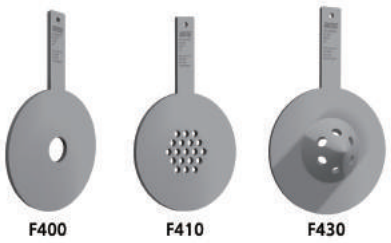
Restriction orifice plate
Model : F400 series

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)

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

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

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

Standards
- R.W. Miller
- ISA standard design
- L.K Spink

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

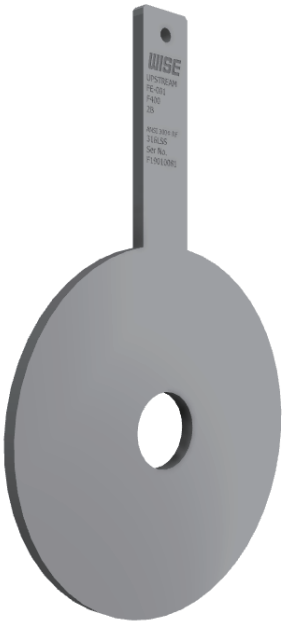
Installation method (Between)
Flanged (API / ASME)
Hubs
Carriers
Welded directly into piping
Multi-stage units supplied flanged or butt-weld

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.



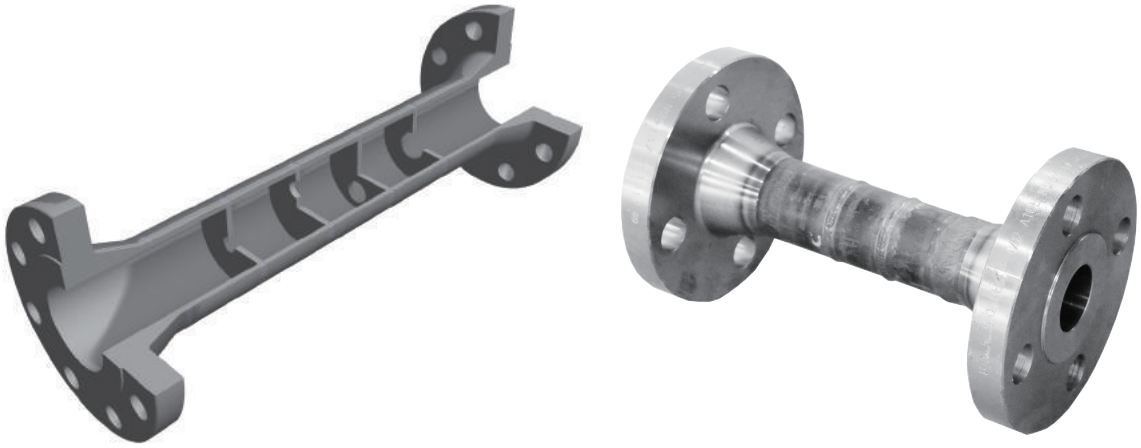
(b) Single stage multi-hole restriction orifice (Model : F410)

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.

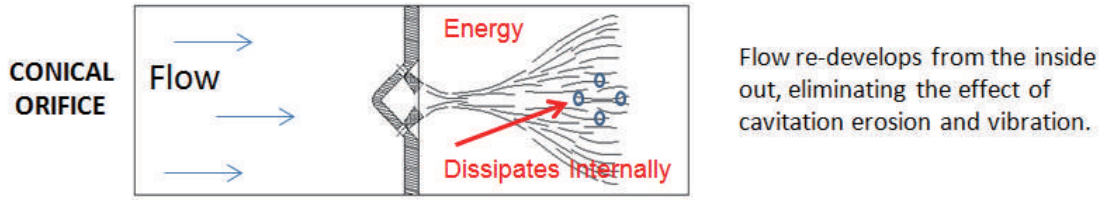


(d) Conical shaped restriction orifice plate (Model : F430)

