

ORIFICE FLOW METERS

Standard Orifice Plate

Orifice Plate & Flange

MODEL : DHOP / DHOF-W



DHOP

DHOE-W

Because an orifice plate can be installed directly in the pipe flanges, it measures flow more economically than an orifice plate with rings and is generally suitable for large-bore piping. For large-bore piping of 500mm and above, several DP tap holes are drilled around the pipe circumference and connected by a loop-type equalizing pipe to measure the average pressure.

Daehan Instruments' paddle-type orifice plates are used with orifice flange unions. The outside diameter of the plate is fully machined into a uniform disc, giving high concentricity between the orifice bore and the plate outside diameter. The handle is then welded on and the plate is ground to the specified surface finish on dedicated equipment. Blank plates and plates with commonly requested bore sizes are kept in stock at all times, and the handle of each plate is stamped with the pipe size, flange rating, orifice bore and plate material. Standard thicknesses of 304 and 316 stainless steel are stocked; other sizes and materials are manufactured on request.

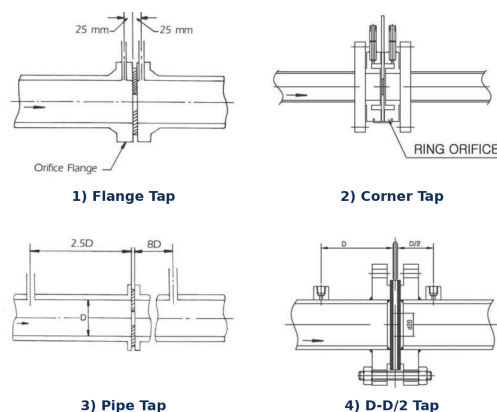
The bevel of a concentric (Concentric) bore, which serves to limit the plate edge thickness, is machined at 45°. Unless otherwise specified, the bevel is machined to the smaller of 1/50 of the pipe inside diameter or 1/8 of the orifice bore.

An eccentric (Eccentric) bore plate has the orifice offset from the center; the bore is normally inscribed in a circle of 98% of the pipe diameter so that solids or slurry can pass through. It is used in many industries including heavy and light chemicals, steelmaking, paper, nuclear power and petrochemicals.

A segmental (Segmental) bore plate is used for measurement where solids are entrained in gas or liquid flow. The arc of the bore is normally inscribed in a circle of 98% of the pipe diameter, and the segmental opening can be placed at the top or bottom of the pipe. It is used in sewage treatment, steelmaking, chemicals, water treatment, paper and petrochemicals.

Accuracy $\pm 1.5\%$ Turndown 4:1 25mm(1") ~ 3000mm(120") ISO 5167-2

Measurement principle



DP tapping positions by tap type

Flange Tap, Corner Tap or D-D/2 Tap is selected according to the position (tap type) at which differential pressure is taken across the orifice plate (ordering codes F / C / D).

Flange Tap: both upstream and downstream taps are located 25mm from the orifice plate; applied to relatively small-bore piping.

Corner Tap: differential pressure is taken immediately before and after the orifice; mainly used for small-bore piping of 2" and under (ring type orifice).

D-D/2 Tap: the upstream tap is located one pipe diameter (D) from the orifice, and the downstream tap at half the pipe diameter (D/2).

Types · model configuration



Concentric

Concentric orifice — bore at the plate center; the most common standard type



Eccentric

Eccentric orifice — bore offset toward the bottom of the pipe so solids and condensate pass easily



Segmental

Segmental orifice — segment-shaped (D-shaped) opening for slurries and fluids containing solids

Photographic examples by bore type (produced from the drawings). Actual bore size and β ratio are determined by the flow calculation.

Item	DHOP Orifice plate (Plate Only)	DHOF-W Orifice Plate & Flange assembly (including Bolt, Nut, Gasket)
Features	Low installation and maintenance cost	Low installation and maintenance cost
Turndown	4:1	4:1
Materials	STS304, STS316, Inconel, Monel, Hastelloy, Teflon	Plate: STS304, STS316, Inconel, Monel, Hastelloy, Teflon · Flange: C.S, STS304, STS316, Inconel, Monel, Hastelloy, A182 F11, F22, F51
Connection	Flange 150#, 300#, 600#, 900#	Flange 300#, 600#, 900#
Applicable piping	2B ~ 92B (50A ~ 2300A) Pipe & Duct	2B ~ 24B (50A ~ 600A) Pipe & Duct
Standards	ISO5167-2	ISO5167-2
Accuracy	±1.5%	±1.5%

