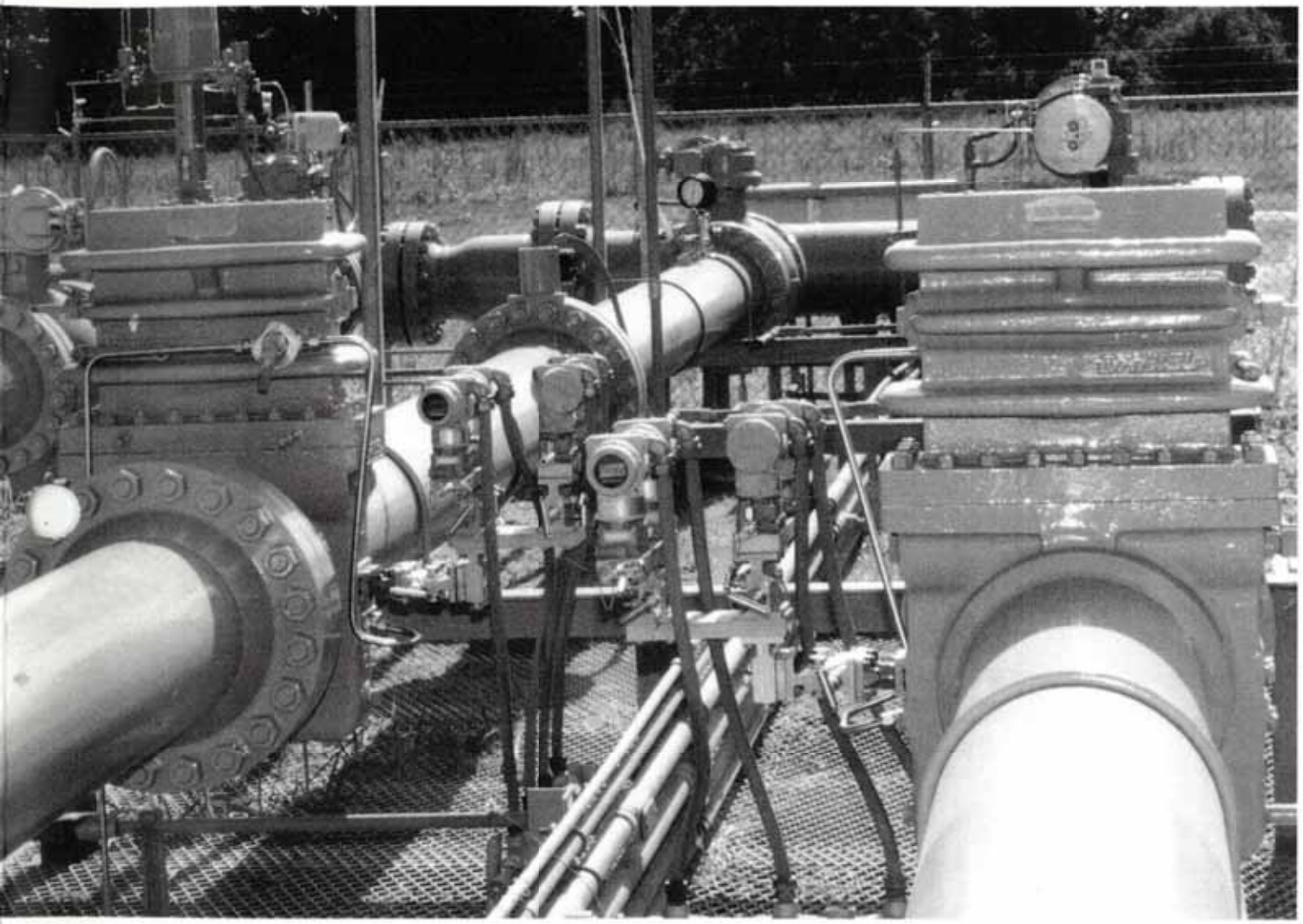
Senior® Orifice Fitting Technical Guide



DANIEL®
www.daniel.com

EMERSON
Process Management

Daniel Senior® Orifice Fitting

This fitting provides a fast, safe and extremely simple method of changing orifice plates under pressure without interrupting line flow. It eliminates costly by-passes, valves and other fittings required with conventional orifice flange installations.

Available in 2" through 48" line sizes, up to Daniel 2500 flanged, and 10,000 psi (68958 kPa).

Meets all requirements and recommendations for accurate flow measurement of gas and liquid, including AGA 14.3 requirements without compromise; full beta range; no uncertainty needs to be added to published values. AGA 14.3 retrofit available. "Soft Seal" option available for ultra-tight sealing of gas products such as ethylene.

DANIEL SENIOR® ORIFICE FITTING CATALOG NUMBERING SYSTEM

6" (6.065) 01 5 DSC "A"

NOMINAL LINE SIZE

INTERNAL DIAMETER

FITTING STYLE
- 01 Raised Face Flangnek™
- 10 Raised Face Flanged
- 18 Welding Neck
- 014 Ring Joint Flangnek™
- 14 Ring Joint Flanged

Daniel
- 1 150#
- 3 300#
- 5 600#
- 6 900#
- 7 1500#
- 8 2500#

ORIFICE PLATE SEAL MATERIAL
- DSC Removable Dual Seal*(up to 10")
- 3DVS Dual Vulcanized Seal*(12" and up)
- TSC Removable Teflon Seal (up to 24")
- MSC Removable Metal Seal (up to 24")
- SNC Removable Snap Seal*(up to 20")

