

# Orifice plate, model FLC-OP

## Orifice flange, model FLC-FL

## Annular chamber, model FLC-AC

WIKA data sheet FL 10.01

### Applications

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

### Special features

- Maximum operating temperature up to 800 °C
- Maximum operating pressure up to 400 bar
- Suitable for liquid, gas and steam flow measurement
- Accuracy  $\leq \pm 0.5\%$  of actual flow rate
- Repeatability of measurement of 0.1 %

### Description

Differential pressure flow meters are used in many industrial applications. As primary flow elements, orifice plates represent the most common solution. This instrument is notable for its easy installation and management.

The differential pressure generated by the primary flow element is normally transformed into an electrical signal proportional to the flow rate by a differential pressure transmitter.



Orifice plate, model FLC-OP



Orifice flange, model FLC-FL



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## Orifice plates, model FLC-OP

### Description

Orifice plates are the simplest type of primary flow elements. Their bore diameter is calculated to generate the specified differential pressure at full scale flow rate. Suitable orifice plates are available for a wide range of different media.

### Materials

- Stainless steel (standard)
  - Hastelloy C276
  - Monel 400
  - Duplex
  - Super Duplex
- Others on request



Fig. right: Eccentric orifice plate  
Fig. left: Quarter circle orifice plate

### Overview

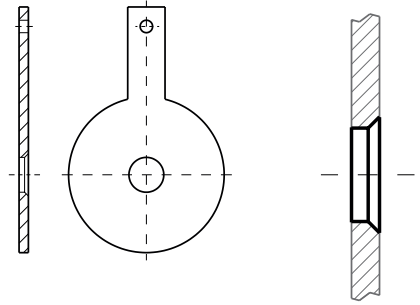
Media		Square edge orifice plate	Quarter circle or conical entrance orifice plate	Eccentric orifice plate	Segmental orifice plate
Gas	clean	++	-	+	+
	dirty	-	-	++	++
Liquid	clean	++	++	+	+
	viscous	-	++	-	-
	dirty	+	+	++	++
	corrosive	+	+	+	+
Steam		+	+	+	-

++ preferred    + suitable    - not suitable

## Square edge orifice plate

This design is intended for general applications in clean media and gases.

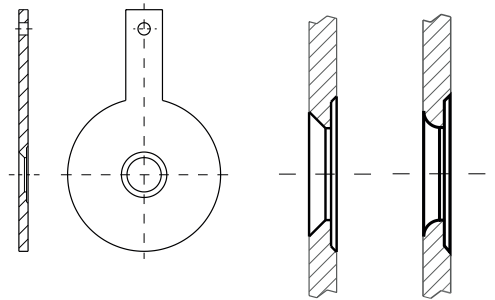
Design:	per ISO 5167-2/ ASME MFC3M
Nominal size:	$\geq 1\frac{1}{2}$ " (40 mm)
Nominal pressure rating:	as per customer requirements
$\beta$ -ratio:	0.20 ... 0.75
Accuracy:	$\leq \pm 0.5$ % of full scale flow rate
Repeatability:	0.1 % of flow rate



## Quarter circle and conical entrance orifice plate

They are the best choice for the measurement of liquids with a low Reynolds number.

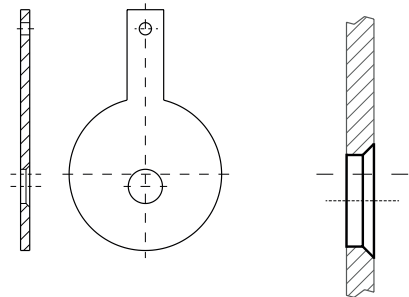
Design:	per ISO/TR 15377
Nominal size:	$\geq 1\frac{1}{2}$ " (40 mm)
Nominal pressure rating:	as per customer requirements
$\beta$ -ratio:	0.100 ... 0.316 (conical entrance) 0.245 ... 0.600 (quarter circle)
Accuracy:	$\leq \pm 2$ % of full scale flow rate
Repeatability:	0.1 % of flow rate



## Eccentric orifice plate

For measurements with two-phase, dirty and particle-laden media. However, for small pipe diameters an eccentric orifice plate is a better solution than a segmental orifice plate.

