



FF SERIES FABRICATED SUCTION DIFFUSERS

PRESSURES TO 740 PSIG (51 BARG)
TEMPERATURES TO 800°F (427°C)

- Strainer, flow straightener, elbow and pipe reducer for pump applications
- Standard and custom engineered designs
- Integral straightening vanes reduce turbulence to improve pump efficiency
- One, three or five pipe diameters of flow straightening (Type 1, 3 or 5)
- Standard, undersized or oversized outlet connections
- Direct mount to the suction side of a pump in either horizontal or vertical position
- Supporting pads for easy mounting of standard I.D. support foot
- Drain connection with plug furnished as standard

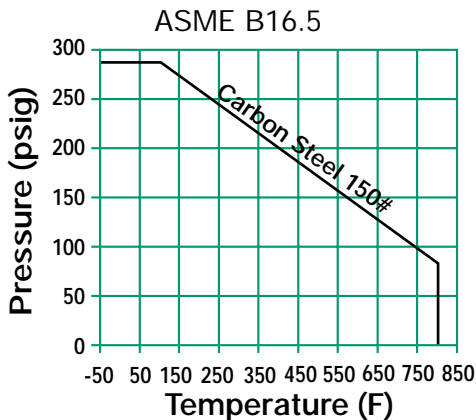
APPLICATIONS

- Pump Protection

APPLICABLE CODES

- Designed and manufactured in accordance with ASME B31.1, ASME B31.3 and/or ASME Section VIII, Div. 1
- CRN available in all Provinces
- Welders certified to ASME Section IX

PRESSURE/TEMPERATURE CHART



Contact Factory for higher ratings.

MODELS see Ordering Code below

- Type 1 - One pipe diameter of flow straightening
- Type 3 - Three pipe diameters of flow straightening
- Type 5 - Five pipe diameters of flow straightening

OPTIONS

- Customer specified materials, sizes and designs
- Other flow straightening quality designs
- Hinged or quick opening/operator assisted covers
- Vent and/or differential pressure connections
- ASME "U" stamped vessels on request
- Other perforated screen and mesh liner baskets
- Data Packages and MTR's available on request

Fabricated Suction Diffuser Ordering Code

Model	Material	Inlet Size	Class	Con- nections	Dash	Cover	Perf.	Mesh
F F 1	C	T	1	F	-	J	2	2
1	2	3	4	5	6	7	8	9
10	11							

Model - Position 1 - 3

- FF1 - Type 1 - Standard Outlet
- FF2 - Type 1 - Undersized Outlet
- FF3 - Type 1 - Oversized Outlet
- FF4 - Type 3 - Standard Outlet
- FF5 - Type 3 - Undersized Outlet
- FF6 - Type 3 - Oversized Outlet
- FF7 - Type 5 - Standard Outlet
- FF8 - Type 5 - Undersized Outlet
- FF9 - Type 5 - Oversized Outlet
- FFZ - Custom Configuration

Standard Outlet is one size smaller than the inlet.

Undersized Outlet is two sizes smaller than the inlet.

Oversized Outlet is the same size as the inlet.

Material - Position 4

- C - Carbon Steel
- L - Low Temp CS
- V - 304 SS
- T - 316 SS
- M - Monel
- Z - Other

Inlet Size - Position 5

- | | |
|--------|-----------|
| H - 2 | S - 12 |
| J - 2½ | T - 14 |
| K - 3 | U - 16 |
| M - 4 | V - 18 |
| N - 5 | W - 20 |
| P - 6 | X - 22 |
| Q - 8 | Y - 24 |
| R - 10 | Z - Other |
| 1 - 28 | 3 - 36 |
| 2 - 30 | 4 - 40 |

Class - Position 6

- A - 125
- 1 - 150
- 2 - 250
- 3 - 300
- Z - Other

Connection - Inlet Position 7

- F - Flat Face Flange
- J - Ring Joint
- R - Raised Face Flange
- Z - Other

Dash - Position 8

Note:
Standard Connections
RF inlet x FF outlet

Cover - Position 9

- B - Bolted
- C - C-Clamp
- J - Bolted w/ Hinge¹
- D - Davit Bolted
- H - T-Bolt Hinged
- T - Threaded Hinged
- Y - Yoke Hinged
- Z - Other