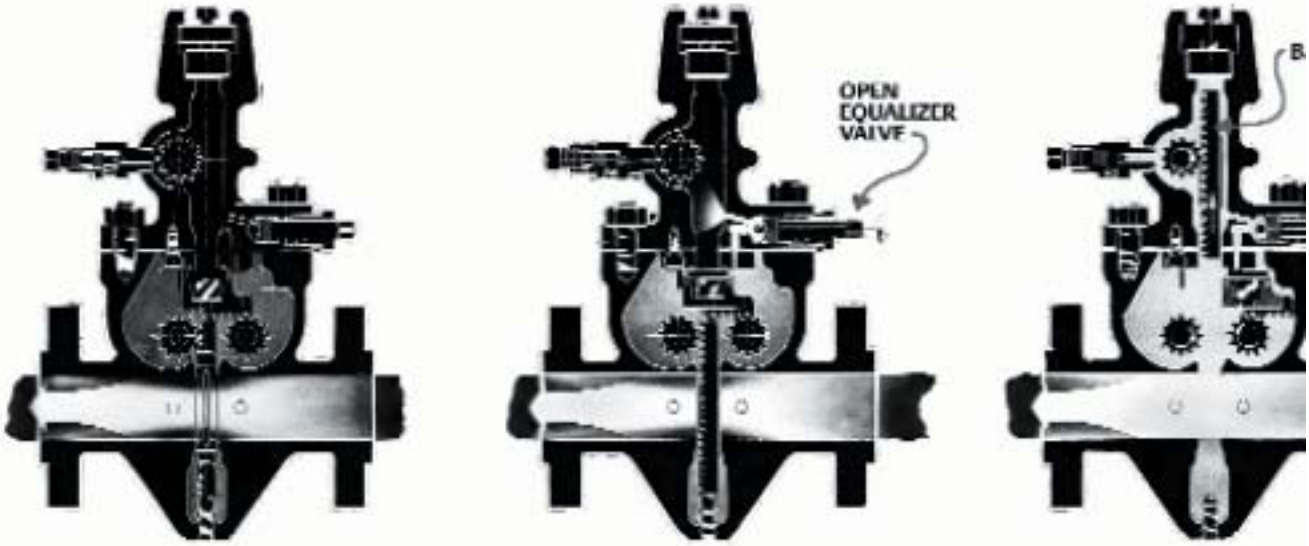
INTERNAL TRIM MATERIAL
- "A" Standard
- "AASG" Sour Gas/Corrosive Service
- NACE

WHEN ORDERING, PLEASE SPECIFY:
1. Catalog Number
2. Plate Material
3. Plate Bore(s)
4. Quantity

*Patented

Note: All products and components are subject to change without notice in a continuing effort of product improvement.

Operational sequence of removing an orifice plate under pres



1.UNDER FLOW CONDITIONS

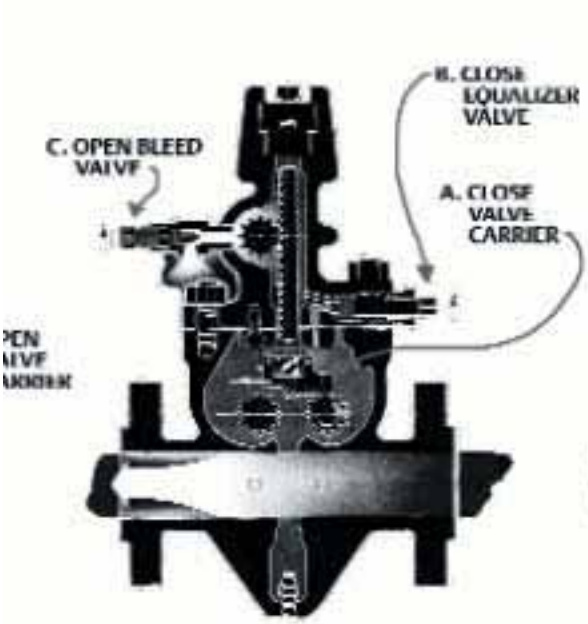
2. EQUALIZE PRESSURE

3. RAISE ORIFICE PI

Flanged

Flangnek™

Weldnek™



4. BLEED TOP CHAMBER
& LUBRICATE VALVE SEAT

5. REMOVE ORIFICE PLATE

THE VALVE SEAT AND THE VALVE S
ARE FIELD-REPLACEABLE OR
REPAIRABLE (RE-LAPPING) WITHOU
REMOVING THE FITTING FROM THE
LINE, REDUCING DOWN-TIME.

CAUTION: THIS OPERATIONAL SEQUENCE I
REPRESENTATIONAL ONLY AND IS NOT INTEND
FOR USE AS A FIELD GUIDE TO OPERATION.
ALWAYS READ & FOLLOW THE DETAILED OPER
INSTRUCTIONS PROVIDED WITH EACH FITTING
BEFORE ATTEMPTING TO OPERATE.

Special Features

Orifice Plate Sealing Units, designed and patented by Daniel, give positive seal between orifice plate and body seats. Available for a variety of services.

Plate Carrier protects orifice plate at all times while inserting or removing from fitting.

Top Outside Guide Brackets with pinion and roller assembly are standard equipment on 18-inch and larger Senior Orifice Fittings. Orifice plates can be inspected or changed without disengaging plate carrier from pinions.

Indicator Plate clearly shows the position of the slide valve within the fitting.

Teflon Shaft Packing and Centering Rings are standard equipment on all Daniel Senior Orifice U.C. Fittings in all sizes and ratings.

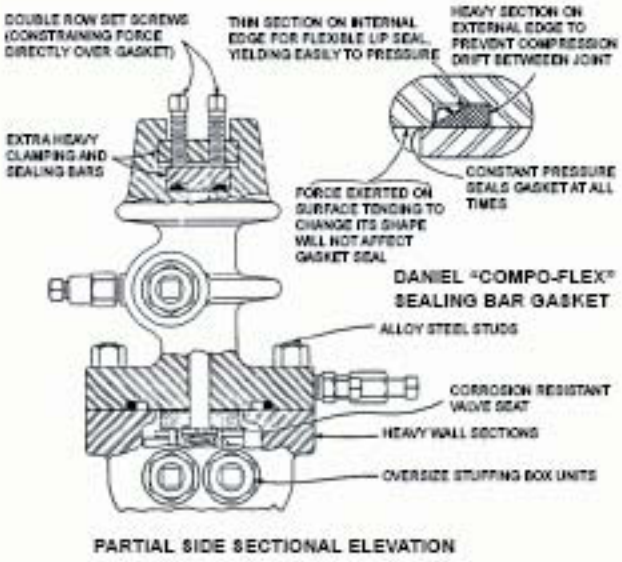
Fittings up to and including 12" line size can op a vertical down flow condition or positioned in horizontal flow for side opening.

Compact Design requires minimum operating s

All Daniel Senior Orifice Fittings are designed manufactured to meet latest API/AGA recommendations, and in strict accordance with A.S.T.M. specifications.