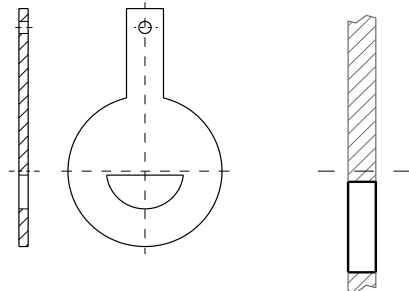
Design:	per ISO/TR 15377
Nominal size:	$> 4$ " (100 mm)
Nominal pressure rating:	as per customer requirements
$\beta$ -ratio:	0.46 ... 0.84
Accuracy:	$\leq \pm 2$ % of full scale flow rate
Repeatability:	0.1 % of flow rate



## Segmental orifice plate

For measurements with two-phase, dirty and particle-laden media.

Design:	per ASME MFC
Nominal size:	$\geq 4$ " (100 mm)
Nominal pressure rating:	as per customer requirements
$\beta$ -ratio:	0.35 ... 0.80
Accuracy:	$\leq \pm 2$ % of full scale flow rate
Repeatability:	0.1 % of flow rate



## Sealing face for flanges with raised face

### Description

Raised face is the most common sealing and can be used under uncritical pressure and temperature conditions.

### Surface finishing

125 ... 250 AARH

The ANSI accredited ASME standard B 16.5 requires that the flange face and the sealing face of the orifice plate have a specified roughness to ensure the compatibility of the surface with the gasket and a high quality seal.



## Ring joint gasket (option)

### Description

This solution is used under high temperature and pressure conditions

### Designs

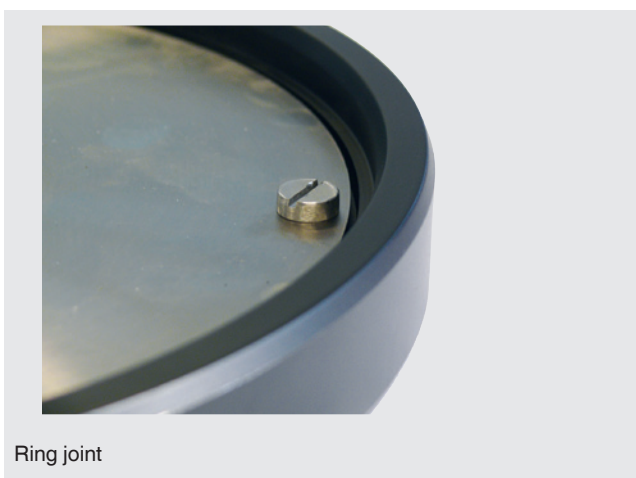
- Octagonal
- Oval

### Surface finishing and ring dimensions

The ring joint gasket can be manufactured in accordance with all relevant standards to suit the following flange standards:

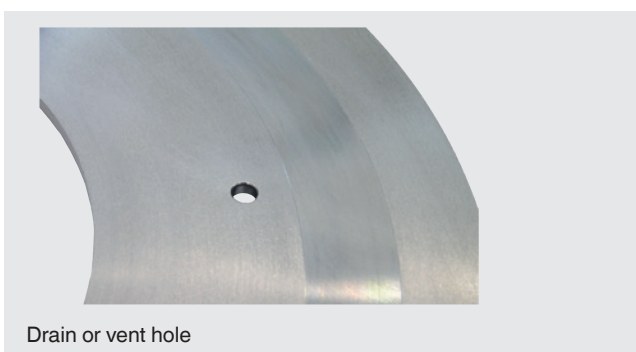
- API 6A
- ASME/ANSI B16.5
- MSS SP44 (ASME B16.47 series A)
- BS 1560

The surface finishing of the ring joint gasket (< 63 AARH) complies with these flange standards.



