

ORIFICE PLATE FLOW ELEMENT



- ACCURACY $\leq \pm 0.5 \%$ OF ACTUAL FLOW
- REPEATABILITY 0.1 %
- LIQUID · GAS · STEAM · FROM DN 50



Stainless
Steel

MEDIUM AND PLATE TYPE

Medium		Standard orifice plate	Quarter round or tapered plate	Eccentric orifice plate	Segmental orifice
Gas	clean	++	–	+	+
	dirty	–	–	++	++
Liquid	clean	++	++	+	+
	viscous	–	++	–	–
	corrosive, polluted	+	+	++	++
Steam		+	+	+	–

An orifice plate is a primary differential pressure element: it creates a pressure drop proportional to the square of the flow rate. It has no supply, no output signal, no protection grade and no display — a separate differential pressure transmitter turns the pressure difference into a signal. The plate is chosen for the medium and for the pipe; the bore is calculated for the process data of the individual case.

++ best choice · + suitable · – not suitable.



STANDARD ORIFICE PLATE

Application	General applications, clean media and gases
Design	To ISO 5167-2
Nominal size	$\geq 2''$ (DN 50)
Nominal pressure rating	Subject to customer requirements
Beta ratio	0.20 ... 0.75
Accuracy	$\leq \pm 0.5\%$ of full range flow
Repeatability	0.1 % of flow

QUARTER ROUND AND TAPERED ORIFICE PLATE

Application	Liquid measurement at low Reynolds number
Design	To ISO/TR 15377
Nominal size	$\geq 2''$ (DN 50)
Nominal pressure rating	Subject to customer requirements
Accuracy	$\leq \pm 2\%$ of full range flow
Repeatability	0.1 % of flow

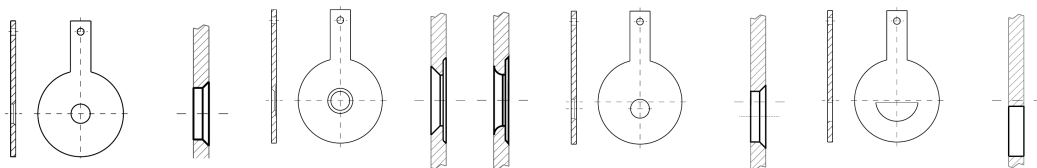
ECCENTRIC ORIFICE PLATE

Application	Two-phase, dirty and particle-laden media · small pipe diameters
Design	To ISO/TR 15377
Nominal size	$> 4''$ (DN 100)
Nominal pressure rating	Subject to customer requirements
Beta ratio	0.46 ... 0.84
Accuracy	$\pm 2.5\%$ below $\beta 0.316 \cdot \pm 2.0\%$ from $\beta 0.316$
Repeatability	0.1 % of flow

SEGMENTAL ORIFICE

Application	Two-phase, dirty and particle-laden media
Design	To ASME MFC
Nominal size	$\geq 4''$ (DN 100)
Nominal pressure rating	Subject to customer requirements
Beta ratio	0.35 ... 0.80
Accuracy	$\pm 1 \dots 2\%$ of full range flow
Repeatability	0.1 % of flow

PLATE TYPES · MATERIALS · SEALING FACES

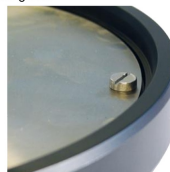


Left to right: standard orifice plate, quarter round or tapered orifice plate, eccentric orifice plate, segmental orifice.

Convex sealing face



Ring joint gasket



Vent or drain hole



MATERIALS

Material	Grade
Standard	Stainless steel
Alternatives	Hastelloy C276 · Monel 400 · duplex steel
On request	Super duplex steel and other materials
Orifice plate of the ring chamber	Stainless steel 316 / 316L

SEALING FACES AND OPTIONS

Feature	Data
Convex (raised) face	The most common seal · for moderate force and temperature
Surface finish	125 ... 250 AARH
Flange standard	ASME B16.5, which specifies the surface roughness of both the flange face and the orifice seal
Ring joint gasket	Optional · for high temperature and high pressure
Ring joint standards	API 6A · ASME/ANSI B16.5 · ASME B16.47 Series A · BS 1560
Ring joint surface finish	< 63 AARH
Vent or drain hole	Optional · designed to the relevant international standards according to the medium



DIMENSIONS (mm)

PLATE THICKNESS

Sealing surface	Nominal size D	Plate thickness t
Convex face	2 ... 6"	3 mm
	8 ... 16"	6 mm
	16 ... 24"	10 mm
	> 26"	16 mm
Ring joint	2 ... 6"	3 mm
	8 ... 12"	6 mm
	14 ... 16"	10 mm
	18 ... 20"	12 mm
	> 24"	16 mm