Special Features

High Pressure Fittings



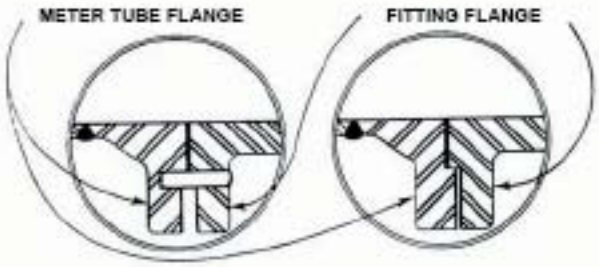
Daniel 1500
Daniel 2500 (See Note A)

The drawing above shows in detail the extra-heavy construction of the wall sections and essential parts on the Daniel 1500 Senior Orifice Fitting.

NOTE: Body/Top Gasket-peroxide cured Nitrile O-ring for Daniel 1500 Orifice Fittings. Male and female gasket joint with Parker seal gaskets for Daniel 2500 Orifice Fitting.

"TS" (All-Teflon) Orifice Plate Sealing Unit is standard in Daniel 900, 1500, and 2500 fittings.

Daniel Method of Aligning Meter Tube Flange to Orifice Fitting Flange

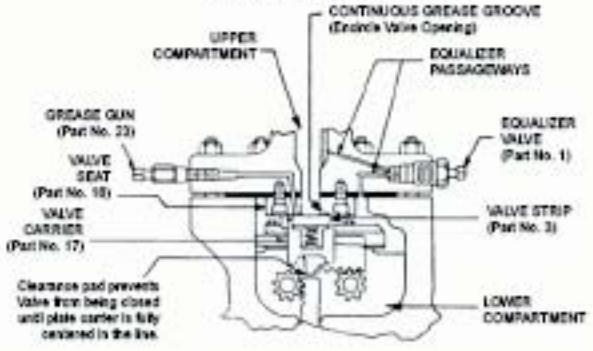


Daniel 125 thru 300 Daniel 400 and higher

On all sizes, Daniel 300 or under, three dowel pin flange-alignment holes are drilled in the flanges.

Daniel 400 or higher, flanges are manufactured with close-tolerance, square-shouldered, large male flange-facing on fitting and large female flange-facing on meter tube to assure proper internal alignment. Flange gaskets are precision-cut so that under compression they will not extend into internal bore of fitting. Refer to engineering drawing above.

SLIDE VALVE DETAIL



In Daniel Senior Orifice Fittings, the valve seat (Part No. 18) is a part of the upper chamber. The valve strip (Part No. 3) moves underneath this seat, thus utilizing line pressure to affect a positive seal. The valve strip is maintained in "floating" position by minimum spring pressure.

Before slide valve is opened, it is lubricated through grease gun (Part No. 23). Pressure is then equalized throughout the entire fitting by operation of the equalizer valve (Part No. 1). Equalized pressure on both sides of the valve strip allows slide valve to move freely without wear. Valve seat and valve strip are ground for tight shut-off and are easily removable for grinding if required.

Standard Specifications

Meter Taps: All Daniel Orifice Fittings are provided with two sets of "Flange Taps," located in accordance with latest API 14.3 (AGA Report #3) recommendations.

Flange Tap Specifications: Flange tap meter connections are ½" N.P.T. Internal tap hole sizes follow latest API 14.3 (AGA Report #3) recommendations. Internal edges of tap holes are free from burrs and square edged.

Line Bore Tolerances: 2-inch and 3-inch sizes, plus or minus .003", 4, 6, 8, 10-inch sizes, plus or minus .004"; 12-inch and 14-inch plus or minus .005". Unless otherwise specified, all fittings are furnished with standard internal line bore as listed in dimensional tables.

Operating Shafts: On sizes 2-inch to 14-inch inclusive, single end operating shafts are standard on left side of fitting when looking downstream. On sizes 16-inch and larger, operating shafts on both sides of fitting are standard.

The Senior Orifice Fitting is composed of two independent compartments separated by a hardened stainless steel slide valve.

Side sectional view below left shows the slide valve in closed position and orifice plate concentric in line of flow. Slide valve cannot be closed unless orifice is concentric to bore of fitting, or in upper chamber during plate removal.

Photo, below right, shows the Daniel top closure in opened position with plate carrier in place for change or inspection of orifice plate. Only a few turns of the speed wrench are required to loosen screws to remove or replace clamping and sealing bars. Set screws always remain in clamping bar. This feature adds greatly to speed and ease of operation.

Plate carrier is raised and lowered by double rack and pinion mechanism with power applied through speed wrench. This method provides the quickest means of operation with the least amount of effort and assures positive control of plate carrier at all times.

All parts, including the essential slide valve assembly, may be replaced or repaired without removing fitting from line.

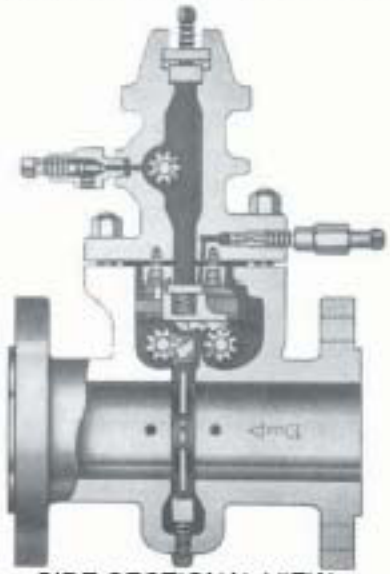
Temperature Units: Standard trim fittings Daniel 150-900 are suitable for -20 to +450°F service. Daniel 1500 and 2500 are suitable for service in -20 to +275°F. However, the Orifice Plate Seal used may limit the service temperatures. Special trims and seals are available for higher or lower temperature service. Please consult factory.

Indicator Plates: Standard on all Senior Orifice Fittings, this plate clearly shows the direction of the open and close position of the Slide Valve.

Operating Wench: A speed wrench is provided with each fitting for quick operation of the shaft and pinions, equalizer valve, grease gun, bleed valve and clamping bar screws.