## Drain or vent hole (option)

Depending on the medium a drain or vent hole may be required. The hole is manufactured in accordance with ISA RP 3.2, unless otherwise specified.



## Dimensions of orifice plates for flanges with raised face

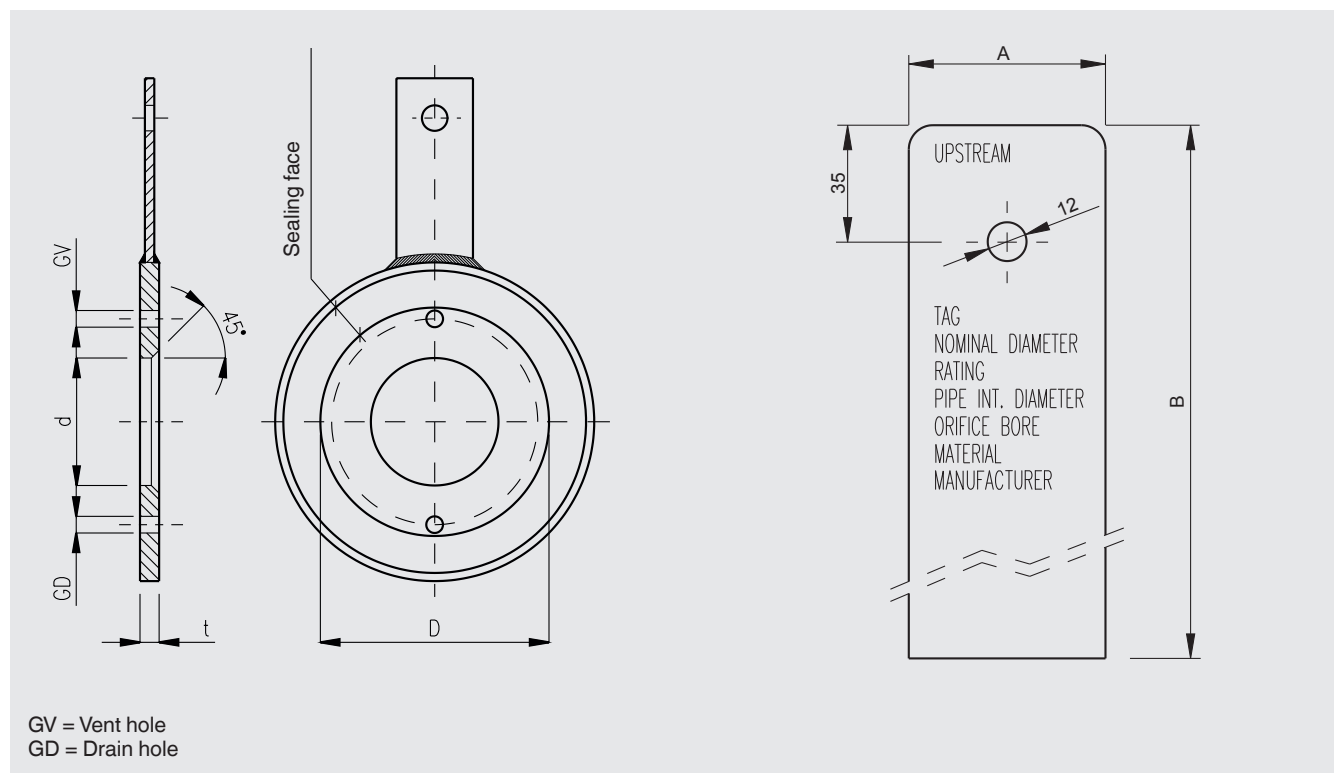
### Thickness of the orifice plate

Nominal size [D]	Plate thickness (standard) [t]
½ ... 6"	3 mm
8 ... 16"	6 mm
18 ... 26"	10 mm
> 26"	16 mm

The listed values are suitable for a differential pressure of max. 1,000 mbar.