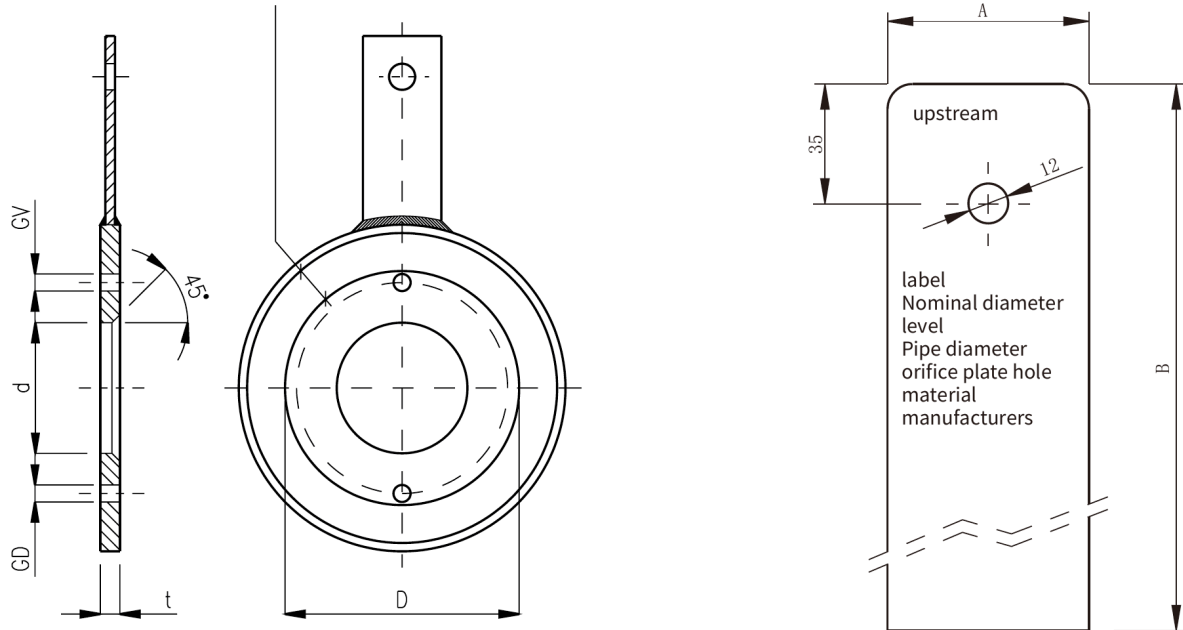
Valid for differential pressures up to 100 kPa. Other plate thicknesses on request.

GRIP SIZE

Sealing surface	Nominal size D	A	B
Convex face	½ ... 5"	30 mm	120 mm
	6 ... 12"	40 mm	150 mm
	14 ... 18"	40 mm	180 mm
	> 18"	50 mm	200 mm
Ring joint	2 ... 4"	30 mm	120 mm
	6 ... 12"	40 mm	150 mm
	14 ... 18"	40 mm	180 mm
	20 ... 24"	50 mm	200 mm

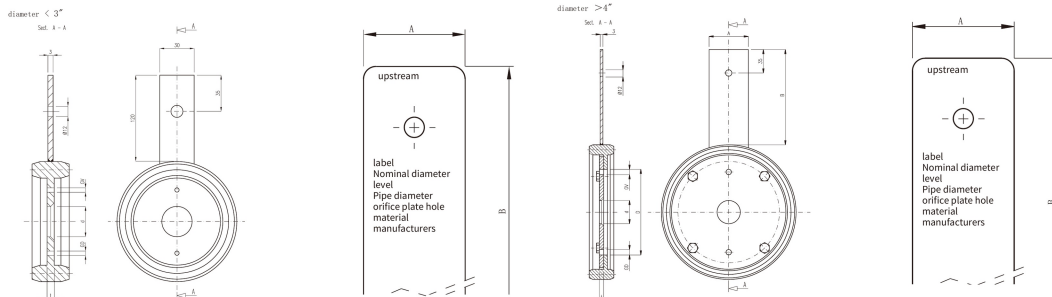
A is the width and B the length of the handle.





GV =
GD =

Orifice plate for the convex (raised) flange face.



Orifice plate for the ring joint gasket — above for pipe diameters below 3", below for 4" and larger.



COMPLIANCE AND CERTIFICATION

Design standards	ISO 5167-2 for the standard plate · ISO/TR 15377 for the quarter round, tapered and eccentric plate · ASME MFC for the segmental orifice
Flange and gasket standards	ASME B16.5 · ASME B16.47 Series A · API 6A · BS 1560
Pressure rating	Subject to customer requirements
Wetted materials	Stainless steel (standard) · Hastelloy C276 · Monel 400 · duplex steel · super duplex and others on request
Surface finish	125 ... 250 AARH on the convex face · < 63 AARH on the ring joint gasket

MOUNTING FORMS AND ORDER INFORMATION

Orifice flange

- The orifice flange replaces a standard pipe flange where an orifice plate or a flow nozzle has to be installed. It comes as a pair with the two pressure ports already in place, so no separate orifice carrier and no drilling of the pipe is needed. The plate is held by screws and can be removed without cutting the line. Each flange carries two NPT threads, one of them plugged; other numbers and thread types on request. Nominal size and pressure rating meet all relevant standards; the pipe number has to be stated by the customer.