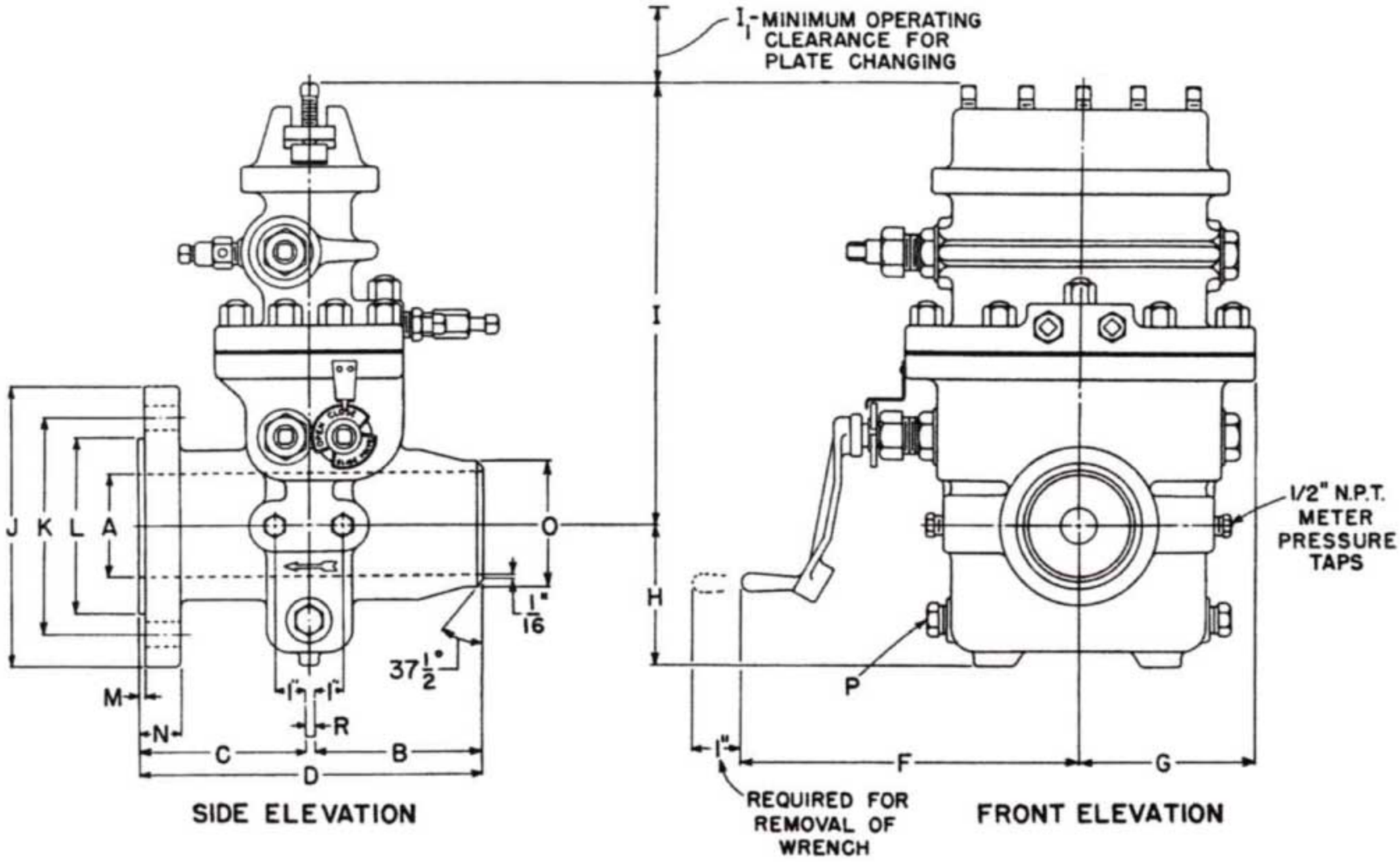
Hydrostatic Testing: All Daniel Senior Orifice U.C. Fittings are hydrostatically tested to 1.5 times operating pressure.

Plate Alignment: The plate carriers in all Senior Orifice Fittings are centered using a fixed three point positioning system. This assures concentricity within the fitting in accordance with the latest API 14.3 (A.G.A. Report #3).



SIDE SECTIONAL VIEW

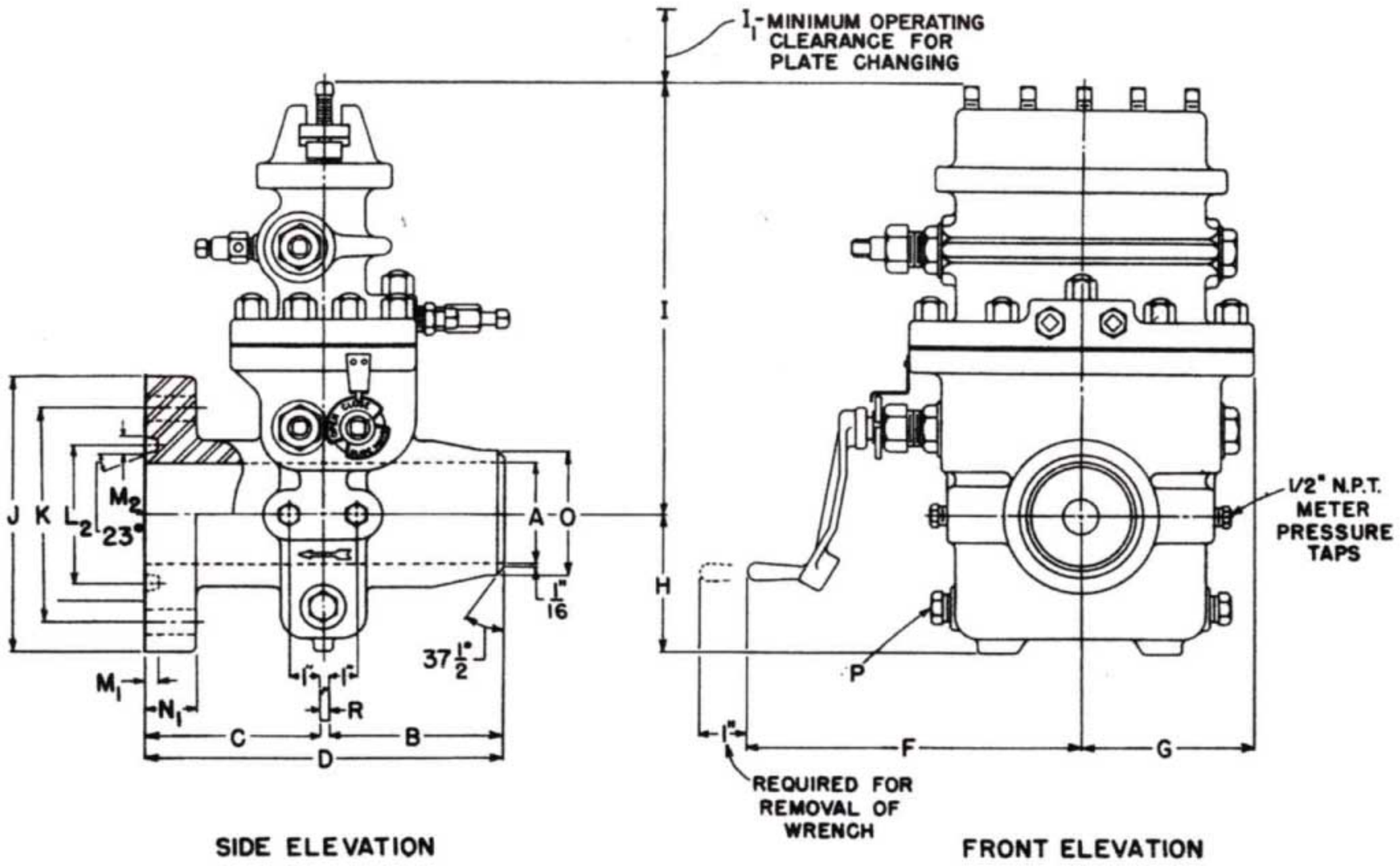
FLANGNEK™ - RAISED FACE
2"-14" Daniel 150-900



