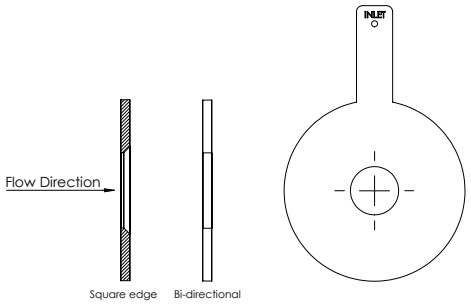
Flange rating																	
Line Size	150#		300#, 600#		L	T	900#				1500#				2500#			
	Ring No.	D	Ring No.	D			Ring No.	D	L	T	Ring No.	D	L	T	Ring No.	D	L	T
2-in	R-22	3.56	R-23	3.69	5.50	1.06	R-24	4.19	6.50	1.06	R-24	4.19	6.50	1.06	R-26	4.44	6.50	1.06
2 ½ in	R-25	4.31	R-26	4.44	6.50	1.06	R-27	4.69	6.50	1.06	R-27	4.69	6.50	1.06	R-28	4.83	6.50	1.19
3-in	R-29	4.81	R-31	5.31	6.50	1.06	R-31	5.31	6.50	1.06	R-35	5.81	6.50	1.06	R-32	5.50	7.50	1.19
4-in	R-36	6.19	R-37	6.31	6.50	1.06	R-37	6.31	6.50	1.06	R-39	6.81	6.50	1.06	R-38	6.81	7.50	1.31
6-in	R-43	7.94	R-45	8.75	7.50	1.06	R-45	8.75	7.50	1.06	R-46	8.81	7.50	1.19	R-47	9.75	8.50	1.44
8-in	R-48	10.06	R-49	11.06	7.50	1.06	R-49	11.06	7.50	1.06	R-50	11.25	7.50	1.44	R-51	11.88	9.50	1.69
10-in	R-52	12.31	R-53	13.19	8.50	1.06	R-53	13.19	8.50	1.06	R-54	13.38	8.50	1.44	R-55	14.63	9.50	2.00
12-in	R-56	15.31	R-57	15.44	8.50	1.06	R-57	15.44	8.50	1.06	R-58	15.88	9.50	1.44	R-60	17.25	10.50	2.13
14-in	R-59	15.94	R-61	16.94	8.50	1.06	R-62	17.13	8.50	1.31	R-63	17.50	9.50	1.88	-	-	-	-
16-in	R-64	18.06	R-65	18.94	8.50	1.19	R-66	19.13	8.50	1.44	R-67	19.63	10.50	2.13	-	-	-	-
18-in	R-68	20.69	R-69	21.44	8.50	1.19	R-70	21.75	8.50	1.56	R-71	22.13	10.50	2.13	-	-	-	-
20-in	R-72	22.31	R-73	23.5	8.50	1.52	R-74	23.75	8.50	1.56	R-75	24.25	11.50	2.13	-	-	-	-
24-in	R-76	26.81	R-77	27.88	8.50	1.44	R-78	28.75	10.50	1.88	R-79	28.63	11.50	2.44	-	-	-	-

ORIFIC PLATE BORE TYPES

Fartak Imen Vision company offers a diverse selection of orifice plates in various shapes and sizes, along with materials that are appropriate for specific applications. Specifications for available orifice plate types are mentioned below.

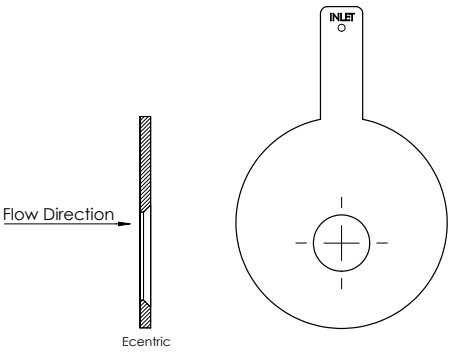
1. CONCENTRIC ORIFICE PLATE:

The concentric orifice plate is the most frequently used primary element due to its versatility in different conditions. It's commonly used for liquids, gases, and steam services. These orifice plates are designed per the ISO5167-2 standard.