Threads
2 × NPT

Plate
Screwed, removable

ORIFICE FLANGE · SIZE AND WEIGHT · 300 AND 600 lb

DN	Weight 300 lb	L 300 lb	E_D 300 lb	Weight 600 lb	L 600 lb	E_D 600 lb
1"	9	171	124	9	171	124
1½"	13	178	155	13	178	155
2"	14	178	165	14	178	165
2½"	18	184	191	18	284	191
3"	21	184	210	21	184	210
4"	31	190	245	41	209	273
6"	50	206	318	82	241	356
8"	73	232	381	124	276	419
10"	100	244	445	208	314	508
12"	151	269	521	250	320	559
14"	207	294	584	—	339	603
16"	275	301	648	—	365	686



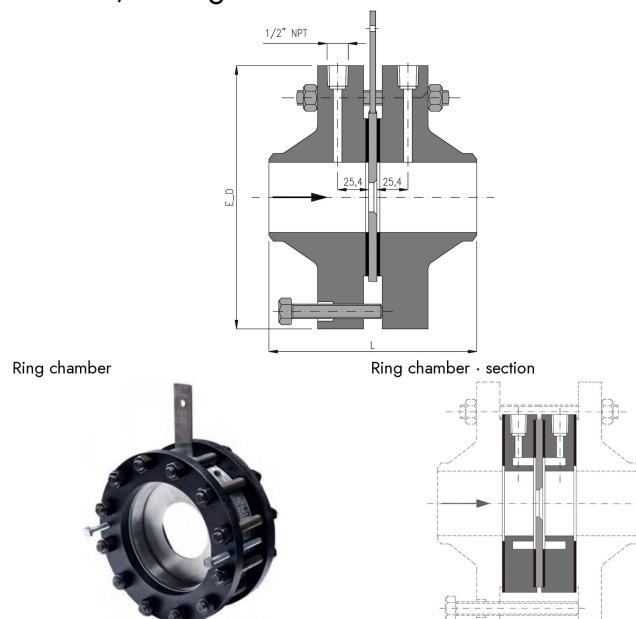
ORIFICE FLANGE · SIZE AND WEIGHT · 300 AND 600 lb · CONTINUED

DN	Weight 300 lb	L 300 lb	E_D 300 lb	Weight 600 lb	L 600 lb	E_D 600 lb
18"	341	327	711	—	377	743
20"	408	333	775	—	390	813
24"	604	345	914	—	415	940

ORIFICE FLANGE · SIZE AND WEIGHT · 900 AND 1500 lb

DN	Weight 900 lb	L 900 lb	E_D 900 lb	Weight 1500 lb	L 1500 lb	E_D 1500 lb
1"	13	171	149	13	171	149
1½"	18	184	178	18	184	178
2"	29	209	216	29	209	216
2½"	41	215	244	41	215	244
3"	34	209	241	58	241	267
4"	59	235	292	82	254	311
6"	120	285	381	186	349	394
8"	204	333	470	306	435	483
10"	291	377	546	500	517	584
12"	405	409	610	746	574	673
14"	—	434	641	—	606	749
16"	—	441	705	—	631	826
18"	—	466	787	—	663	914
20"	—	504	857	—	720	984
24"	—	593	1041	—	822	1168

Weight in kg, dimensions in mm, for a gasket thickness of 1.5 mm and the plate thickness required.



The ring chamber gives a stable measurement under harsh process conditions and is installed between the existing process flanges. Pressure differences around the circumference of the pipe are evened out by the annular gap between the pipe bore and the chamber. Each flange carries two NPT threads, one of them plugged. The orifice plate is stainless steel 316 / 316L; other materials for the chamber on request. The customer has to state the pipe specification, the wall thickness and the required seal cover; the size of the chamber follows the standard of the process flange.

ORDER INFORMATION

Field	Has to be stated	Meaning
1 Series	QBKA	QBKA orifice plate flow element
2 Version	Standard · quarter round · tapered · eccentric · segmental	The four plate types on page 2 · the tapered plate shares its data sheet entry with the quarter round plate
3 Nominal size	≥ 2" (DN 50) · ≥ 4" (DN 100) for the eccentric and segmental plate	The bore is calculated for the process data
4 Nominal pressure	To be stated	Subject to customer requirements
5 Sealing surface	Convex (raised) face · ring joint gasket	RF, FF or RTJ sealing faces are available
6 Vent or drain	With · without	Vent hole for liquids, drain hole for gases
7 Material	Stainless steel · Hastelloy C276 · Monel 400 · duplex steel · super duplex on request	Stainless steel is the standard
Orifice flange	Nominal size · nominal pressure · pipe number · sealing surface · pressure outlet · material	Mounting form · sizes and weights in the table above
Ring chamber	Nominal size · nominal pressure · pipe number · sealing surface · pressure outlet · material	Mounting form · size follows the standard of the process flange

The order is placed in plain words, stating the fields above.