1. J-Hinged Cover is standard.

2. For other screen materials, contact factory.

Perf. - Position 10

304SS Material²

- | | |
|-----------|-----------|
| A - None | 5 - 5/32" |
| B - 3/64" | 6 - 3/16" |
| 1 - 1/32" | 7 - 7/32" |
| 2 - 1/16" | 8 - 1/4" |
| 3 - 3/32" | 9 - 3/8" |
| 4 - 1/8" | Z - Other |

Mesh² - Position 11

- | | |
|----------|-----------|
| A - None | 6 - 60 |
| 1 - 10 | 7 - 80 |
| 2 - 20 | 8 - 100 |
| 3 - 30 | 9 - 120 |
| 4 - 40 | Z - Other |
| 5 - 50 | |



FF SERIES FABRICATED SUCTION DIFFUSERS

SPECIFICATION

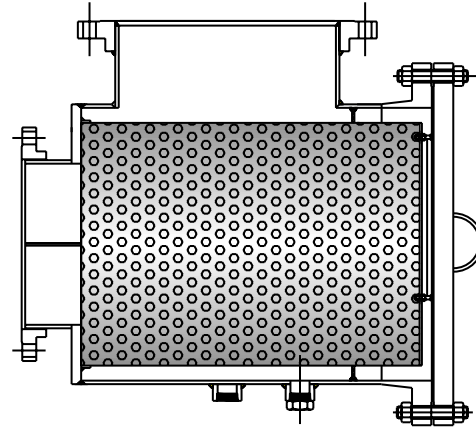
Suction Diffuser shall mount directly to the suction side of the pump in either a horizontal or vertical position. The Suction Diffuser shall be manufactured in accordance with ASME B31.1, ASME B31.3 and /or ASME Section VIII, Div. I. The Suction Diffuser shall be available with reduced outlet sizes. The Suction Diffuser shall be _____ inlet by _____ outlet and shall have a _____ perforated screen. The Suction Diffuser shall have the equivalent of _____ pipe diameters of flow straightening. The Suction Diffuser shall be SSI FF Series.

MATERIALS OF CONSTRUCTION*-(Std Carbon Steel Body)

Body	SA106-B CS
Cover	SA105 CS
Flanges	SA105 CS
Reducer Plate	SA516-70 CS
Coupling	SA105 CS
Plug	SA105 CS
Screen ¹	304 SS
Cover Gasket ¹	304 SS Spiral Wound
Stud	SA193-B7 CS
Nut	SA194-2H CS

* Other materials are available upon request.
Standard materials are subject to change.
Please contact factory for Certified drawings.

1 Recommended Spare Parts.



Connections:
10" x 6" - 24" x 24" RF Inlet x FF Outlet

SCREEN OPENINGS

SIZE	STANDARD SCREEN	MATERIALS
All	1/8" Perf.	304 SS

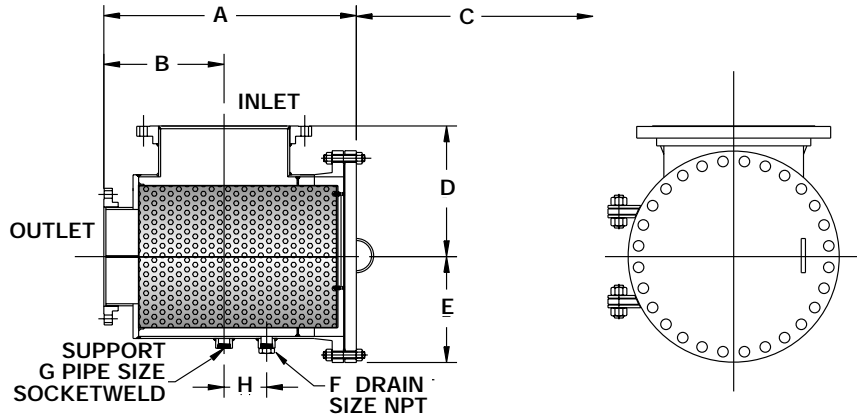
OPEN AREA RATIOS with Standard Perforated Screen