Technical Specifications

Item	Value
Accuracy	±1.5%
Turndown (Turndown Range)	4:1
Applicable standards (Regulations)	ISO5167-2
Flow calculation standard	ISO5167, JIS Z 8762, ASME, KS A 0612
Nominal diameters (Nominal Diameters)	25mm (1inch) ~ 3000mm (120inch)
Orifice bore types	Concentric Square Edge Type, Eccentric Type, Segmental Type, Quadrant Edge Type
Tap types (Taps Type)	Flange Taps Type, Corner Taps Type, D-D/2 Taps Type
Orifice flange types	Weld Neck Type, Socket Weld Type, Slip On Type
Flange rating (Flange Rating)	ANSI 150, 300, KS, JIS 10K 20K, AWWA
Plate material	304SS, 304L SS, 316SS, 316L SS, Monel, Hastelloy, Inconel, Cu-Ni, PTFE, Glass, Ni·Cr·Mo Alloy Steel (A182 F11 to 91)
Flange material	A105, A182 F304, A182 F316, A182 F11, A182 F22, A182 F51, A350 LF2, etc

Item	Value
Orifice flange material	Forged steel A.S.T.M. A-105 (other materials by special order, delivery to be advised)
Concentric bore bevel	Machined at 45°. Unless otherwise specified, the smaller of 1/50 of the pipe inside diameter or 1/8 of the orifice bore
Eccentric · segmental bores	Bore (arc) inscribed in a circle of 98% of the pipe diameter
Standard stock	Type 304 · 316 stainless steel in standard thicknesses (blank plates and commonly requested bore sizes always in stock)
Handle stamping	Pipe size, flange rating, orifice bore, plate material
DP tap connection (Diff' Taps)	NPT 1/2, NPT 3/4, SW 1/2, SW 3/4
DHOF-W assembly contents	Orifice flanges + plate + Bolt, Nut, Gasket (meter run optional)

Standards · ISO 5167-2 · ISO 5167 · JIS Z 8762 · ASME · KS A 0612

Dimensions · drawings

Unit: mm. Actual manufacturing dimensions are based on the approved drawing.

Diameters of holes in paddle plate handles (Diameters of holes in paddle Plate Handles)

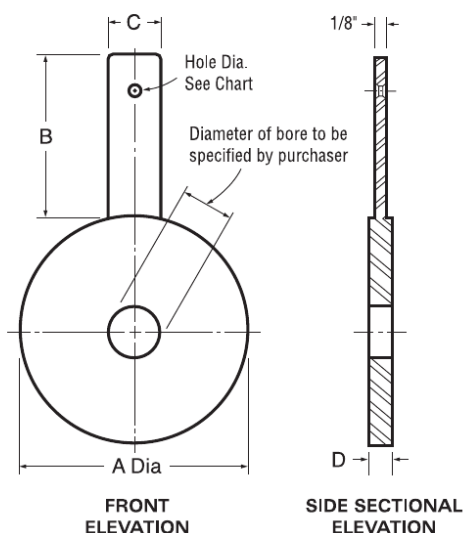


Plate Size	Hole Diameter
1/2" thru 2"	1/4"
1-1/2" thru 12"	3/8"
14" thru 24"	1/2"
26" and larger	3/4"

In the drawing, A (plate outside diameter) · B (handle height) · C (handle width) · D (thickness) are determined by the flange rating and pipe size, and the bore diameter is specified by the customer.

Installation requirements

- The orifice plate is installed directly between the pipe flanges (orifice flanges). With Flange Taps, the upstream and downstream taps are located 25mm from the plate.
- For large-bore piping of 500mm and above, several DP taps are placed around the pipe circumference and connected by a loop-type equalizing pipe to measure the average pressure.
- For fluids containing solids or slurry, an eccentric (Eccentric) or segmental (Segmental) bore is applied. The segmental opening can be placed at the top or bottom of the pipe.
- The upstream/downstream straight run lengths for orifices, flow nozzles and venturi tubes and the impulse piping configuration (steam · liquid · gas) are determined according to the β ratio on the basis of ISO 5167, as described on the 'Orifice Tap Types · Installation Piping Requirements' page.

Ordering information (How to Order)

1 Model	
DHOP	Plate Only
DHOF-W	Flange Assembly (including Bolt, Nut, Gasket)

2 Tap Type	
D	D-D/2 Taps
F	Flange Taps
C	Corner Taps

3 Nominal Pipe Size	
(size)	Pipe size in inch or mm

4 Material : Plate / Flange	
CS	Carbon Steel
4S	304SS
4L	304L SS
6S	316SS
6L	316L SS
11	A182 F11
12	A182 F12
51	A182 F51
91	A182 F91
OP	Option

5 Mounting Connection	
015	ASME(ANSI) Class 150 LB
030	ASME(ANSI) Class 300 LB
010	KS(JIS) Class 10K
020	KS(JIS) Class 20K
000	Option

6 Diff' Taps	
1	NPT 1/2
2	NPT 3/4
3	SW 1/2
4	SW 3/4

7 Meter Run	
N	None
Y	Include

Ordering example: **DHOF-W-D-1800-6S/CS-PN10-1-N**

DHOF-W flange assembly, D-D/2 tap (D), 1800A, plate 316SS (6S) / flange Carbon Steel (CS), PN10 flange (optional rating), DP tap 1 (1/2 tap), no meter run (N) — ordering example based on the orifice approved drawing