	Diam. Internal Line Bore	Upstream Face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter fo Flange	Diameter of Bolt Circle	Diameter of Raised Face +.000 -.005	Height of Raised Face	Flange Thickness	Number and Diameter of Bolts or Studs (Per Flange)	Length of Bolts (Sq. Head with Hex. Nut)	Length of Bolt-Studs with 2 Hex. Nuts	Diameter of Hub at Point of Welding	Size of Drain Plugs	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE	A	B	C	D	F	G	H	I	I1	J	K	L	M	N				O	P	R		SIZE
Catalog No. 011DS-Daniel 150 -Dual Seal																						
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6	4 3/4	3 5/8	1/16	3/4	4- 5/8	2 3/4	3 1/4	2.375	1/2	1/8	100	2
3	3.068	5 5/16	5 5/16	10 3/4	13 3/4	5 3/8	4	14 1/2	6 1/16	7 1/2	6	5	1/16	15/16	4- 5/8	3	3 3/4	3.500	1/2	1/8	140	3
4	4.026	5 7/16	5 7/16	11	14 1/8	5 7/8	4 1/2	15 3/4	7	9	7 1/2	6 3/16	1/16	15/16	8- 5/8	3	3 3/4	4.500	3/4	1/8	185	4
6	6.065	5 9/16	5 9/16	11 1/4	15 1/2	6 3/4	5 1/2	18 3/4	9	11	9 1/2	8 1/2	1/16	1	8- 3/4	3 1/4	4	6.625	3/4	1/8	265	6
8	8.071	6 1/8	6 1/8	12 1/2	16 1/2	8	6 3/4	21 3/4	11	13 1/2	11 3/4	10 5/8	1/16	1 1/8	8- 3/4	3 1/2	4 1/4	8.625	3/4	1/4	345	8
10	10.136	6 3/8	6 3/8	13	17 3/8	9	8	24 7/8	13 1/8	16	14 1/4	12 3/4	1/16	1 3/16	12- 7/8	3 3/4	4 3/4	10.750	3/4	1/4	465	10
12	12.090	7 3/8	6 3/8	14	18 7/8	10 3/4	9 1/2	28	15	19	17	15	1/16	1 1/4	12- 7/8	4	4 3/4	12.750	3/4	1/4	655	12
14	13.250	7 3/8	7 3/8	15	20 1/8	11	10 1/2	31 5/8	17	21	18 3/4	16 1/4	1/16	1 3/8	12- 1 1/8	4 1/4	5 1/2	14.000	3/4	1/4	945	14
Catalog No. 013DS-Daniel 300 -Dual Seal																						
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6 1/2	5	3 5/8	1/16	7/8	8- 5/8	3	3 1/2	2.375	1/2	1/8	100	2
3	3.068	5 1/2	5 1/2	11 1/8	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	5	1/16	1 1/8	8- 3/4	3 1/2	4 1/4	3.500	1/2	1/8	150	3
4	4.026	6 1/4	5 5/8	12	14 1/8	5 7/8	5	15 3/4	7	10	7 1/8	6 3/16	1/16	1 1/4	8- 3/4	3 3/4	4 1/2	4.500	3/4	1/8	200	4
6	6.065	615/16	6 15/16	14	15 1/2	7	6 1/4	18 3/4	9	12 1/2	10 5/8	8 1/2	1/16	1 7/16	12- 3/4	4 1/4	4 3/4	6.625	3/4	1/8	330	6
8	8.071	6 7/8	6 7/8	14	16 1/2	8	7 1/2	21 3/4	11	15	13	10 5/8	1/16	1 5/8	12- 7/8	4 3/4	5 1/2	8.625	3/4	1/4	480	8
10	10.136	8 1/8	7 1/8	15 1/2	17 3/8	9	8 3/4	24 7/8	13 1/8	17 1/2	15 1/4	12 3/4	1/16	1 7/8	16- 1	5 1/4	6 1/4	10.750	3/4	1/4	615	10
12	12.090	8 7/8	7 7/8	17	18 7/8	10 3/4	10 1/4	28	15	20 1/2	17 3/4	15	1/16	2	16- 1 1/8	5 3/4	6 3/4	12.750	3/4	1/4	1110	12
14	13.250	9 3/8	9 3/8	19	20 1/8	11	11 1/2	31 5/8	17 9/16	23	20 1/4	16 1/4	1/16	2 1/8	20- 1 1/8	6	7	14.000	3/4	1/4	1105	14
Catalog No.15DS-Daniel 600 -Dual Seal																						
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6	5	3.625	1/4	1 1/4	8- 5/8	....	4 1/4	2.375	1/2	1/8	105	2
3	3.068	6 15/16	6 15/16	14	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	5.000	1/4	1 1/2	8- 3/4	....	5	3.500	1/2	1/8	160	3
4	4.026	6 9/16	6 9/16	13 1/4	14 1/8	6 1/8	5 3/8	15 3/4	7	10 3/4	8 1/2	6.188	1/4	1 3/4	8- 7/8	....	5 3/4	4.500	3/4	1/8	265	4
6	6.065	7 15/16	7 15/16	16	15 1/2	7	7	18 3/4	9	14	11 1/2	8.500	1/4	2 1/8	12- 1	....	6 3/4	6.625	3/4	1/8	400	6
8	7.981	8 5/8	8 5/8	17 1/2	16 1/2	8	8 1/4	21 3/4	11	16 1/2	13 3/4	10.625	1/4	2 7/16	12- 1 1/8	....	7 3/4	8.625	3/4	1/4	595	8
10	10.020	9	8	17 1/4	17 3/8	9	10	24 7/8	13 1/8	20	17	12.750	1/4	2 3/4	16- 1 1/4	....	8 1/2	10.750	3/4	1/4	745	10
12	11.938	9 13/16	8 13/16	18 7/8	18 7/8	10 3/4	11	28	15	22	19 1/4	15.000	1/4	2 7/8	20- 1 1/4	....	8 3/4	12.750	3/4	1/4	1215	12
14	13.125	10 1/4	10 1/4	20 3/4	20 1/8	11 7/8	11 7/8	31 5/8	17 9/16	23 3/4	20 3/4	16.250	1/4	3	20- 1 3/8	....	9 1/2	14.000	3/4	1/4	1475	14
Catalog No.016TS-Daniel 900 -Teflon Seal																						
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3.625	1/4	1 3/4	8- 7/8	....	5 3/4	2.375	1/2	1/8	205	2
3	†	6 15/16	6 15/16	14	13 3/4	5 3/8	4 3/4	14 1/2	6 1/16	9 1/2	7 1/2	5.000	1/4	1 3/4	8- 7/8	....	5 3/4	3.500	1/2	1/8	215	3
4	†	7 13/16	7 1/16	15	14 1/8	6 1/8	5 3/4	15 3/4	7	11 1/2	9 1/4	6.188	1/4	2	8- 1 1/8	....	6 3/4	4.500	3/4	1/8	300	4
6	†	8 9/16	7 15/16	16 5/8	15 1/2	7	7 1/2	18 3/4	9	15	12 1/2	8.500	1/4	2 7/16	12- 1 1/8	....	7 3/4	6.625	3/4	1/8	490	6
8	†	9 1/16	9 1/16	18 3/8	17 1/4	9 1/8	9 1/4	21 3/4	11	18 1/2	15 1/2	10.625	1/4	2 3/4	12- 1 3/8	....	8 3/4	8.625	3/4	1/4	1095	8
10	†	10 13/16	10 13/16	21 7/8	18 3/8	11	10 3/4	24 7/8	13 1/8	21 1/2	18 1/2	12.750	1/4	3	16- 1 3/8	....	9 1/4	10.750	3/4	1/4	1555	10
12	†	11 9/16	11 9/16	23 3/8	20 3/8	12	12	28	15	24	21	15.000	1/4	3 3/8	20- 1 3/8	....	10	12.750	3/4	1/4	1935	12
14	†	11 1/16	11 1/16	22 3/8	21	12 3/8	12 3/16	31 11/16	17 9/16	25 1/4	22	16.250	1/4	3 5/8	20- 1 1/2	....	11 1/4	14.000	3/4	1/4	2115	14