Opening 40%, 1/8" Diameter

Size Inlet X Outlet	Nominal Outlet Area (in ²)	Gross Screen Area (in ²)	Free Screen Area (in ²)	Open Area Ratio (OAR)
10 x 6	28.89	455	182	6.3
10 x 8	50.03	455	182	3.6
10 x 10	78.85	700	280	3.6
12 x 8	50.03	524	210	4.2
12 x 10	78.85	700	280	3.6
12 x 12	113.10	811	324	2.9
14 x 10	78.85	700	280	3.6
14 x 12	113.10	811	324	2.9
14 x 14	137.89	1162	465	3.4
16 x 12	113.10	811	324	2.9
16 x 14	137.89	1162	465	3.4
16 x 16	182.65	1275	510	2.8
18 x 14	137.89	1162	465	3.4
18 x 16	182.65	1275	510	2.8
18 x 18	233.71	1470	588	2.5
20 x 16	182.65	1275	510	2.8
20 x 18	233.71	1470	588	2.5
20 x 20	291.04	2454	982	3.4
24 x 18	233.71	1470	588	2.5
24 x 20	291.04	2454	982	3.4
24 x 24	424.56	2454	982	2.3

OAR = Free Screen Area divided by Nominal Outlet Area.
Free Screen Area = Opening % times Gross Screen Area.
Values shown are approximate. Contact factory for exact ratios.

FF SERIES FABRICATED SUCTION DIFFUSERS DIMENSIONS & WEIGHTS



DIMENSIONS* inches (mm) **AND WEIGHTS** pounds (kg)

