

# Restriction orifice plate

## Model : F400 series

Spec. sheet no. FD04-01

### Description

Restriction orifice plates are widely used for many applications within the industry. Although the design is very similar to an orifice plate, the function is different. Restriction plates are used to suit a number of different purposes including:

- Reduction in line pressure
- Control flow rates by restricting flow, regardless of downstream conditions

### Design considerations

- Prevent critical flow
- Removal of cavitation
- Reduce noise levels

We offer a number of different restriction designs to suit the needs of your application

### Configuration

- Restriction plates (Standard applications)
- Multi-hole restriction plates (Used to reduce noise)
- Multi-stage restriction units (Flanged / Butt-weld)
- Conical shaped restriction orifice (Eliminated damage caused by cavitation)

### Benefits

- Proven design technology
- Products designed in accordance with R.W.Miller - Flow engineering handbook
- Plate thickness calculations designed in accordance with ASME B31.3
- Designs available to accommodate site restrictions and noise limitations
- Prevent critical flow or cavitation issues

### Applications

- Hydrocarbon gas and liquids
- Controlled pressure reduction
- Blow-down service
- Pressure vessels
- Noise reduction

### Key parameters

- Proven technology
- Prevent critical flow or cavitation issues
- Reduce site restrictions and noise levels

### Standards

- R.W. Miller
- ASME B31.3
- ISA standard design



**EAC**

## Specification

### Line size

DN15 to DN1,800  
½" ~ 72"

### Designs

Restriction plate  
Full-face restriction plate  
Restriction carrier  
Multi-hole restriction plate  
Multi-stage restriction unit  
Conical shaped plate

### Reynolds number

Unlimited range

### Plate and carrier material

Stainless steel  
Duplex  
Super duplex  
6 Mo  
Alloy 400  
Inconel 625  
Inconel 825  
Hastelloy-C 276  
Titanium  
Others available on request

### Installation method (Between)

Flanged (API / ASME)  
Hubs  
Carriers  
Welded directly into piping  
Multi-stage units supplied flanged or butt-weld

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## Type of restriction orifice

Here is a description of a few common type of restriction orifice plate device used in oil and gas applications.

### (a) Single stage restriction orifice (Model : F400)

A single stage restriction orifice is usually a plate or a block with a bore (Orifice) sized to the intended permanent loss of pressure. It is installed between the pipe flanges. Usually it is not a thin orifice plate; it is a thick orifice plate.



### (b) Single stage multi-hole restriction orifice (Model : F410)

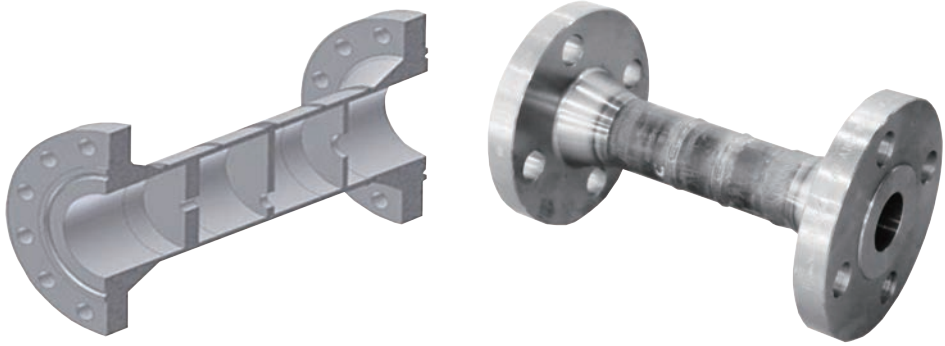
A single stage multi-hole restriction orifice plate is used to abate the noise generated by the device due to high velocity through the bore which offers restriction to the incoming fluid. The flow at the inlet is now channeled into several streams through the multiple holes and this reduces the noise which would be otherwise will be above the acceptable limit if a single hole device is used.