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel # 900 contain "DVS" Seal Vulcanized to plate.

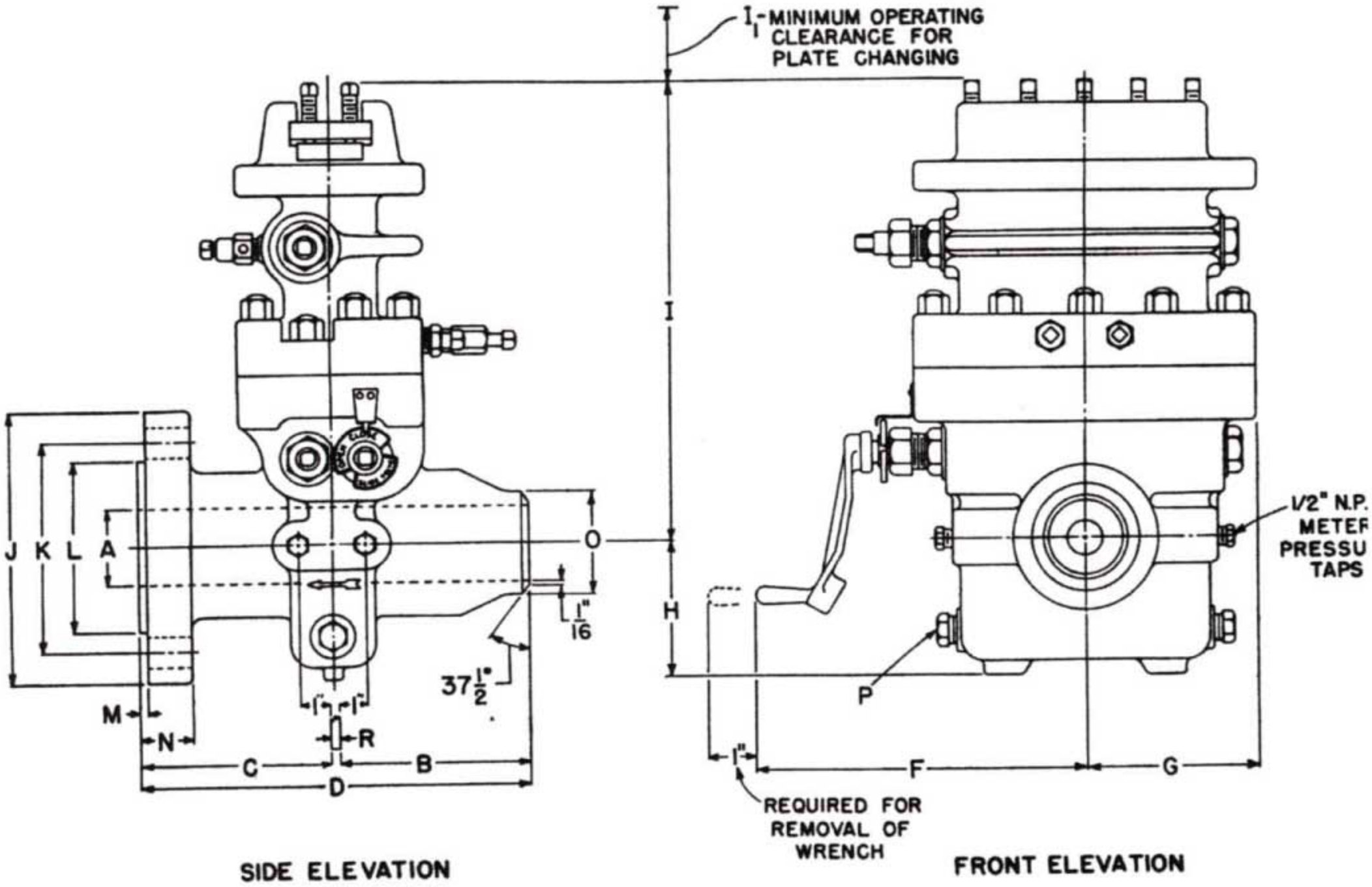
FLANGNEK™ - RING JOINT
2"-14" Daniel 600 & 900