Inlet	Outlet	A			B			C ¹	D	E	F	G	H	Weight ²
		TYPE 1	TYPE 3	TYPE 5	TYPE 1	TYPE 3	TYPE 5							
Standard Outlet														
10 (250)	8 (200)	22 ⁵ / ₁₆ (575)	26 ⁵ / ₁₆ (676)	30 ⁵ / ₁₆ (778)	11 ⁵ / ₁₆ (283)	15 ⁵ / ₁₆ (384)	19 ⁵ / ₁₆ (486)	17 ⁵ / ₁₆ (441)	12 ⁵ / ₁₆ (321)	8 (203)	1 (40)	1 (40)	4 ⁵ / ₁₆ (105)	339 (154)
12 (300)	10 (250)	25 ¹ / ₁₆ (656)	30 ¹ / ₁₆ (783)	35 ¹ / ₁₆ (910)	13 ¹ / ₁₆ (333)	18 ¹ / ₁₆ (460)	23 ¹ / ₁₆ (587)	18 ¹ / ₁₆ (478)	12 ¹ / ₁₆ (327)	10 ¹ / ₂ (267)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	4 ³ / ₄ (121)	530 (240)
14 (350)	12 (300)	26 ³ / ₁₆ (670)	32 ³ / ₁₆ (822)	38 ³ / ₁₆ (975)	13 ³ / ₁₆ (346)	19 ³ / ₁₆ (499)	25 ³ / ₁₆ (651)	21 ³ / ₁₆ (546)	15 ³ / ₁₆ (387)	11 ³ / ₄ (298)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	5 ¹ / ₄ (133)	808 (366)
16 (400)	14 (350)	32 ⁵ / ₁₆ (821)	39 ⁵ / ₁₆ (998)	46 ⁵ / ₁₆ (1,176)	16 ⁵ / ₁₆ (425)	23 ⁵ / ₁₆ (603)	30 ⁵ / ₁₆ (781)	26 ⁵ / ₁₆ (679)	16 ⁵ / ₁₆ (413)	12 ¹ / ₂ (318)	2 (50)	2 (50)	5 ¹ / ₂ (140)	1086 (493)
18 (450)	16 (400)	32 ⁷ / ₁₆ (827)	40 ⁷ / ₁₆ (1,030)	48 ⁷ / ₁₆ (1,233)	10 ⁷ / ₁₆ (270)	18 ⁷ / ₁₆ (473)	26 ⁷ / ₁₆ (676)	26 ⁷ / ₁₆ (676)	17 ⁷ / ₁₆ (448)	13 ³ / ₄ (349)	2 (50)	2 (50)	6 ¹ / ₂ (165)	1256 (570)
20 (500)	18 (450)	32 ⁹ / ₁₆ (816)	41 ⁹ / ₁₆ (1,045)	50 ⁹ / ₁₆ (1,273)	23 ⁹ / ₁₆ (588)	32 ⁹ / ₁₆ (816)	41 ⁹ / ₁₆ (1,045)	25 ⁹ / ₁₆ (641)	20 ⁹ / ₁₆ (511)	16 (406)	2 (50)	2 (50)	2 ⁷ / ₈ (73)	1793 (813)
24 (600)	20 (500)	40 (1,016)	50 (1,270)	60 (1,524)	21 ¹ / ₁₆ (537)	31 ¹ / ₁₆ (791)	41 ¹ / ₁₆ (1,045)	32 ¹ / ₁₆ (826)	22 (559)	17 ¹ / ₂ (444)	2 (50)	2 (50)	9 (227)	3545 (1,608)
Undersized Outlet														
10 (250)	6 (150)	21 ¹ / ₁₆ (556)	24 ¹ / ₁₆ (632)	27 ¹ / ₁₆ (708)	11 ¹ / ₁₆ (298)	14 ¹ / ₁₆ (375)	17 ¹ / ₁₆ (451)	17 ¹ / ₁₆ (440)	11 ¹ / ₁₆ (283)	8 (203)	1 (25)	1 (25)	4 (102)	261 (118)
12 (300)	8 (200)	22 ¹ / ₁₆ (572)	26 ¹ / ₁₆ (673)	30 ¹ / ₁₆ (775)	11 ¹ / ₁₆ (286)	15 ¹ / ₁₆ (387)	19 ¹ / ₁₆ (489)	18 ¹ / ₁₆ (478)	12 ¹ / ₁₆ (327)	9 ¹ / ₂ (241)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	4 ³ / ₄ (118)	437 (198)
14 (350)	10 (250)	25 ¹ / ₁₆ (657)	30 ¹ / ₁₆ (784)	35 ¹ / ₁₆ (911)	13 ¹ / ₁₆ (333)	18 ¹ / ₁₆ (460)	23 ¹ / ₁₆ (587)	18 ¹ / ₁₆ (480)	14 (356)	10 ¹ / ₂ (267)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	5 ¹ / ₄ (133)	670 (304)
