

Orifice Plates and Plate Sealing Units



DANIEL®


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Process Management

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Manufacturing Techniques



Orifice plate manufacture at Daniel is quality-controlled from selection of raw material to packaging of the finished product.

Special Stainless Steel Sheets:

Stretcher-leveled, stainless steel sheets are used. Following careful shearing, squares of sheets are machined/laser cut to circular discs. Other methods such as stamping or burning the plate blanks are relatively inaccurate.

Special Boring Plate Jigs:

Daniel machinist use special jigs and fixtures designed only for orifice plate work. Plates are never chucked in a lathe for this sets up metal stresses. Special clamps are used to apply only face pressure to hold the plate for boring. Flatness is assured by the use of a heavy back-up plate.

Uniformly Smooth Surface Finish:

Daniel plates are finished to 15-30 micro-inch roughness, applied by special sanding machines designed to preserve the flatness of each plate. No knives, honing devices or other devices are used for plate finishing. Daniel methods avoid procedures which may damage the bore accuracy or the plate finish.

Protective Packaging:

Each Daniel Orifice Plate is packaged in clear polyethylene plastic bags which protect the plate surface and the bore edge, and keep the plate clean until ready for use. The plate identification can be read through the clear plastic bag.

Plate Identification:

Plates are lightly stamped to show the following information:

#520	#500 & *3DVS*
Material	Material
Line Size	Line size
Rating	Outlet (on downstream side)
Inlet (on upstream side)	Bore (specified or calculated)
Bore (specified or calculated)	d_r (Bore corrected to 68°F)
d_r (Bore corrected to 68°F)	Tag # (if required)
Tag # (if required)	

Design Specifications

Two basic styles of Orifice Plates are available. Catalog No. 500 Universal Size for use in Orifice Fittings and Ring-Joint Plate Holders, and Catalog No. 520 Paddle Type for use in Orifice Flanges. Specific tolerances that apply to all Daniel Orifice Plates are as follows:

Edges:
Square and Sharp, will not reflect a beam of light when viewed without magnification.

Finish:
15-30 micro-inch roughness.

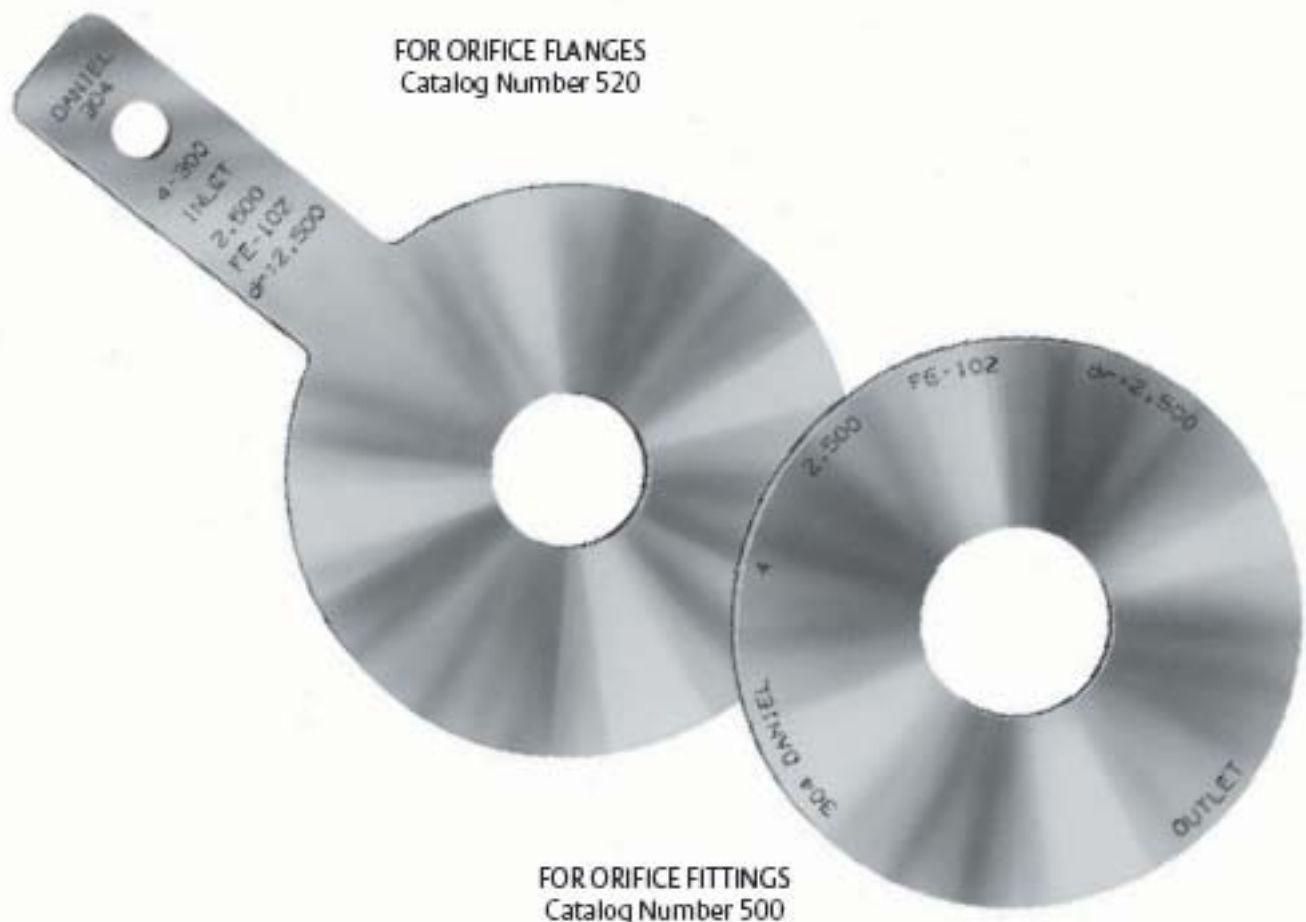
Flatness:
Flat within 0.010 inches, per inch of dam height. (Dam height = pipe diameter minus orifice diameter, divided by 2.)