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

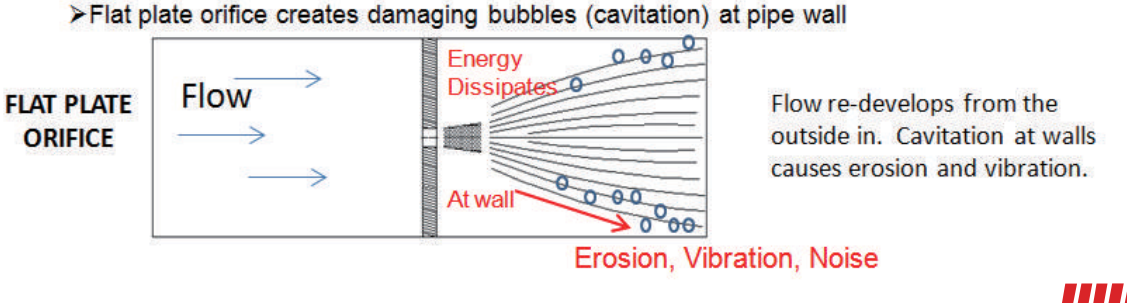
Eliminated damage caused by cavitation

- 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.

Main order — Ordering information

1. Base model

F400	Single stage restriction orifice

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Connection

A01	150Lb RF	**J01**	10K RF
A02	300Lb RF	**J02**	16K RF
A03	600Lb RF	**J03**	20K RF
A04	900Lb RF	**J04**	30K RF
A05	1500Lb RF	**J05**	40K RF
A06	2500Lb RF	**J06**	63K RF
A11	150Lb FF	**J11**	10K FF
A12	300Lb FF	**J12**	16K FF
A13	600Lb FF	**J13**	20K FF
A14	900Lb FF	**J14**	30K FF
A15	1500Lb FF	**J15**	40K FF
A16	2500Lb FF	**J16**	63K FF
A21	150Lb RTJ	**J21**	10K RTJ
A22	300Lb RTJ	**J22**	16K RTJ
A23	600Lb RTJ	**J23**	20K RTJ
A24	900Lb RTJ	**J24**	30K RTJ
A25	1500Lb RTJ	**J25**	40K RTJ
A26	2500Lb RTJ	**J26**	63K RTJ
ZZZ	Other		

4. Element type

40	Single hole

5. Element material

6	316L SS
O	Other

6. Option

O	Other
N	None

Sample ordering code

1	2	3	4	5	6
F400	**A01**	**A01**	**40**	**6**	**O**

Main order

1. Base model

F410	Single stage multi-hole restriction orifice

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Connection

A01	150Lb RF	**J01**	10K RF
A02	300Lb RF	**J02**	16K RF
A03	600Lb RF	**J03**	20K RF
A04	900Lb RF	**J04**	30K RF
A05	1500Lb RF	**J05**	40K RF
A06	2500Lb RF	**J06**	63K RF
A21	150Lb RTJ	**J21**	10K RTJ
A22	300Lb RTJ	**J22**	16K RTJ
A23	600Lb RTJ	**J23**	20K RTJ
A24	900Lb RTJ	**J24**	30K RTJ
A25	1500Lb RTJ	**J25**	40K RTJ
A26	2500Lb RTJ	**J26**	63K RTJ
ZZZ	Other		

4. Element type

41	Multi hole

5. Element material

6	316L SS
O	Other

6. Option

O	Other
N	None

Sample ordering code

1	2	3	4	5	6
F410	**A01**	**A01**	**41**	**6**	**O**

Main order — Ordering information

1. Base model

F420	Multi-stage restriction orifice

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Connection

A01	150Lb RF	**J01**	10K RF
A02	300Lb RF	**J02**	16K RF
A03	600Lb RF	**J03**	20K RF
A04	900Lb RF	**J04**	30K RF
A05	1500Lb RF	**J05**	40K RF
A06	2500Lb RF	**J06**	63K RF
A21	150Lb RTJ	**J21**	10K RTJ
A22	300Lb RTJ	**J22**	16K RTJ
A23	600Lb RTJ	**J23**	20K RTJ
A24	900Lb RTJ	**J24**	30K RTJ
A25	1500Lb RTJ	**J25**	40K RTJ
A26	2500Lb RTJ	**J26**	63K RTJ
ZZZ	Other		