16 (400)	12 (300)	26 ³ / ₁₆ (667)	32 ³ / ₁₆ (819)	38 ³ / ₁₆ (972)	13.63 (346)	19 ³ / ₁₆ (499)	25 ³ / ₁₆ (651)	21 ³ / ₁₆ (546)	15 ³ / ₁₆ (394)	11 ³ / ₄ (298)	2 (50)	2 (50)	5 ³ / ₁₆ (129)	913 (414)
18 (450)	14 (350)	29 ⁵ / ₁₆ (744)	36 ⁵ / ₁₆ (922)	43 ⁵ / ₁₆ (1,100)	16 ⁵ / ₁₆ (425)	23 ⁵ / ₁₆ (603)	30 ⁵ / ₁₆ (781)	26 ⁵ / ₁₆ (679)	16 ⁵ / ₁₆ (416)	12 ¹ / ₂ (318)	2 (50)	2 (50)	5 ¹ / ₂ (149)	1058 (480)
20 (500)	16 (400)	32 ⁷ / ₁₆ (827)	40 ⁷ / ₁₆ (1,030)	48 ⁷ / ₁₆ (1,233)	17 ⁷ / ₁₆ (437)	25 ⁷ / ₁₆ (640)	33 ⁷ / ₁₆ (843)	26 ⁷ / ₁₆ (676)	17 ⁷ / ₁₆ (454)	13 ³ / ₄ (349)	2 (50)	2 (50)	6 ¹ / ₈ (168)	1452 (659)
24 (600)	18 (450)	32 ⁹ / ₁₆ (816)	41 ⁹ / ₁₆ (1,045)	50 ⁹ / ₁₆ (1,273)	17 (432)	26 (660)	35 (889)	25 ⁹ / ₁₆ (651)	23 ⁹ / ₁₆ (607)	16 (406)	2 (50)	2 (50)	7 ¹ / ₁₆ (198)	2382 (1,080)
Oversized Outlet														
10 (250)	10 (250)	25 ¹ / ₁₆ (656)	30 ¹ / ₁₆ (783)	35 ¹ / ₁₆ (910)	13 ¹ / ₁₆ (333)	18 ¹ / ₁₆ (460)	23 ¹ / ₁₆ (587)	18 ¹ / ₁₆ (478)	13 ¹ / ₁₆ (346)	10 ¹ / ₂ (267)	1 (25)	1 (25)	5 ⁵ / ₁₆ (135)	420 (190)
12 (300)	12 (300)	26 ³ / ₁₆ (670)	32 ³ / ₁₆ (822)	38 ³ / ₁₆ (975)	13 ³ / ₁₆ (346)	19 ³ / ₁₆ (499)	25 ³ / ₁₆ (651)	21 ³ / ₁₆ (546)	15 ³ / ₁₆ (384)	11 ³ / ₄ (298)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	4 ¹ / ₁₆ (119)	650 (295)
14 (350)	14 (350)	32 ⁵ / ₁₆ (816)	39 ⁵ / ₁₆ (994)	46 ⁵ / ₁₆ (1,172)	16 ⁵ / ₁₆ (425)	23 ⁵ / ₁₆ (603)	30 ⁵ / ₁₆ (781)	26 ⁵ / ₁₆ (679)	16 (406)	12 ¹ / ₂ (318)	1 ¹ / ₂ (40)	1 ¹ / ₂ (40)	5 (127)	964 (437)
16 (400)	16 (400)	32 ⁷ / ₁₆ (827)	40 ⁷ / ₁₆ (1,030)	48 ⁷ / ₁₆ (1,233)	17 ⁷ / ₁₆ (437)	25 ⁷ / ₁₆ (640)	33 ⁷ / ₁₆ (843)	26 ⁷ / ₁₆ (676)	17 ⁷ / ₁₆ (445)	13 ³ / ₄ (349)	2 (50)	2 (50)	8 ¹ / ₁₆ (205)	1280 (580)
18 (450)	18 (450)	32 ⁹ / ₁₆ (816)	41 ⁹ / ₁₆ (1,045)	50 ⁹ / ₁₆ (1,273)	17 (432)	26 (660)	35 (889)	25 ⁹ / ₁₆ (641)	19 ⁹ / ₁₆ (505)	16 (406)	2 (50)	2 (50)	5 ³ / ₁₆ (151)	1572 (713)
20 (500)	20 (500)	40 (1,016)	50 (1,270)	60 (1,524)	21 ¹ / ₁₆ (537)	31 ¹ / ₁₆ (791)	41 ¹ / ₁₆ (1,045)	32 ¹ / ₁₆ (826)	21 ¹ / ₁₆ (549)	17 ¹ / ₂ (444)	2 (50)	2 (50)	8 (203)	2560 (1,161)
24 (600)	24 (600)	41 ³ / ₁₆ (1,051)	53 ³ / ₁₆ (1,356)	65 ³ / ₁₆ (1,661)	22 ³ / ₁₆ (562)	34 ³ / ₁₆ (867)	46 ³ / ₁₆ (1,172)	34 ³ / ₁₆ (886)	23 ³ / ₁₆ (606)	17 ¹ / ₂ (444)	2 (50)	2 (50)	7 ³ / ₁₆ (198)	3600 (1,633)