Bore:
Orifice bore tolerance in strict accordance with A.P.I. Chapter 14, Section 3, A.G.A. Gas Measurement Committee Report No. 3, A.S.M.E., I.S.O., I.S.A., and with other societies' recommendations.

Material:
Stock materials are 304 and 316 Stainless Steel, Monel and Hastelloy. Other materials furnished on request.

Design:
Normal stocked items are the standard design used in all industries. Special designs are available on request.

Sizes:
Daniel Orifice Plates have been furnished in line sizes from ¼ inch to 60 inches.

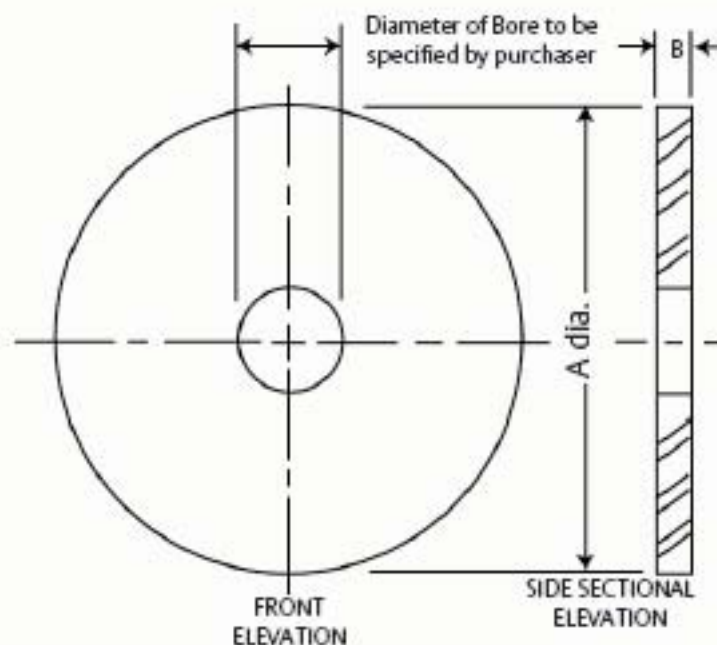


Orifice Fitting Plates

CATALOG NO. 500

Universal Size Orifice Plates, originated by Daniel, are the standard used in many industries. They can be used interchangeably in all Daniel Orifice Fittings and Plate Holders. The Universal Size is the most economical style of plate available because of low initial cost, less maintenance, less storage space required, and the necessity of stocking plates for various pressure ratings is eliminated.

Four types of sealing units are available for use with the Daniel Catalog No. 500 orifice plates. These are the "DSC" Dual Seal, which is removable up through 10" size; the "TSC" Teflon Seal, available to 16" size; the "Snap Seal", available through 16" size; and the "MSC" Metal Seal, available to 12" size. All the units shown on page 5 are removable.



CATALOG NUMBER 500 ORIFICE PLATES

Line Size (inches)	Plate O.D. A	Plate Thickness B (inches)	Blank WT. (Lbs.)	Line Size (inches)	Plate O.D. A	Plate Thickness B (inches)	Blank WT. (Lbs.)
3/4	1.125	1/8	.06	14	14.000	1/4	11.91
1	1.312	1/8	.06	16	16.000	3/8	22.69
1-1/2	2.000	1/8	.11	18	18.000	3/8	28.72
2	2.437	1/8	.17	20	20.000	3/8	35.24
2-1/2	2.812	1/8	.25	24	24.000	1/2	66.70
3	3.437	1/8	.34	26	26.000	1/2	79.52
4	4.406	1/8	.55	30	30.000	1/2	105.08
6	6.437	1/8	1.18				
8	8.437	1/4	4.06				
10	10.687	1/4	6.41				
12	12.593	1/4	9.61				

CATALOG NUMBER "3 DVS"