### Dimensions of the handle

Nominal size [D]	A	B
½ ... 5"	30 mm	120 mm
6 ... 12"	40 mm	150 mm
14 ... 18"	40 mm	180 mm
> 18"	50 mm	200 mm



# Dimensions of orifice plates with ring joint gasket

## Thickness of the orifice plate

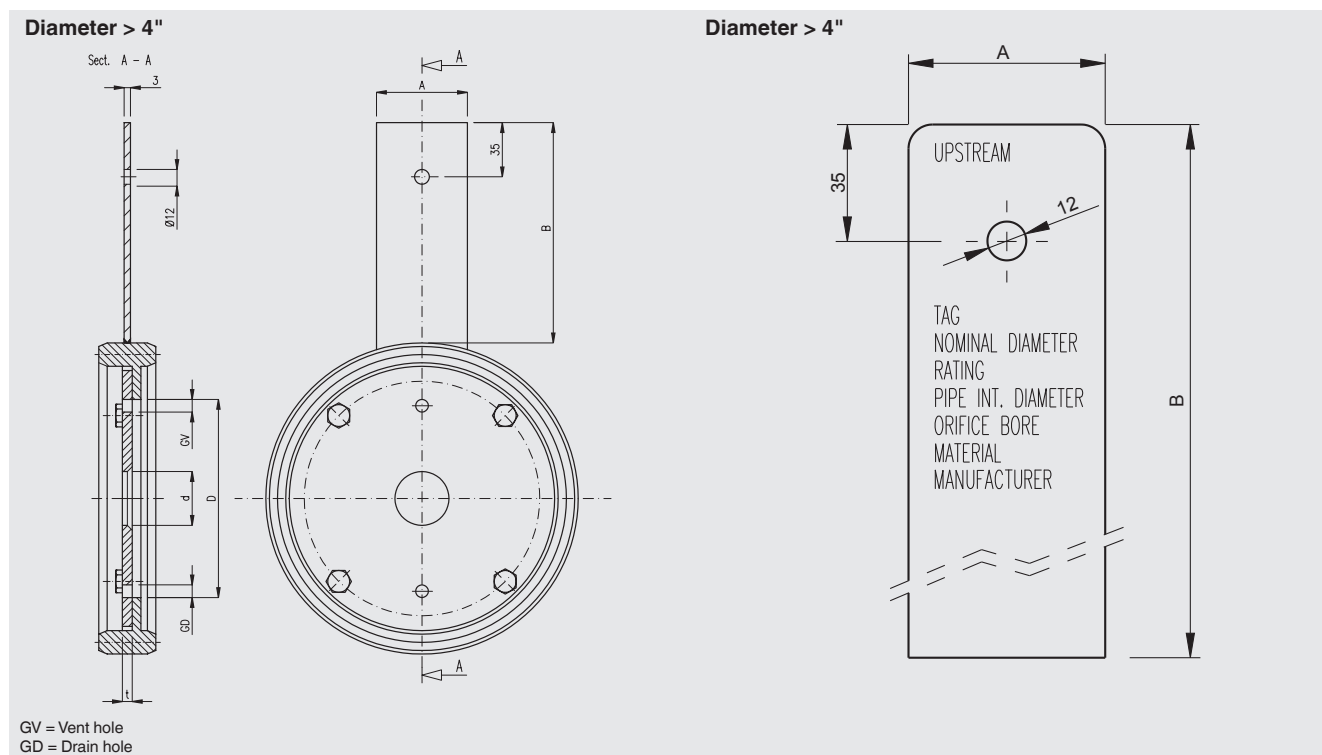
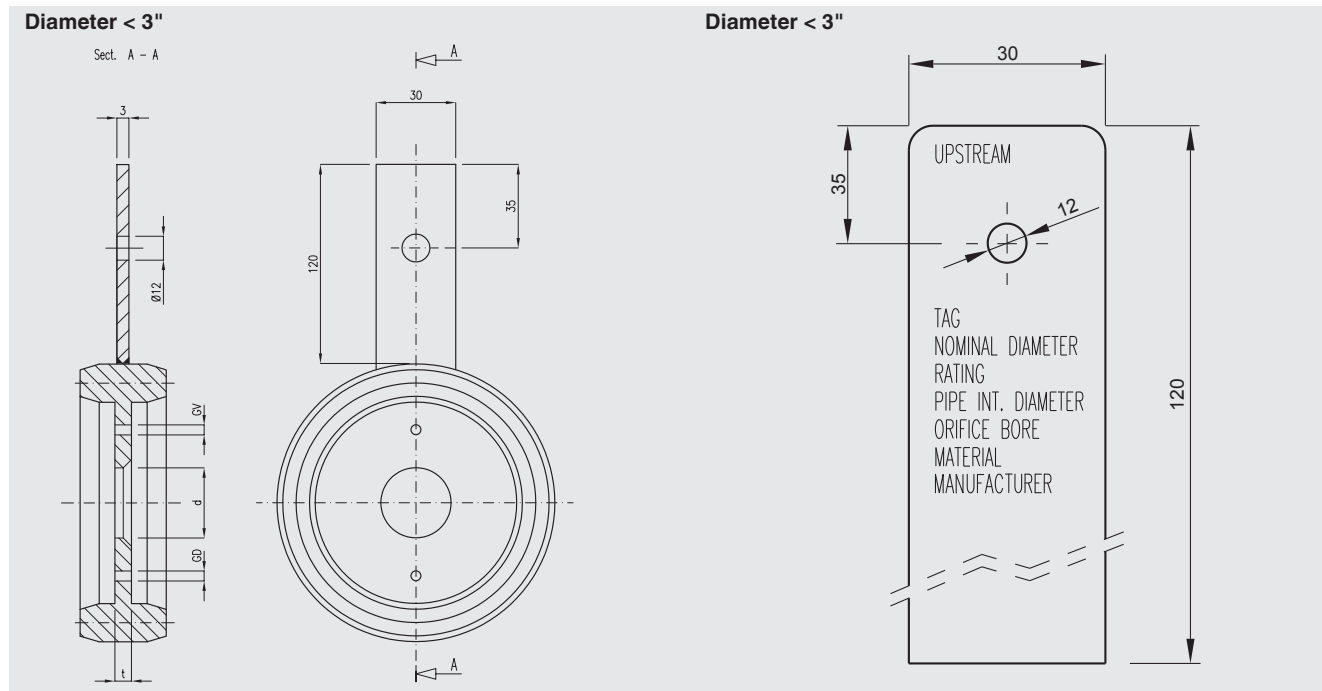
Nominal size [D]	Plate thickness (standard) [t]
1/2 ... 6"	3 mm
8 ... 16"	6 mm
18 ... 26"	10 mm
> 26"	16 mm