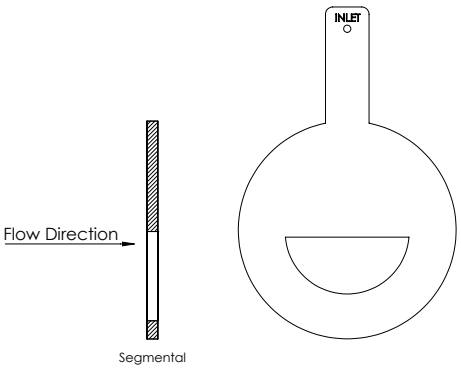
2. ECCENTRIC ORIFICE PLATE:

The eccentric orifice plate has a eccentric hole useful for measuring fluids such as oil and wet steam. this plate can also be used in horizontal runs for special services where the fluid has a high viscosity and a concentric orifice cannot be used. These plates are designed according to the ISO/TR15377 standard.



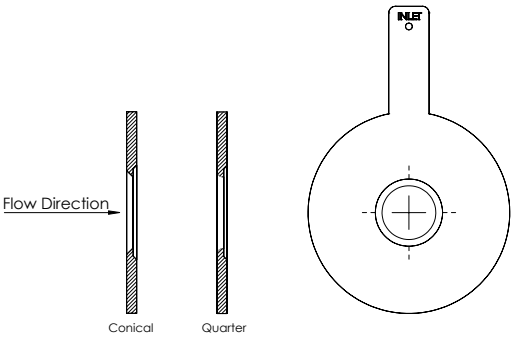
3. SEGMENTAL ORIFICE PLATE:

The segmental orifice plates are commonly used to measure the flow of light slurries and fluids that contain concentrations of solids. These plates can be used in horizontal runs for special services where concentric orifice plates cannot be utilized and are designed according to the ISO/ASME standard.



4. CONICAL ENTRANCE AND QUARTER CIRCLE ORIFICE PLATE:

Conical and quarter orifice plates are a specific type of orifice plate that is suitable for laminar flow and high-viscosity fluids, such as crude oil. These plates are designed according to the ISO/TR15377 standard.



VENT AND DRAIN HOLE

In the case of steam process fluids, it could potentially condensate and liquefy, resulting in droplets being formed. If these droplets pass through the bore, the differential pressure will be impacted, leading to inaccuracies. To prevent this issue, a drain hole is included within the orifice plate, which redirects the droplets away from the bore and through the drain hole instead. This ensures that differential pressure is maintained accurately.

In some instances the case of liquid process fluids, vaporization may occur, leading to the formation of bubbles. These bubbles can accumulate on top of the pipe and eventually pass through the bore, leading to inaccuracies and changes in differential pressure. To prevent this, a vent hole is included on top of the orifice plate. This vent hole allows the bubbles to pass through it, avoiding any changes in differential pressure and ensuring accurate readings.