Line Size (inches)	Plate O.D. A	Plate Thickness B (inches)	Blank WT. (Lbs.)
12	13.079	1/4	9.61
14	14.563	1/4	11.91
16	16.563	3/8	22.69
18	18.563	3/8	28.72
20	20.563	3/8	35.24
24	24.500	1/2	66.70
26	26.750	1/2	79.52
30	30.750	1/2	105.08
34	35.228	1/2	137.91
36	38.000	1/2	160.91
42	44.000	3/4	322.73

CATALOG NO. "3DVS"

Universal size 12" and larger orifice fitting plates include a synthetic rubber sealing unit ("3DVS") bonded to both sides of the plate for a nonmetallic seal in the orifice fitting body seats. "A" dimension shown above for these sizes includes the 3DVS Seal. The "3DVS" is the standard plate for most applications in these sizes. Other type seals, shown on the next page, are also available for use with Catalog 500 plates in these sizes.

Orifice Plate Sealing Units

DSC DUAL SEAL*



The Daniel Dual Seal is the most simple and practical orifice plate sealing device for normal flowing streams. It is precision molded from 70-80 shore nitrile synthetic rubber** and provides four rubber-to-metal sealing surfaces 360° around the plate. The units positively seal against both outer faces of the plate and against both seats of the orifice fitting to prevent leakage. In 1-1/2" to 10" sizes, the *DSC* is interchangeable with Daniel *TSC* and *MSC* seal units. In 12" sizes and up, the seal is bonded from 80-90 shore rubber directly to the outer edge of the orifice plate at the factory. If damaged, the *DVSC* seal and plate may be returned to the factory for revulcanizing. The *DSC* and *DVSC* seals are used in pressure ratings to 600 lbs. ANSI, in temperatures from -20°F to +275°F.

DSC in 2"-8", *DS* in 10"

* US Patent # 5085250. ** Also available in Viton® fluoroelastomers

SSR SNAP SEAL RING*



The Daniel Snap Seal Ring is a removable orifice plate holder designed for use in services where elastomer seal swelling is a problem. Certain media, such as ethylene or carbon dioxide may cause seal swelling when other type seal units are removed from high-pressure service. The Snap Seal Ring unit consists of two symmetrical metal rings, each one having an O-ring on both sides for a positive seal on the plate side and the fitting side of the ring. These rings center and secure the orifice plate between them. The assembled unit provides a full 360° rubber-to-metal seal around both sides, even in the absence of any pressure differential. No special tools are required for assembly or disassembly. The Snap Seal Ring is designed for service temperatures ranging from -20°F to +275°F (standard O-rings) to -67°F to +437°F (Viton® O-rings). It is available for line sizes of 2" through 16". When ordering, please specify nominal line size, schedule, plate thickness, and flowing media or material choice. The unit is available in 316 stainless steel and cadmium-plated carbon steel.

SSRC 2"-8", *SSR* 10" & up

* US Patent # 4,478,251.

TSC TEFLON SEAL



The Daniel Teflon Seal is a superior orifice plate sealing unit for difficult, corrosive flows and for higher temperatures than the *DSC* unit can handle. The *TSC* has proven effective in such flows as dilute sulphuric acid, fuming nitric acid, hydrazine, liquid oxygen and other unusual flows, from -65°F to +500°F. The two-piece unit consists of an inlet ring which fits around the plate outer diameter, and a downstream ring fitted with metal clips for assembling the unit. A special lip on this ring plus an annular groove* provide compression to effectively seal off the plate. The *TSC* unit can be assembled or taken apart by hand and is interchangeable in 1 1/2" to 10" sizes with Daniel *DSC* and *MSC* seal units. The Teflon seal is recommended for services with pressure ratings of 900 lbs. ANSI to 2500 lbs. ANSI or lower pressure services where rubber seals may not be satisfactory. Size 14" and larger now have graphite added for lubricity and ease of movement.

TSC 2"-8", *TS* 10" & up

* This groove should be spread by inserting a blunt object such as screw driver and rotating 360° to reengage the spring lip after each use.

MSC METAL SEAL

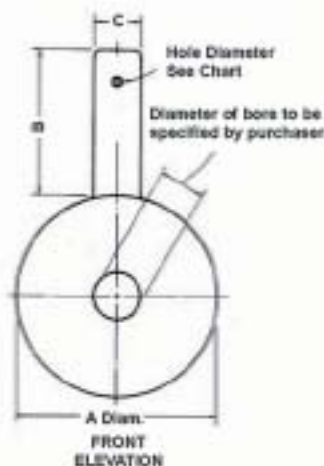


The Daniel Metal Seal is a stainless or cadmium-plated carbon steel clip-ring assembly recommended for high pressures and for temperatures up to 1200°F. The assembly consists of an upstream and a downstream ring. The upstream ring has a recessed groove into which a thin leaf-spring is inserted. When the plate is clamped between the rings, the spring provides the necessary compression to seat the plate against the downstream ring and effect a seal. *MSC* Seal Units of cadmium-plated carbon steel are recommended for services to +600°F, standard 316 stainless steel units to +1000°F, and 316 stainless steel units with an Inconel spring to +1200°F. The *MSC* seal unit can be assembled or taken apart by hand and is interchangeable in 1-1/2" to 12" sizes with Daniel *DSC* and *TSC* seal units.