1. Distance required for screen removal.

2. Weight shown for Type 1. For Type 3 and 5 multiply Type 1 weight by 1.1 and 1.2, respectively.

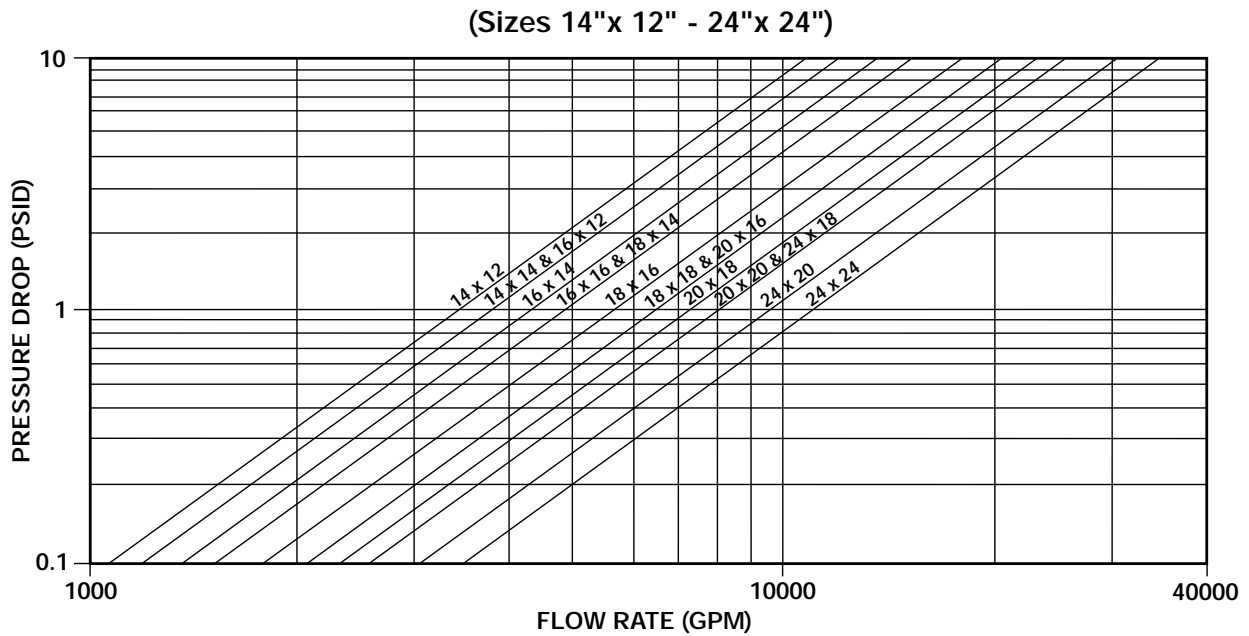
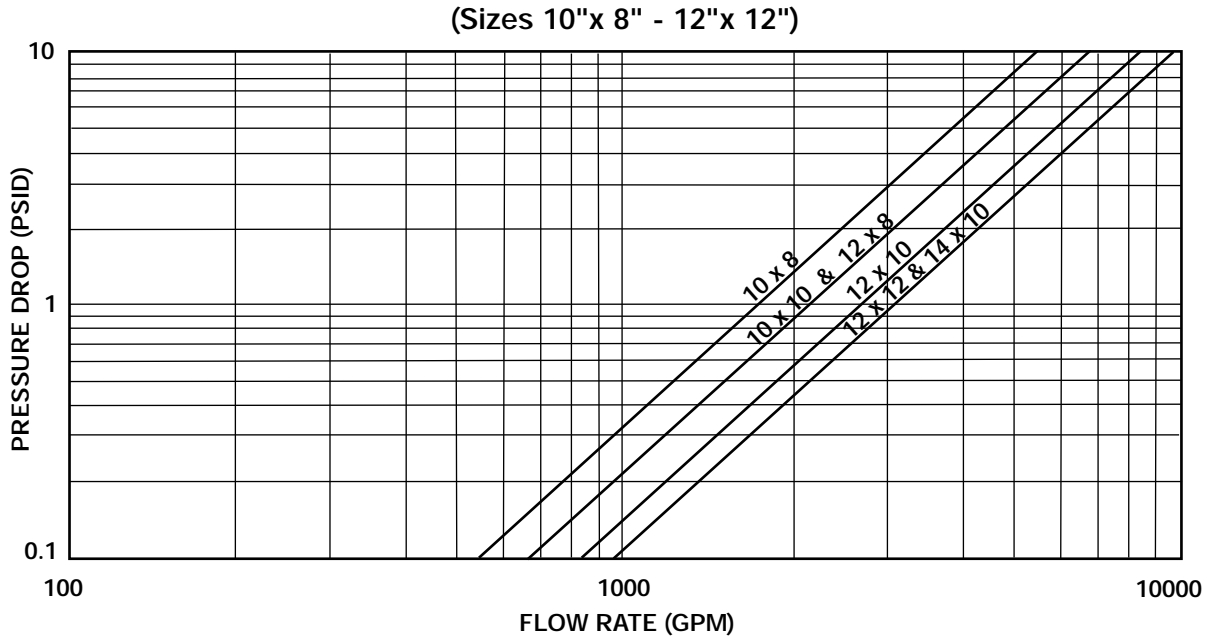
* Dimensions are subject to change. Contact factory for certified drawings when required. Custom dimensions available upon request.