4. Element type

42	Multi-stage

5. Element material

6	316L SS
O	Other

6. Pipe material

C	Carbon steel
4	304SS
6	316SS

7. Option

O	Other
N	None

Sample ordering code

1	2	3	4	5	6	7
F420	**A01**	**A01**	**42**	**6**	**C**	**O**

Main order

1. Base model

F430	Conical shaped restriction orifice

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Connection

A01	150Lb RF	**J01**	10K RF
A02	300Lb RF	**J02**	16K RF
A03	600Lb RF	**J03**	20K RF
A04	900Lb RF	**J04**	30K RF
A05	1500Lb RF	**J05**	40K RF
A06	2500Lb RF	**J06**	63K RF
A21	150Lb RTJ	**J21**	10K RTJ
A22	300Lb RTJ	**J22**	16K RTJ
A23	600Lb RTJ	**J23**	20K RTJ
A24	900Lb RTJ	**J24**	30K RTJ
A25	1500Lb RTJ	**J25**	40K RTJ
A26	2500Lb RTJ	**J26**	63K RTJ
ZZZ	Other		

4. Element type

43	Conical type

5. Element material

6	316L SS
O	Other

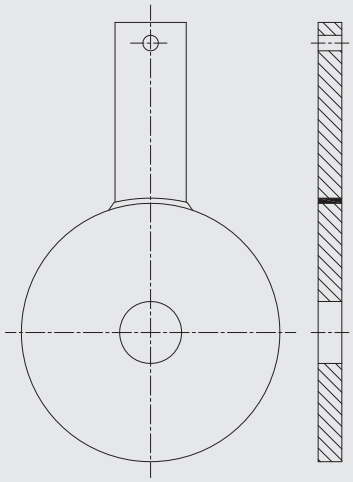
6. Option

O	Other
N	None

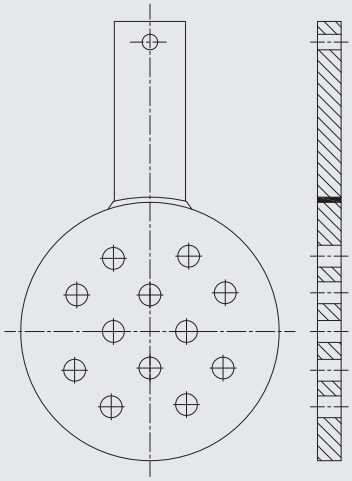
Sample ordering code

1	2	3	4	5	6
F430	**A01**	**A01**	**43**	**6**	**O**

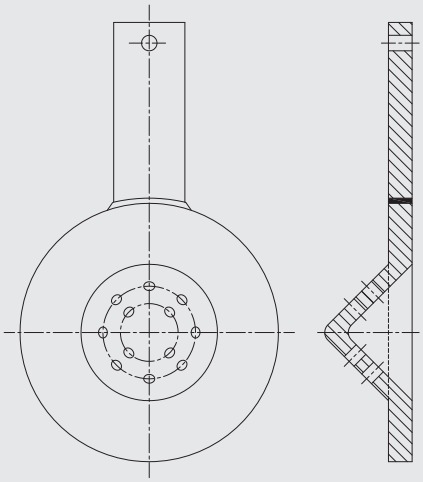
Dimension



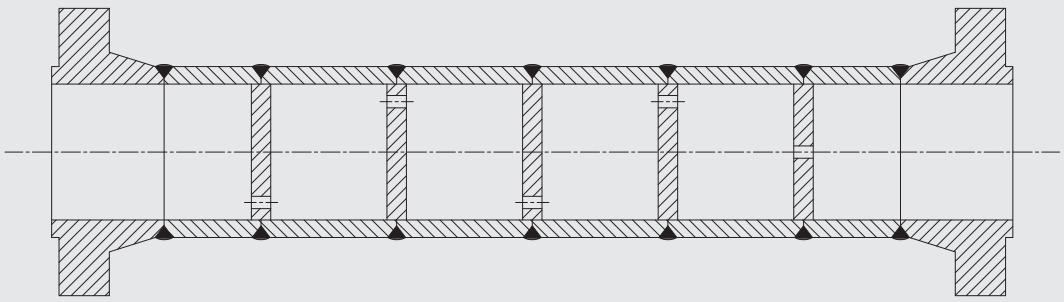
Model : F400



Model : F410



Model : F430



MODEL : F420