

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



F400

F410

F430



F420

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

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

EAC

WISE[®]

| F400_01

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 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)

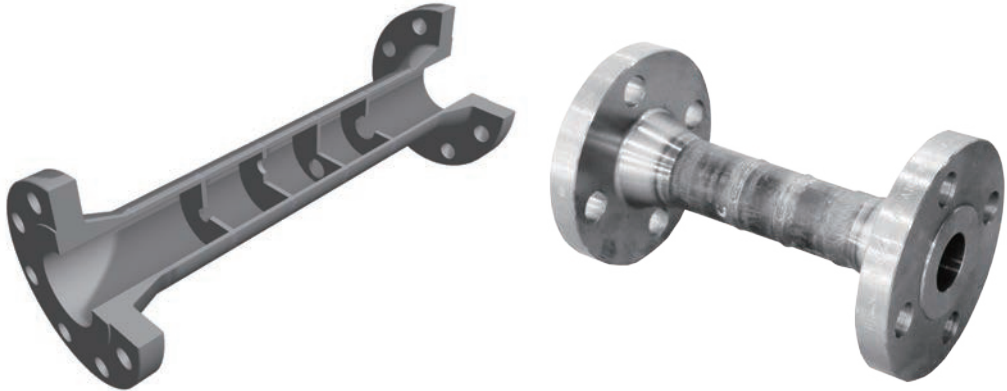
A single stage multi-hole restriction orifice plate is used to abate the noise generated by the device due to high velocity through the bore which offers restriction to the incoming fluid. The flow at the inlet is now channeled into several streams through the multiple holes and this reduces the noise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

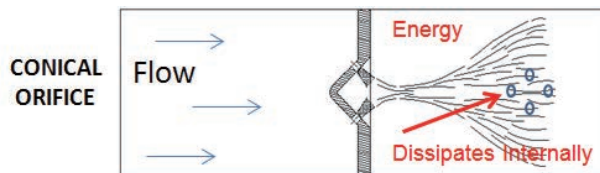


(d) Conical shaped restriction orifice plate (Model : F430)

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

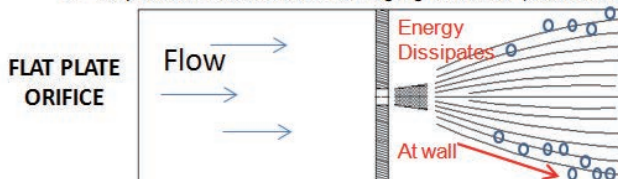
Eliminated damage caused by cavitation

- 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

F400	Single stage restriction orifice
F410	Single stage multi-hole restriction orifice
F420	Multi-stage restriction orifice
F430	Conical shaped restriction orifice

2. Line size

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

3. Bore type

C	Concentric edge
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4. Flange rating

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

5. Plate material

4	304SS
6	316L SS
H	Hastelloy-C
O	Other

6. Pipe material

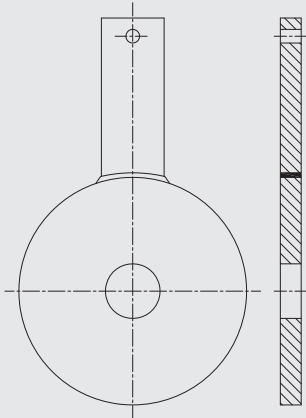
C	304SS
N	316L SS
4	Hastelloy-C
5	Monel
O	Other

7. Options

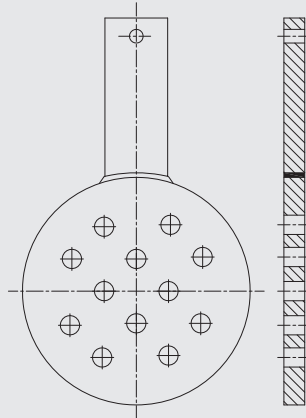
F1	Flange included
NO	None

1	2	3	4	5	6	7	
F400	J040	C	J010	4	C	NO	Sample ordering code

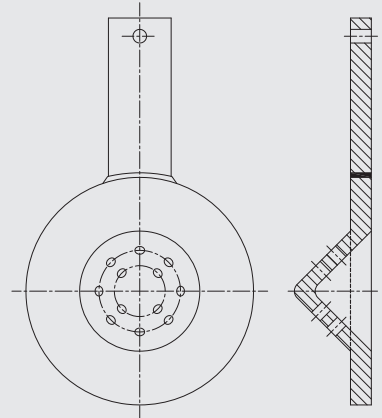
Dimension



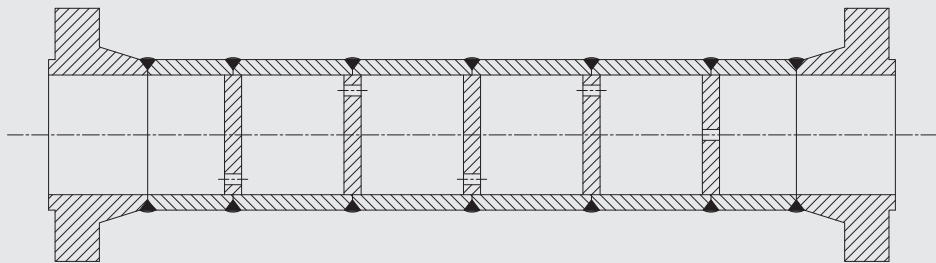
Model : F400



Model : F410



Model : F430



MODEL : F420

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