MSC 2"-8", *MS* 10" & up

Orifice Flange Plates

PADDLE-TYPE, CATALOG NO. 520



Daniel Paddle-Type Orifice Plates are used with Orifice Flange Unions. All outer diameters of the plates are machined/laser cut providing a uniformly circular disc. This results in a high degree of concentricity of the orifice bore and the plate outer diameter. Next, the handles are carefully welded on. The plates are then sanded in special machines to a prescribed finish. Blank plates are stocked continuously. Each plate is stamped on its handle with line size, flange rating, orifice bore and plate material. Daniel maintains a stock in Types 304 and 316 Stainless Steel in standard thickness. Other sizes and materials are available on request.

Diameters of holes in Paddle Plate Handles are as follows:

Plate Size	Hole Diameter
1/2 thru 2"	1/4"
2-1/2 and larger	3/8"

Handle is 1/8" thick for sizes to 24". 1/4" for 30" & larger.

DIMENSIONS (In Inches)

Line Size	125 Lbs. and 150 Lbs. ANSI	250 Lbs. and 300 Lbs. ANSI	400 Lbs. ANSI	600 Lbs. ANSI	900 Lbs. ANSI	1500 Lbs. ANSI	2500 Lbs. ANSI	For All Pressure Ratings 125-2500 Lbs. ANSI		
								Handle Dimensions		Plate Thickness
								A	B	C
1/2	1-7/8	2-1/8	2-1/8	2-1/8	2-1/2	2-1/2	2-3/4	4	1	1/8
3/4	2-1/4	2-5/8	2-5/8	2-5/8	2-3/4	2-3/4	3	4	1	1/8
1	2 5/8	2-7/8	2-7/8	2-7/8	3-1/8	3-1/8	3-3/8	4	1	1/8
1-1/4	3	3-1/4	3-1/4	3-1/4	3-1/2	3-1/2	4-1/8	4	1	1/8
1 1/2	3-3/8	3-3/4	3-3/4	3-3/4	3-7/8	3-7/8	4-5/8	4	1	1/8
2	4-1/8	4-3/8	4-3/8	4-3/8	5-5/8	5-5/8	5-3/4	4	1	1/8
2-1/2	4-7/8	5-1/8	5-1/8	5-1/8	6-1/2	6-1/2	6-5/8	4	1-1/4	1/8
3	5-3/8	5-7/8	5-7/8	5-7/8	6-5/8	6-7/8	7-3/4	4	1-1/4	1/8
4	6-7/8	7-1/8	7	7-5/8	8-1/8	8-1/4	9-1/4	4	1-1/4	1/8
5	7-3/4	8-1/2	8-3/8	9-1/2	9-3/4	10	11	5	1-1/2	1/8
6	8-3/4	9-7/8	9-3/4	10-1/2	11-3/8	11-1/8	12-1/2	5	1-1/2	1/8
8	11	12-1/8	12	12-5/8	14-1/8	13-7/8	15-1/4	5	1-1/2	1/4
10	13-3/8	14-1/4	14-1/4	15-3/4	17-1/8	17-1/8	18-3/4	6	1-1/2	1/4
12	16-1/8	16-5/8	16-1/2	18	19-5/8	20-1/2	21-5/8	6	1-1/2	1/4
14	17-3/4	19-1/8	19	19-3/8	20-1/2	22-3/4	--	6	1-1/2	1/4
16	20-1/4	21-1/4	21-1/8	22-1/4	22-5/8	25-1/4	--	6	1-1/2	3/8
18	21-1/2	23-3/8	23-1/4	24	25	27-5/8	--	6	1-1/2	3/8
20	23-3/4	25-5/8	25-3/8	26-3/4	27-3/8	29-5/8	--	6	1-1/2	3/8
22	26	27-3/4	27-1/2	28-7/8	--	--	--	6	1-1/2	3/8
24	28-1/8	30-3/8	30-1/8	31	32-7/8	35-1/2	--	6	1-1/2	1/2
30	34-5/8	37-5/8	37-1/8	38-1/8	--	--	--	6	1-1/2	1/2
36	41-1/8	43-7/8	43-7/8	44-3/8	--	--	--	6	1-1/2	1/2

Orifice Flange Plates

BLANK PLATE WEIGHTS (In Pounds)