The listed values are suitable for a differential pressure of max. 1,000 mbar.

## Dimensions of the handle

Nominal size [D]	A	B
4 ... 10"	40 mm	150 mm
12 ... 16"	40 mm	180 mm
> 16"	50 mm	200 mm

The listed values apply to orifice plates with a diameter of > 4". Dimensions for a diameter of < 3", see drawing below.



GV = Vent hole  
GD = Drain hole

## Orifice flanges, model FLC-FL

### Description

Orifice flanges are intended for use instead of standard pipe flanges when an orifice plate or flow nozzle must be installed. Pairs of pressure tapings are machined into the orifice flanges, making separate orifice carriers or tapings in the pipe wall unnecessary. The assembly of the orifice plate is completed with jacking screws to ensure an easy removal.

### Nominal size

Available in accordance with all relevant standards.

### Nominal pressure rating

Available in accordance with all relevant standards.

### Pipe schedule

The pipe schedule must be specified by the customer.

### Materials

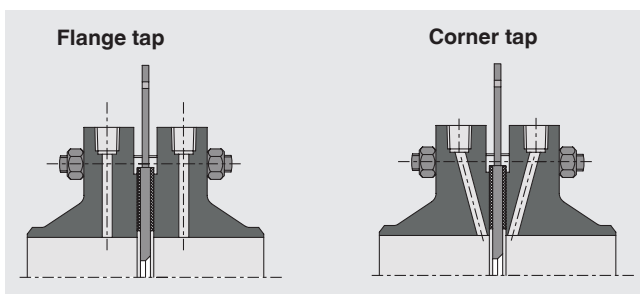
- Carbon steel, ASTM A105
  - Low temperature carbon steel, ASTM A350 LF2
  - ASTM A182 F316
  - ASTM A182 F304
  - ASTM A182 F11
  - ASTM A182 F22
- Others on request

### Pressure tapings

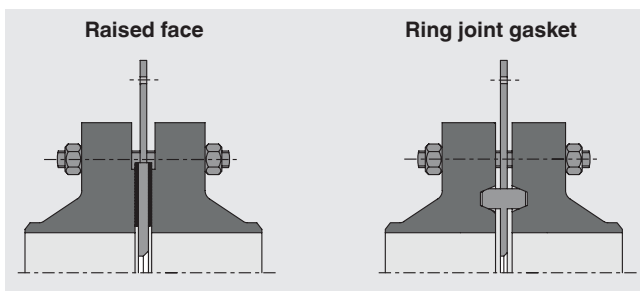
Two ½ NPT threads are provided in each flange as standard (one with a plug). Other amount and types of threads on request.