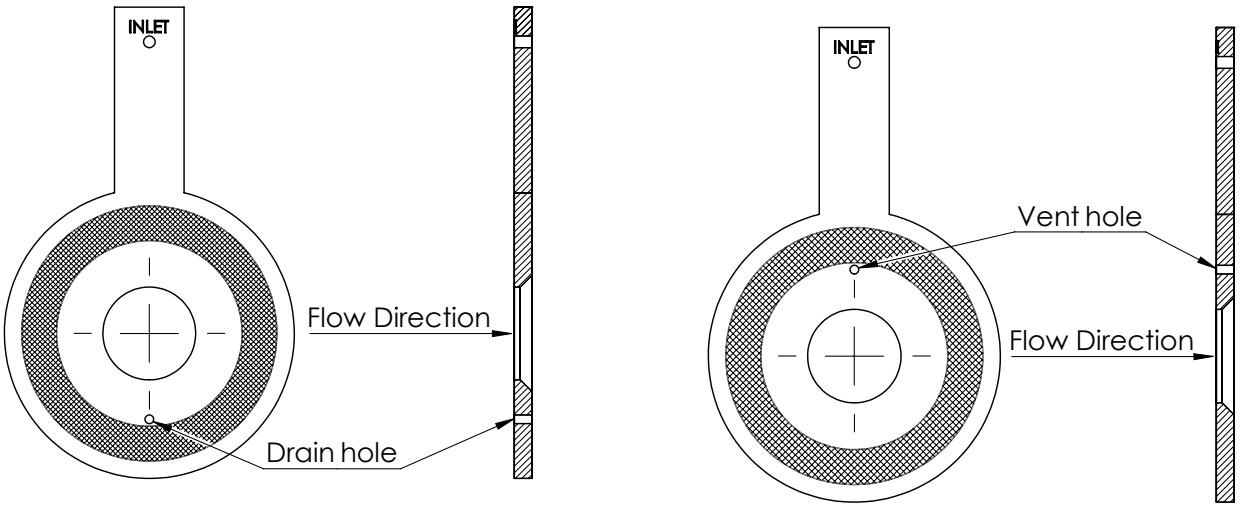


Figure 5. Vent and drain hole

ORDERING CODE

Example ordering code:

FIV-OP - I - 020 - S - D2 - A - S2

Code	Orifice plate type
I	Integral
P	Paddle
R	RTJ

Code	Nominal line size	
020	2-in (DN50)	Other line size are available per request
025	2 ½-in (DN65)	
030	3-in (DN80)	
040	4-in (DN100)	
060	6-in (DN150)	
080	8-in (DN200)	
100	10-in (DN250)	
120	12-in (DN300)	
140	14-in (DN350)	
160	16-in (DN400)	
180	18-in (DN450)	
200	20-in (DN500)	
240	24-in (DN600)	

Code	Range of orifice type
C1	Concentric-square edge orifice plate
C2	Concentric-Bidirectional orifice plate
E	Eccentric orifice plate
S	Segmental orifice plate
C3	nical orifice plate
Q	Quarter orifice plate

Code	Flange rating
RF1	ANSI Class 150 Raised Face
RF3	ANSI Class 300 Raised Face
RF6	ANSI Class 600 Raised Face
RF9	ANSI Class 900 Raised Face
RF15	ANSI Class 1500 Raised Face
RF25	ANSI Class 2500 Raised Face
RTJ3	ANSI Class 300 Ring Joint
RTJ6	ANSI Class 600 Ring Joint
RTJ9	ANSI Class 900 Ring Joint
RTJ15	ANSI Class 1500 Ring Joint
RTJ25	ANSI Class 2500 Ring Joint
D1	DIN/PN 10
D2	DN/PN 16
D3	DN/PN 25
D4	DN/PN 40
D5	DN/PN 63
D6	DN/PN 64
D7	DN/PN 100

Code	Flange rating	
A	ANSI thickness	0.125-in (3.2 mm)- default for line size 2 to 6-in.
B		0.250-in (6.35 mm)- default for line size 8 to 14-in.
C		0.375-in (9.53 mm)- default for line size 16 to 20-in.
D		0.500-in (12.7 mm)- default for line size 24-in.
E	DIN thickness	0.125-in (3 mm)- default for DN50-65.
F		0.157-in (4.0 mm)- default for DN80-450.
G		0.236-in (6.0 mm)- default for DN500-600.

Code	Material	
S1	Stainless Steel 316	Other materials are available per request
S2	Stainless Steel 304	

ADDITIONAL OPTIONS

Code	Bore calculation
BC	Bore calculation

Code	Vent/drain hole
VH	Vent hole
DH	Drain hole

Code	Certificates
N	NACE Standards/Approval
P	PMI Testing

ORIFICE PLATE

MODEL: FIV-OP

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