Line Size (inches)	ANSI Class 125 & 150	ANSI Class 250 & 300	ANSI Class 600	ANSI Class 900	Plate Thickness (inches)
1/2	0.09	0.12	0.12	0.12	1/8
3/4	0.16	0.21	0.21	0.21	1/8
1	0.31	0.36	0.36	0.42	1/8
1-1/2	0.43	0.52	0.52	0.56	1/8
2	0.59	0.66	0.66	1.03	1/8
3	0.93	1.10	1.10	1.37	1/8
4	1.46	1.57	1.78	2.01	1/8
6	2.34	2.94	3.33	3.87	1/8
8	7.22	8.72	9.46	11.78	1/4
10	10.37	11.73	14.25	16.79	1/4
12	14.92	15.84	18.52	21.95	1/4
14	18.01	20.86	21.40	23.92	1/4
16	35.03	38.52	42.18	43.61	3/8
18	35.60	47.37	49.95	54.20	3/8
20	48.81	56.81	61.88	64.86	3/8
24	90.94	106.12	110.52	125.20	1/2

WHEN ORDERING, PLEASE SPECIFY:

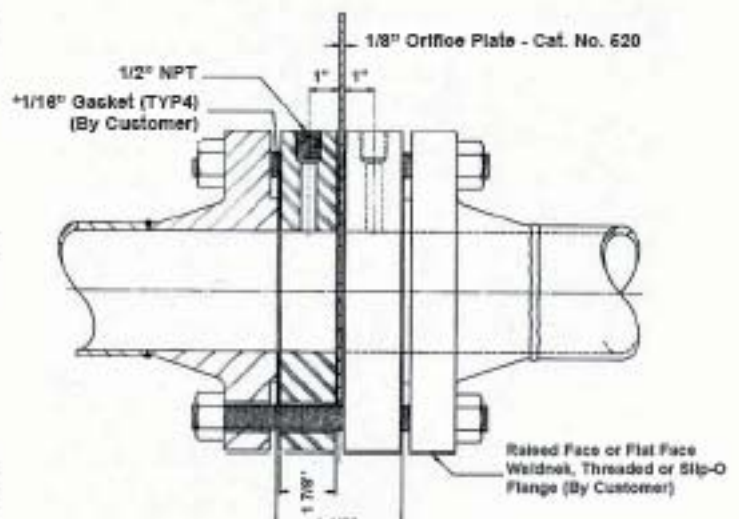
1. CATALOG NUMBER
2. SIZE, FLANGE ANSI RATING
3. DIMENSION "A" IF NOT AS LISTED
4. MATERIAL
5. QUANTITY
6. REQUIRED ORIFICE SIZE

Orifice Holding Blocks

Daniel manufactures orifice holding blocks in Teflon, PVC and Daniel manufactures orifice holding blocks in Teflon, PVC and other materials suitable for use in severe or caustic applications. Line sizes are from 1" up to 12", and these orifice holding blocks are used between 150 lbs. ANSI rated flanges. Flange taps are standard in all sizes, and the tap hole I.D. depends on the line size.

For additional information or prices, contact Daniel's Sales Department. When ordering please specify: nominal line size, line I.D., and material desired.

*Taps are located for use with 1/16" thick gaskets. If other thickness gaskets are to be used, specify so the tap holes can be prop-



Special Orifice Plate Bores



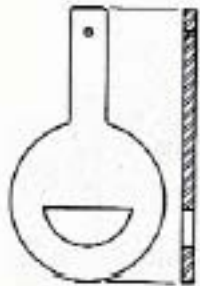
BORE AND BEVEL

The Bore and Bevel is the standard method of limiting the plate edge thickness. The bevel is machined on a 45° angle to the desired edge thickness. Unless otherwise specified, plates will be beveled to 1/50 of the line I.D. or 1/8 of the orifice bore, minimum governing.



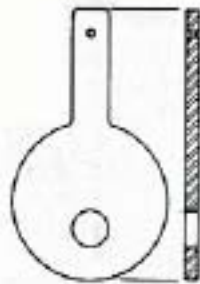
BORE AND COUNTERBORE

The Bore and Counterbore is a special method to limit the plate edge thickness. Instead of beveling at the normal 45 degrees, the plate is counterbored to the desired edge thickness.



SEGMENTAL

Segmentally bored orifice plates are provided for measurements where solids are entrained in a gas or liquid flow stream. The circular portion of the bore is inscribed within a circle which is normally 98% of the pipe diameter. The segmental opening may be placed at the top or the bottom of the pipe. Industries using these bores include, sewage treatment, steel, chemical, water conditioning, paper and petrochemical.



ECCENTRIC

Eccentrically bored plates are plates with the orifice off center, or eccentric, as opposed to concentric. The bore of the eccentric orifice normally is inscribed in a circle that is 98% of the pipe diameter, so the solids or slurries may pass through. Eccentric orifice plates are used in many industries including heavy and light chemicals, steel, paper, atomic, and petrochemicals.



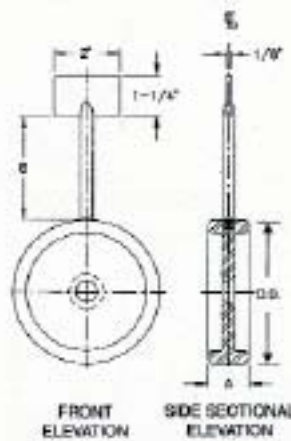
QUARTER-ROUND

The Quarter-Round, or Quadrant bore, is an orifice with the inlet edge rounded. The radius of the quarter-circle bore is a function of the orifice-to-pipe ratio (d/D). Thickness at the throat is equal to the radius. Overall plate thickness is frequently greater than for standard plates. This bore is specifically designed for fluids of high viscosity, such as heavy crudes, syrups, and slurries. Quarter-Round bores are recommended for viscous flows having Reynolds Numbers below 4,000.