Orifice flange with orifice plate



### Sealing faces

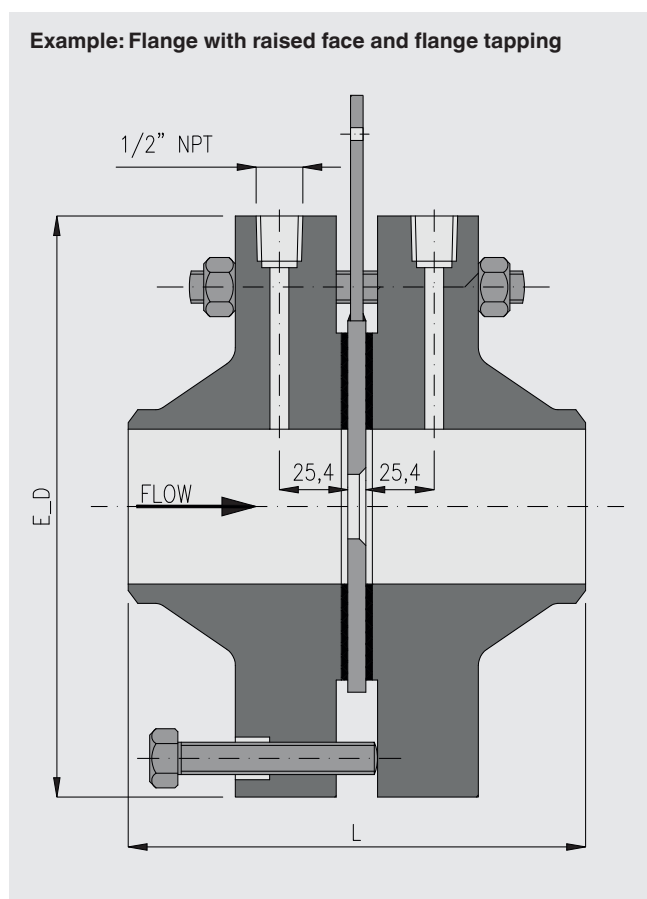


## Dimensions and weight

Standard dimensions per ASME B16.36

DN	Class 300			Class 600			Class 900			Class 1,500		
	Weight kg	L mm	E_D mm	Weight kg	L mm	E_D mm	Weight kg	L mm	E_D mm	Weight kg	L mm	E_D mm
1"	9	171	124	9	171	124	13	171	149	13	171	149
1 ½"	13	178	155	13	178	155	18	184	178	18	184	178
2"	14	178	165	14	178	165	29	209	216	29	209	216
2 ½"	18	184	191	18	284	191	41	215	244	41	215	244
3"	21	184	210	21	184	210	34	209	241	58	241	267
4"	31	190	245	41	209	273	59	235	292	82	254	311
6"	50	206	318	82	241	356	120	285	381	186	349	394
8"	73	232	381	124	276	419	204	333	470	306	435	483
10"	100	244	445	208	314	508	291	377	546	500	517	584
12"	151	269	521	250	320	559	405	409	610	746	574	673
14"	207	294	584	-	339	603	-	434	641	-	606	749
16"	275	301	648	-	365	686	-	441	705	-	631	826
18"	341	327	711	-	377	743	-	466	787	-	663	914
20"	408	333	775	-	390	813	-	504	857	-	720	984
24"	604	345	914	-	415	940	-	593	1.041	-	822	1.168

Values approx weight (kg) and dimensions (mm) for the assembly assuming a gasket with a thickness of 1.5 mm and a plate thickness in accordance with our standard (see page 5 + 6).





## Annular chambers, model FLC-AC

### Description

Annular chambers are used to achieve stable measurements under difficult process conditions. They are mounted between already installed process flanges. The different pressures in the pipe are compensated for by using an annular gap located between the interior of the pipe and the annular chamber.

### Nominal size

Available in accordance with all relevant standards

### Nominal pressure rating

Available in accordance with all relevant standards

### Pipe schedule

The pipe schedule must be specified by the customer.

### Materials

Annular chambers can be delivered in a wide range of materials.

Material of the orifice plate: Stainless steel 316/316L, other materials on request.

### Pressure tapings

Two ½ NPT threads are provided in each carrier ring as standard (one with a plug).

Other amount and type of threads on request.

### Sealing face

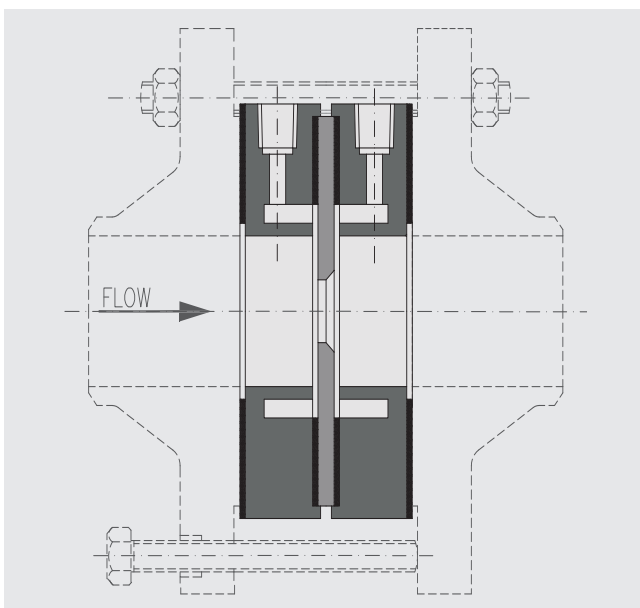
The sealing face must be specified by the customer.

### Dimensions

The dimension of the annular chamber corresponds to the standard used for the process flange.



Annular chambers



## Ordering information

### ■ Orifice plate (model FLC-OP)

Nominal size / Nominal pressure rating / Version / Sealing face / Drain or vent hole / Material

### ■ Orifice flange (FLC-FL)

Nominal size / Nominal pressure rating / Pipe schedule / Sealing face / Pressure tappings / Material

### ■ Annular chamber (model FLC-AC)

Nominal size / Nominal pressure rating / Pipe schedule / Sealing face / Pressure tappings / Material

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