## Type of restriction orifice

### (c) Multi-stage restriction orifice plate assembly (Model : F420)

These devices are used where the pressure reduction ratio is very high and cannot be achieved by a single stage orifice plate. Thus a multistage device essentially consists of a number of single stage device built in a single spool. Like a single stage device it can be of single hole multistage design or multihole multistage design or combination of both.

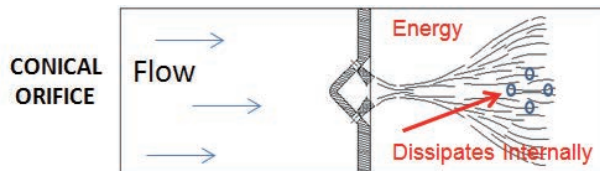


### (d) Conical shaped restriction orifice plate (Model : F430)

Solve problems associated with orifice cavitation (Erosion, vibration, noise)

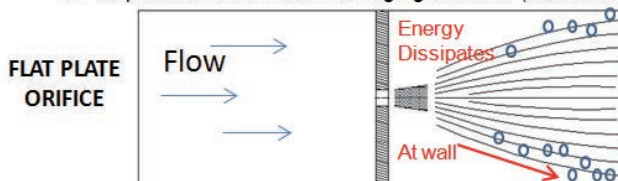
Eliminated damage caused by cavitation

- Energy dissipated inside the cone of the orifice, not at pipe wall
- Conical orifice allows energy to dissipate before striking pipe wall



Flow re-develops from the inside out, eliminating the effect of cavitation erosion and vibration.

➤ Flat plate orifice creates damaging bubbles (cavitation) at pipe wall



Flow re-develops from the outside in. Cavitation at walls causes erosion and vibration.

Erosion, Vibration, Noise

**1. Base model**

<b>F400</b>	Single stage restriction orifice
<b>F410</b>	Single stage multi-hole restriction orifice
<b>F420</b>	Multi-stage restriction orifice
<b>F430</b>	Conical shaped restriction orifice

**2. Line size**

JIS	mm	ANSI	inch	DIN	mm
<b>J015</b>	15A	<b>A001</b>	½B	<b>D015</b>	15A
<b>J020</b>	20A	<b>A002</b>	¾B	<b>D020</b>	20A
<b>J025</b>	25A	<b>A003</b>	1B	<b>D025</b>	25A
<b>J040</b>	40A	<b>A004</b>	1½B	<b>D040</b>	40A
<b>J050</b>	50A	<b>A005</b>	2B	<b>D050</b>	50A
<b>J065</b>	65A	<b>A006</b>	2½B	<b>D065</b>	65A
<b>J080</b>	80A	<b>A007</b>	3B	<b>D080</b>	80A
<b>J100</b>	100A	<b>A008</b>	4B	<b>D100</b>	100A
<b>J125</b>	125A	<b>A009</b>	5B	<b>D125</b>	125A
<b>J150</b>	150A	<b>A010</b>	6B	<b>D150</b>	150A
<b>J200</b>	200A	<b>A011</b>	8B	<b>D200</b>	200A
<b>J250</b>	250A	<b>A012</b>	10B	<b>D250</b>	250A
<b>J300</b>	300A	<b>A013</b>	12B	<b>D300</b>	300A
<b>J350</b>	350A	<b>A014</b>	14B	<b>D350</b>	350A
<b>J400</b>	400A	<b>A015</b>	16B	<b>D400</b>	400A
<b>J450</b>	450A	<b>A016</b>	18B	<b>D450</b>	450A
<b>J500</b>	500A	<b>A017</b>	20B	<b>D500</b>	500A
<b>J600</b>	600A	<b>A018</b>	24B	<b>D600</b>	600A
<b>J700</b>	700A	<b>A019</b>	28B	<b>D700</b>	700A
<b>J800</b>	800A	<b>A020</b>	32B	<b>D800</b>	800A
<b>J000</b>	1,000A	<b>A021</b>	40B	<b>D000</b>	1,000A
<b>XXXX</b>	Other				