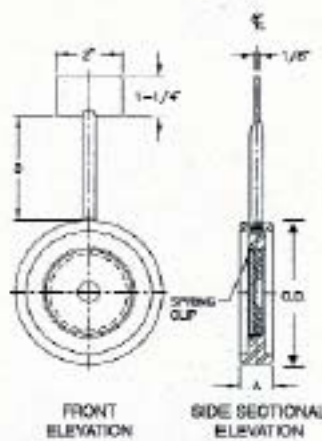
Handle-Type Ring-Joint Orifice Plate Holders

Daniel Ring-Joint Orifice Plate Holders are fitted with Catalog No. 500 Orifice Plates and are used with Ring-Joint Orifice Flanges. The Oval Form is standard. Catalog No. 580 Plate Holders are equipped with a monel snap-ring which clamps the snap ring snugly in place. Catalog No. 590 Plate Holders have holding screws to keep the plate in the holder. Both 580 and 590 styles have a gasket between the plate

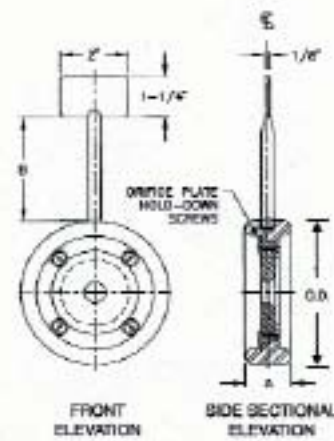
and the holder. Orifice Plates are not included and must be ordered separately. Catalog 580 and 590 Plate holders are available in cadmium plated mild steel and Type 304 and Type 316 Stainless Steel in most sizes and ratings. Catalog, No. 560 Plate Holders are a one-piece integral plate seal. Catalog No. 560 Plate Holders are available in all sizes in Type 304 and 316 Stainless Steel.



CATALOG NO. 560
Integral Plate Seal



CATALOG NO. 580
With Snap-Ring Clip



CATALOG NO. 590
With Hold-Down Screws

DIMENSIONS (In Inches) AND A.P.I. RING NUMBERS

Line Size	ANSI Class 300-600					ANSI Class 900				
	A.P.I. Ring Nos.	A*	B	Approx. Gap*	Ring O.D.	A.P.I. Ring Nos.	A*	B	Approx. Gap*	Ring O.D.
1/2	R-11	29/32	4-1/4	19/32	1.593	R-12	1	4-1/4	19/32	1.875
3/4	R-13	1	4-1/4	19/32	2.000	R-14	1	4-1/4	19/32	2.063
1	R-16	1	4-1/4	19/32	2.313	R-16	1	4-1/4	19/32	2.313
1-1/2	R-20	1	4-1/4	19/32	3.000	R-20	1	4-1/4	19/32	3.000
* 2	R-23	1-1/16	4-1/4	19/32	3.688	R-24	1-1/16	5-1/4	17/32	4.188
* 2-1/2	R-26	1-1/16	5-1/4	19/32	4.438	R-27	1-1/16	5-1/4	17/32	4.688
* 3	R-31	1-1/16	5-1/4	19/32	5.313	R-31	1-1/16	5-1/4	17/32	5.313
* 3-1/2	R-34	1-1/16	5-1/4	19/32	5.625	--	--	--	--	--
* 4	R-37	1-1/16	5-1/4	19/32	6.313	R-37	1-1/16	5-1/4	17/32	6.313
* 5	R-41	1-1/16	6-1/4	19/32	7.563	R-41	1-1/16	6-1/4	17/32	7.563
* 6	R-45	1-1/16	6-1/4	19/32	8.750	R-45	1-1/16	6-1/4	17/32	8.750
* 8	R-49	1-3/16	6-1/4	23/32	11.063	R-49	1-3/16	6-1/4	21/32	11.063
10	R-53	1-3/16	7-1/4	23/32	13.118	R-53	1-3/16	7-1/4	21/32	13.188
12	R-57	1-3/16	7-1/4	23/32	15.438	R-57	1-3/16	7-1/4	21/32	15.438
14	R-61	1-3/16	7-1/4	23/32	16.938	R-62	1-7/16	7-1/4	23/32	17.125
16	R-65	1-5/16	7-1/4	27/32	18.938	R-66	1-9/16	7-1/4	27/32	19.125
18	R-69	1-5/16	7-1/4	27/32	21.438	R-70	1-11/16	7-1/4	7/8	21.750
20	R-73	1-3/8	7-1/4	23/32	23.500	R-74	1-9/16	7-1/4	3/4	23.750
24	R-77	1-9/16	7-1/4	15/16	27.875	R-78	2	9-1/4	29/32	28.250

Note: Catalog No. 560 Plate Holders are available in all sizes and Ring Numbers. Catalog No. 580 Plate Holders are available in all A.P.I. Ring Numbers from 1-1/2 inches and up. Catalog No. 590 Plate Holders are available in 2 inch size and up in all Ring Numbers. Except 2" R-23 and 2-1/2" R-25.