	A.P.I. Ring Number	Diam. Internal Line Bore	Upstream Face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter of Flange	Diameter of Bolt Circle	Pitch Diameter of Ring and Groove	Depth of Groove	Width of Groove	Flange Thickness	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Diameter of Hub at Point of Welding	Size of Drain Plug	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE		A	B	C	D	F	G	H	I	I1	J	K	L2	M1	M2	N1			O	P	R		SIZE
Catalog No. 0145DS-Daniel 600 -Dual Seal																							
2	R-23	2.067	5 5/16	5 5/16	10 3/4	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6 1/2	5	3 1/4	5/16	15/32	1 5/16	8- 5/8	4 1/2	2.375	1/2	1/8	105	2
3	R-31	3.068	7	7	14 1/8	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	4 7/8	5/16	15/32	1 9/16	8- 3/4	5 1/4	3.500	1/2	1/8	160	3
4	R-37	4.026	6 5/8	6 5/8	13 3/8	14 1/8	6 1/8	5 3/8	15 3/4	7	10 3/4	8 1/2	5 7/8	5/16	15/32	1 13/16	8- 7/8	6	4.500	3/4	1/8	265	4
6	R-45	6.065	8	8	16 1/8	15 1/2	7	7	18 3/4	9	14	11 1/2	8 5/16	5/16	15/32	2 3/16	12- 1	7	6.625	3/4	1/8	400	6
8	R-49	7.981	8 11/16	8 11/16	17 5/8	16 1/2	8	8 1/4	21 3/4	11	16 1/2	13 3/4	10 5/8	5/16	15/32	2 1/2	12- 1 1/8	8	8.625	3/4	1/4	595	8
10	R-53	10.020	9 1/16	8 1/16	17 3/8	17 3/8	9	10	24 7/8	13 1/8	20	17	12 3/4	5/16	15/32	2 13/16	16- 1 1/4	8 3/4	10.750	3/4	1/4	745	10
12	R-59	11.938	9 7/8	8 7/8	19	18 7/8	10 3/4	11	28	15	22	19 1/4	15	5/16	15/32	2 15/16	12- 1 1/4	9	12.750	3/4	1/4	1215	12
14	R-61	13.125	10 5/16	10 5/16	20 7/8	20 1/8	11 7/8	11 7/8	31 5/8	17 9/16	23 3/4	20 3/4	16 1/2	5/16	15/32	3 1/16	20- 1 3/8	9 3/4	14.000	3/4	1/4	1475	14
Catalog No. 0146TS-Daniel 900 -Teflon Seal																							
2	R-24	†	7	7	14 1/8	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3 3/4	5/16	15/32	1 13/16	8- 7/8	6	2.375	1/2	1/8	205	2
3	R-31	†	7	7	14 1/8	13 3/4	5 3/8	4 3/4	14 1/2	6 1/16	9 1/2	7 1/2	4 7/8	5/16	15/32	1 13/16	8- 7/8	6	3.500	1/2	1/8	215	3
4	R-37	†	7 7/8	7 1/8	15 1/8	14 1/8	6 1/8	5 3/4	15 3/4	7	11 1/2	9 1/4	5 7/8	5/16	15/32	2 1/16	8- 1 1/8	7	4.500	3/4	1/8	300	4
6	R-45	†	8 5/8	8	16 3/4	15 1/2	7	7 1/2	18 3/4	9	15	12 1/2	8 1/3	5/16	15/32	2 1/2	12- 1 1/8	8	6.625	3/4	1/8	490	6
8	R-49	†	9 1/8	9 1/8	18 1/2	17 1/4	9 1/8	9 1/4	21 3/4	11	18 1/2	15 1/2	10 5/8	5/16	15/32	2 13/16	12- 1 3/8	9	8.625	3/4	1/4	1095	8
10	R-53	†	10 7/8	10 7/8	22	18 3/8	11	10 3/4	24 7/8	13 1/8	21 1/2	18 1/2	12 3/4	5/16	15/32	3 1/16	16- 1 3/8	9 1/2	10.750	3/4	1/4	1555	10
12	R-57	†	11 5/8	11 5/8	23 1/2	20 3/8	12 1/4	12	28	15	24	21	15	5/16	15/32	3 7/16	20- 1 3/8	10 1/4	12.750	3/4	1/4	1935	12
14	R-62	†	11 1/16	11 1/4	22 9/16	21	12 1/8	12 13/16	31 11 /16	17 9/16	25 1/4	22	16 1/2	7/16	21/32	3 13/16	20- 1 1/2	11 3/4	14.000	3/4	1/4	2115	14

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel 900 contain "DVS" Seal Vulcanized to plate.