**3. Bore type**

**C** Concentric edge

**4. Flange rating**

JIS		ANSI		DIN	
<b>J010</b>	JIS 10K	<b>A010</b>	ANSI 150 Lb	<b>P010</b>	PN 10
<b>J016</b>	JIS 16K	<b>A020</b>	ANSI 300 Lb	<b>P016</b>	PN 16
<b>J020</b>	JIS 20K	<b>A030</b>	ANSI 600 Lb	<b>P025</b>	PN 25
<b>J030</b>	JIS 30K	<b>A040</b>	ANSI 900 Lb	<b>P040</b>	PN 40
<b>J040</b>	JIS 40K	<b>A050</b>	ANSI 1,500 Lb		
<b>J063</b>	JIS 63K	<b>A060</b>	ANSI 2,500 Lb		
<b>XXXX</b>	Other				

**5. Plate material**

<b>4</b>	304SS
<b>6</b>	316L SS
<b>H</b>	Hastelloy-C
<b>O</b>	Other

**6. Pipe material**

<b>C</b>	304SS
<b>N</b>	316L SS
<b>4</b>	Hastelloy-C
<b>5</b>	Monel
<b>O</b>	Other

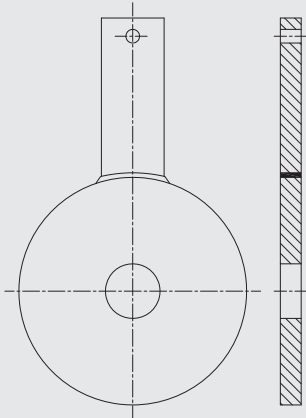
**7. Options**

<b>F1</b>	Flange included
<b>NO</b>	None

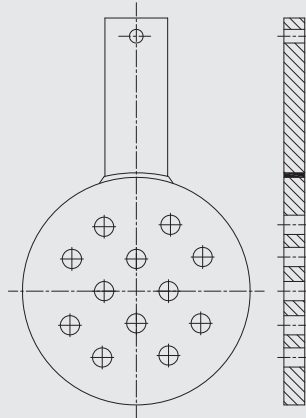
1	2	3	4	5	6	7
<b>F400</b>	<b>J040</b>	<b>C</b>	<b>J010</b>	<b>4</b>	<b>C</b>	<b>NO</b>

Sample ordering code

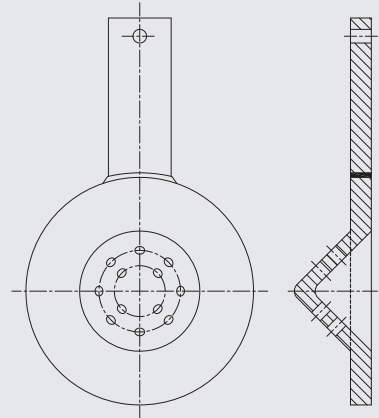
## Dimension



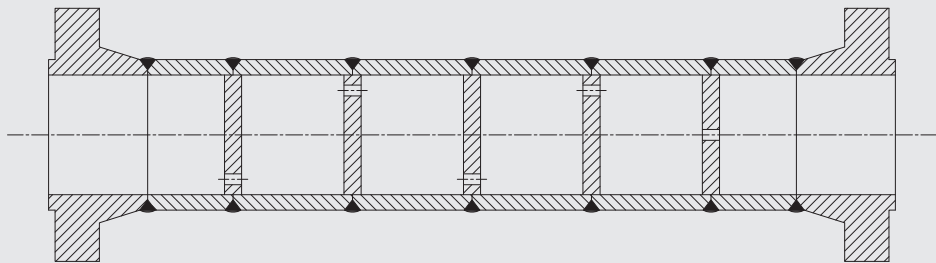
Model : F400



Model : F410



Model : F430



MODEL : F420

A large, empty rectangular box with a thin black border, intended for writing a memo.