Other sizes, materials, ANSI and special flange ratings are available on special order. When ordering specify: 1. Catalog No. 2. Size. 3. Ring No. or ANSI Flange Pressure Rating. 4. Material. 5. Quantity. 6. Required orifice size.

*Approximate distance between flanges.

Standard plate thickness for above holders (except 2-8" 560) are as follows:

1/2" - 6" = 1/8"

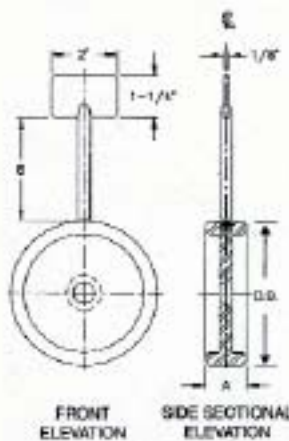
8" - 14" = 1/4"

16" - 20" = 3/8"

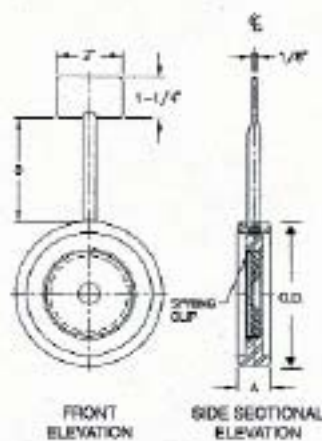
24" = 1/2"

Catalog 560 Holders in 2" through 6" size have 1/4" thick plates as standard. Add 1/8" to A' and Approx. Gap dimensions for 560 Holders in these sizes. See Page 4 for Universal Plates for use in

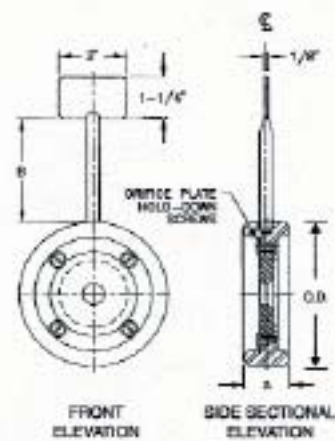
Handle-Type Ring-Joint Orifice Plate Holders



CATALOG NO. 560
Integral Plate Seal



CATALOG NO. 580
With Snap-Ring Clip



CATALOG NO. 590
With Hold-Down Screws

DIMENSIONS (In Inches) AND A.P.I. RING NUMBERS

Line Size	ANSI Class 1500					ANSI Class 2500				
	A.P.I. Ring Nos.	A *	B	Approx. Gap*	Ring O.D.	A.P.I. Ring Nos.	A *	B	Approx. Gap*	Ring O.D.
1/2	R-12	1	4-1/4	19/32	1.875	R-13	1	4-1/4	19/32	2.000
3/4	R-14	1	4-1/4	19/32	2.063	R-16	1	4-1/4	19/32	2.313
1	R-16	1	4-1/4	19/32	2.313	R-18	1	4-1/4	19/32	2.688
1-1/2	R-20	1	4-1/4	19/32	3.000	R-23	1-1/16	5-1/4	1/2	3.688
* 2	R-24	1-1/16	5-1/4	1/2	4.188	R-26	1-1/16	5-1/4	1/2	4.438
* 2-1/2	R-27	1-1/16	5-1/4	1/2	4.688	R-28	1-3/16	5-1/4	9/16	4.825
* 3	R-35	1-1/16	5-1/4	1/2	5.813	R-32	1-3/16	6-1/4	9/16	5.500
* 3-1/2	--	--	--	--	--	--	--	--	--	--
* 4	R-39	1-1/16	5-1/4	1/2	6.813	R-38	1-5/16	6-1/4	19/32	6.813
* 5	R-44	1-1/16	6-1/4	1/2	8.063	R-42	1-7/16	7-1/4	19/32	8.250
* 6	R-46	1-3/16	6-1/4	9/16	8.813	R-47	1-7/16	7-1/4	19/32	9.750
* 8	R-50	1-7/16	6-1/4	23/32	11.250	R-51	1-11/16	8-1/4	3/4	11.875
10	R-54	1-7/16	7-1/4	23/32	13.375	R-55	2	8-1/4	13/16	14.625
12	R-58	1-11/16	8-1/4	3/4	15.875	R-60	2-1/8	9-1/4	7/8	17.250
14	R-63	1-7/8	8-1/4	25/32	17.500	--	--	--	--	--
16	R-67	2-1/8	9-1/4	1	19.625	--	--	--	--	--
18	R-71	2-1/8	9-1/4	1	22.125	--	--	--	--	--
20	R-75	2-1/8	10-1/4	7/8	24.250	--	--	--	--	--
24	R-79	2-7/16	10-1/4	1-1/8	28.625	--	--	--	--	--

Note: Catalog No. 560 Plate Holders are available in all sizes and Ring Numbers. Catalog No. 580 Plate Holders are available in all A.P.I. Ring Numbers from 1-1/2 inches and up. Catalog No. 590 Plate Holders are available in 2 inch size and up in all Ring Numbers. Except 2" R-23 and 2-1/2" R-26.