FF SERIES

FABRICATED SUCTION DIFFUSERS

PRESSURE DROP VS FLOW RATE

Water Service, Clean Basket, 1/32" - 1/4" Perforated Screen*

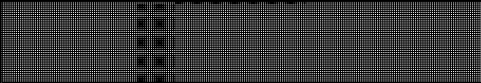
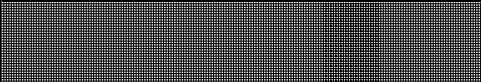
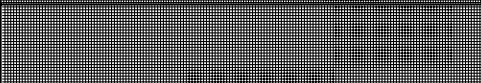
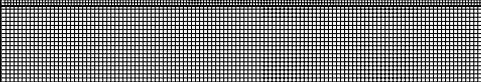
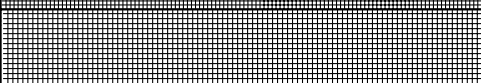
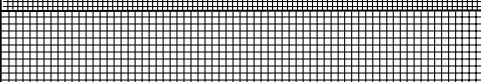
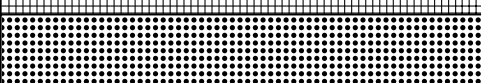
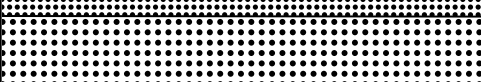
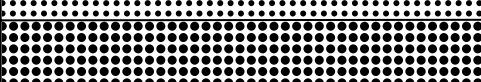
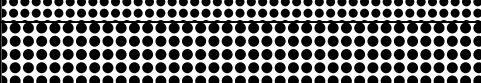

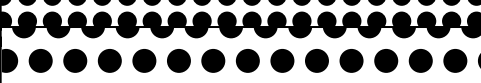





* For other viscous liquids or mesh liners, contact factory.



PUMP PROTECTION TECHNICAL INFORMATION

SCREEN OPENINGS

	100 Mesh - 30% O.A. 0.006" Openings
	80 Mesh - 36% O.A. 0.008" Openings
	60 Mesh - 38% O.A. 0.010" Openings
	40 Mesh - 41% O.A. 0.016" Openings
	30 Mesh - 45% O.A. 0.022" Openings
	20 Mesh - 49% O.A. 0.035" Openings
	0.027" Dia.- 23% O.A.
	0.033" Dia.- 28% O.A.
	3/64" Dia.- 36% O.A.
	1/16" Dia.- 37% O.A.
	3/32" Dia.- 39% O.A.
	1/8" Dia.- 40% O.A.
	5/32" Dia.- 58% O.A.
	3/16" Dia.- 50% O.A.
	1/4" Dia.- 40% O.A.

FACTORS TO CONSIDER

1 Purpose

If the strainer is being used for protection rather than direct filtration, standard screens will suffice in most applications.

2 Service

With services that require extremely sturdy screens, such as high pressure/temperature applications or services with high viscosities, perforated screens without mesh liners are recommended. If a mesh liner is required to obtain a certain level of filtration, then a trapped perf/mesh/perf combination is recommended.

3 Filtration Level

When choosing a perf. or a mesh/perf. combination, attention should be given to ensure overstraining does not occur. As a general rule, the specified level of filtration should be no smaller than half the size of the particle to be removed. If too fine a filtration is specified, the pressure drop through the strainer will increase very rapidly, possibly causing damage to the screen.

Screen openings other than those shown above are readily available. Various mesh sizes as fine as 5 micron and perforated plate as coarse as 1/2" Dia. are in inventory.

Screens are available in a wide range of materials. Screens of carbon steel, stainless steel (304, 316), alloy 20, monel 400, hastelloy C and titanium grade 2 are in inventory.

Custom manufactured screens are available upon request. Please consult factory.

SUCTION DIFFUSER CHECKLIST

Please take the factors listed below into account when selecting a strainer. Kindly photocopy this page and fill out the pertinent information, to your best ability, so that we can recommend a Strainer to suit your specific requirements.