Other sizes, materials, ANSI and special flange ratings are available on special order. When ordering specify: 1. Catalog No. 2. Size. 3. Ring No. or ANSI Flange Pressure Rating. 4. Material. 5. Quantity. 6. Required orifice size.

*Approximate distance between flanges.

Standard plate thickness for above holders (except 2-8" 560) are as follows:

1/2" - 6" = 1/8"
8" - 14" = 1/4"
16" - 20" = 3/8"
24" = 1/2"

*Catalog 560 Holders in 2" through 6" size have 1/4" thick plates as standard. Add 1/8" to A' and 'Approx. Gap' dimensions for 560 Holders in these sizes. See Page 4 for Universal Plates for use in Catalog 580 & 590 Plate Holders.

RTJ HOLDERS (Weight in Lbs.)

Size	Ring	580/590	500(blank)
1/2"	R-11	0.3	0.3
	12	0.4	0.4
	13	0.5	0.5
3/4"	13	0.5	0.5
	14	0.5	0.5
	16	0.6	0.6
1"	16	0.6	0.6
	18	0.7	0.7
1-1/2"	20	0.8	0.9
	23	1.4	1.5
2"	23	1.7	1.9
	24	1.8	2
	26	2.1	2.5
2-1/2"	26	2.1	2.5
	27	2.3	2.7
	28	2.9	3.3
3"	31	2.6	3.3
	35	2.9	3.8
	32	3.7	4.5
3-1/2"			
	34	2.8	3.6
4"	37	3.2	4.3
	39	3.5	4.9
	38	5.5	6.6
6"	45	4.6	7.2
	46	5.6	8.2
	47	10.2	13.1
8"	49	5.9	10.6
	50	9.5	14
	51	15.5	20.1
10"	53	7.2	14.3
	54	11.4	18.3
	55	26.6	37.6
12"	57	8.4	18.7
	58	21.2	30.8
	60	39.3	49.8
14"	61	9.3	21.9
	62	14.8	27.1
	63	29.1	40.8
16"	65	12.3	36.6
	66	18.9	42.6
	67	42.1	64.4
18"	69	14	45.9
	70	26.9	57.8
	71	47.8	77.5
20"	73	17.7	56.2
	74	27.5	65.2
	75	57.8	93.7
24"	77	26.1	80.8
	78	49.7	102.8
	79	81.2	132.8

Orifice Bore Calculations

The Daniel Orifice Calculation Department is a separate engineering branch responsible for the fast and accurate calculation of orifice plate bores. The computerized department utilizes the latest published trade statistics to figure and verify calculations. Their calculations are

recorded on a reproducible data sheet from which a copy is made and sent to the customer. The original is kept on file for 5 years. To insure prompt calculations, the above information relative to either gas, liquid or steam flow should be furnished.

Plate Type	520 Paddle <input type="checkbox"/> 500 Universal <input type="checkbox"/> Other _____
	Concentric <input type="checkbox"/> Other _____
Material:	316 <input type="checkbox"/> 304 <input type="checkbox"/> Other _____
Bore:	Maximum Rate <input type="checkbox"/> Nearest 1/8" <input type="checkbox"/>
Tap Location:	Flange <input type="checkbox"/> Corner <input type="checkbox"/>
	Other _____ Up _____ Down _____
Flange Rating:	_____

G E N E R A L	Tag No.				
	Line No.				
	Fluid				
	Flow Temperature °F				
	Flow Pressure PSIG				
	Actual Orifice I-D. Ins.				
	Line Flange I.D. ins.				
	Meter Type (Mercury or Dry)				
	S.G. of Seal @ Ambient T.				
	Diff. Range Ins. H ₂ O				
L I Q U I D S	Static Range PSIG				
	Chart or Scale Range				
	Chart Multiplier				
	Flow Units				
	Maximum Flow				
	Normal Flow				
	Specific Gravity @ 60°F				
	Specific Gravity @ Flowing Cond.				
	Viscosity cp @ Flowing Cond.				
	V A P O R I G A S	Flow Units			
Maximum Flow					
Normal Flow					
Specific Gravity					
Molecular Weight					
Flowing Density lbs./ft ³ -f					
Barometric Pressure or Elev. at Plant Site (approx.)					
Pressure Base					
Temperature Base					
Supercom. Factor @ Flowing T. & P.					
S T E A M	Viscosity cp @ Flowing T. & P.				
	Flow Units				
	Maximum Flow				
	Quality % or Superheat °F				

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