- | | |
|---|--|
| <p>1. Fluid to be strained _____</p> <p>2. Flow rate _____</p> <p>3. Density of fluid _____</p> <p>4. Viscosity of fluid _____</p> <p>5. Fluid working pressure _____
Maximum pressure _____</p> <p>6. Fluid Working Temp. _____
Maximum Temp. _____</p> <p>7. Preferred material of strainer construction _____</p> <p>8. Present Pipeline size & material _____</p> <p>9. Nature of solids to be strained out _____</p> <p>10. Size of solids to be strained out _____
Size of mesh or Perf. Req. _____</p> | <p>11. Clearance Limitation Above _____ Below _____
Left side facing inlet _____ Right side facing inlet _____</p> <p>12. Maximum pressure drop with clean screen _____</p> <p>13. Expected cleaning frequency _____</p> <p>14. Any other information deemed relevant _____

_____</p> <p>Name _____</p> <p>Company _____</p> <p>Address _____</p> <p>City/Town _____</p> <p>State _____ Zip Code _____</p> <p>Telephone (_____) _____</p> <p>Fax (_____) _____</p> |
|---|--|



SUCTION DIFFUSER

INSTALLATION AND MAINTENANCE INSTRUCTIONS

INSTALLATION

- Ensure all machined surfaces are free of defects and that the inside of the diffuser is free of foreign objects.
- Provide for distance "C" as this dimension represents the distance required for removal of strainer.
- Mount standard support leg and foot to pad of suction diffuser.
- Align inlet and outlet pipe connections. For flanged connections, the flange bolting should be tightened gradually in a back and forth clockwise motion.
- Once installed, increase line pressure gradually and check for leak around joints.
- After piping and initial circulation is complete, remove fine mesh start-up strainer.

MAINTENANCE

For maximum efficiency, determine the length of time it takes for the pressure drop to double that in the clean condition. Once the pressure drop reaches an unacceptable value, shut down the line, drain piping and

remove, clean and replace screen. A differential pressure gauge installed before and after diffuser in line will indicate pressure loss due to clogging and may be used to determine when cleaning is required.

TRIPLE DUTY VALVE

INSTALLATION AND MAINTENANCE INSTRUCTIONS

INSTALLATION

- Ensure all machined surfaces are free of defects and that the inside of the valve is free of foreign objects.
- The valve should be installed on the discharge side of the pump with the flow arrow pointed away from the pump discharge.
- Minimum recommended space for pump sizes 2" through 6" is 12". Minimum recommended space for pump sizes 8" through 14" is 24".
- It is not recommended to mount a valve directly to the pump.
- Sufficient clearance should be left around the valve for removal and/or repair.
- Valve should be mounted with the stem pointing up to facilitate proper seating of the valve disc.
- When connecting the valve to the line be sure that the flanges are the same – flat face to flat face. Flat face flanges require full face gaskets. The specified face-to-face dimension of the valve is approximate due to machining tolerances. Allow adjustment in prefabricated piping or request certified dimensions.
- Check to see that flange gaskets are properly positioned before tightening the bolts. Tighten bolts gradually in a back and forth clockwise motion.
- Once installed, "crack" the valve open before starting the pump.
- Gradually adjust the stem until the proper flow rate is reached. Tapped ports are provided on the valve to insert equipment to measure the valve pressure differential.

MAINTENANCE - PACKING REPLACEMENT

Before starting make a note of the position of the stem indicator.

Shut down the pump and close the isolation valves.

Open the valve completely so that the stem back seats against the inside of the yoke cover. Loosen the two nuts holding the flanged gland.

Remove the old packing and clean out the packing box.

Place a set (usually three or four) of the new packing rings around the stem. Be sure to stagger the 45 degree split in

the packing rings. Press packing rings into the packing box.

Replace the flanged gland and nuts. Do not over tighten or the stem may seize.

Adjust the valve stem indicator to its original position. If there is any leakage around the packing tighten both gland nuts a 1/4 turn at a time until the leakage stops. It is very important that the gland nuts be tightened evenly.

For all other maintenance please contact the factory.

WARNING: *This product operates in pipelines or with equipment that carries fluids and/or gasses at elevated temperatures and pressures. Caution should be taken to make sure that this equipment is installed correctly and inspected regularly. Caution should also be taken to protect personnel from fluid or gas leakage.*