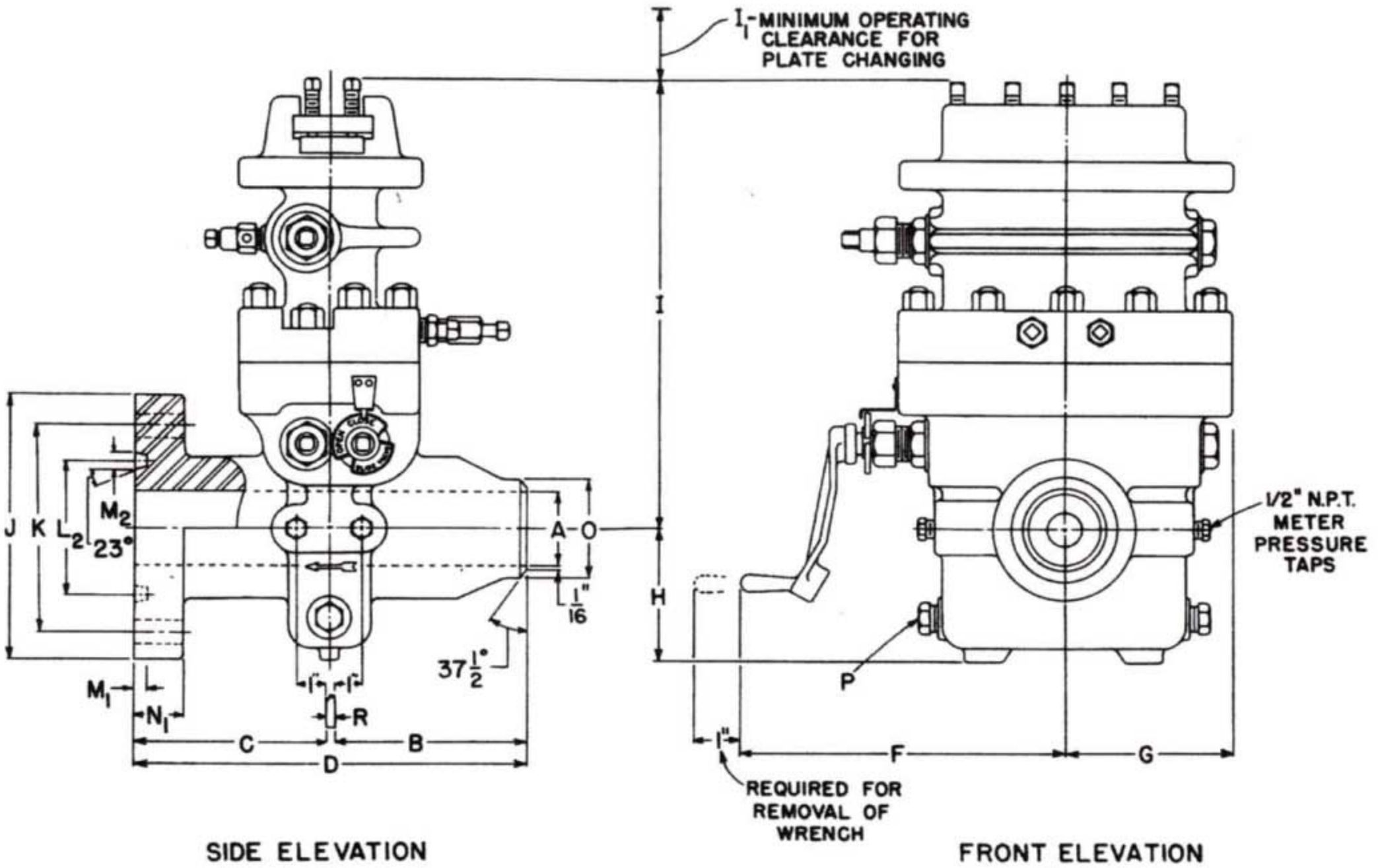
FLANGNEK™ - RAISED FACE
2"-12" Daniel 1500 & 2"- 6" Daniel 2500



	Diam. Internal Line Bore	Upstream Face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter of Flange	Diameter of Bolt Circle	Diameter of Raised Face +.000 -.005	Height of Raised Face	Flange Thickness	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Diameter of Hub at Point of Welding	Size of Drain Plugs	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE	A	B	C	D	F	G	H	I	I1	J	K	L	M	N			O	P	R		SIZE
Catalog No. 017-TS-Daniel 1500 -Teflon Seal																					
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3.625	1/4	1 3/4	8- 7/8	5 3/4	2.375	1/2	1/8	205	2
3	†	8 3/16	7 11/16	16	13 3/4	5 5/8	5 1/4	14 7/8	6 1/16	10 1/2	8	5.000	1/4	2 1/8	8- 1 1/4	7	3.500	1/2	1/8	275	3
4	†	8 3/8	7 7/8	16 3/8	15	6 1/2	6 1/8	16 1/8	7	12 1/4	9 1/2	6.188	1/4	2 3/8	8- 1 1/4	7 3/4	4.500	3/4	1/8	445	4
6	†	10 3/4	10 3/16	21 1/16	16	7 3/4	7 3/4	19 1/8	9	15 1/2	12 1/2	8.500	1/4	3 1/2	12- 1 3/8	10 1/4	6.625	3/4	1/8	710	6
8	†	11 23/32	11 5/32	23 1/8	17 1/4	9 3/4	9 1/2	22 1/8	11	19	15 1/2	10.625	1/4	3 7/8	12- 1 5/8	11 1/2	8.625	3/4	1/4	1240	8
10	†	12 5/16	12 5/16	24 4/8	18 3/8	11	11 1/2	26	13 1/8	23	19	12.750	1/4	4 1/2	12- 1'7/8	13 1/4	10.750	3/4	1/4	1745	10
12	†	13 5/16	13 5/16	26 7/8	20 1/4	12 3/8	13 1/4	28 1/4	15	26 1/2	22 1/2	15.000	1/4	5 1/8	16- 2	14 3/4	12.750	3/4	1/4	2805	12
Catalog No. 018TS-Daniel 2500 -Teflon Seal																					
2	†	8 5/8	8 5/8	17 3/8	15 1/8	7 1/4	6	16 7/8	7	9 1/4	6 3/4	3.625	1/4	2 1/4	8- 1	7	2.375	1/2	1/8	520	2
3	†	9 9/16	9 9/16	19 1/4	15 1/8	7 1/4	6	16 7/8	7	12	9	5.000	1/4	2 7/8	8- 1 1/4	8 3/4	3.500	1/2	1/8	575	3
4	†	10 1/2	10 1/2	21 1/8	16 1/4	7 3/4	7	17	7 3/8	14	10 3/4	6.188	1/4	3 1/4	8- 1 1/2	10	4.500	3/4	1/8	715	4
6	†	12 1/2	12 1/2	25 1/8	17 1/2	9 1/2	9 1/2	19 1/8	9	19	14 1/2	8.500	1/4	4 1/2	8- 2	13 3/4	6.625	3/4	1/8	1195	6

† To be specified by purchaser.

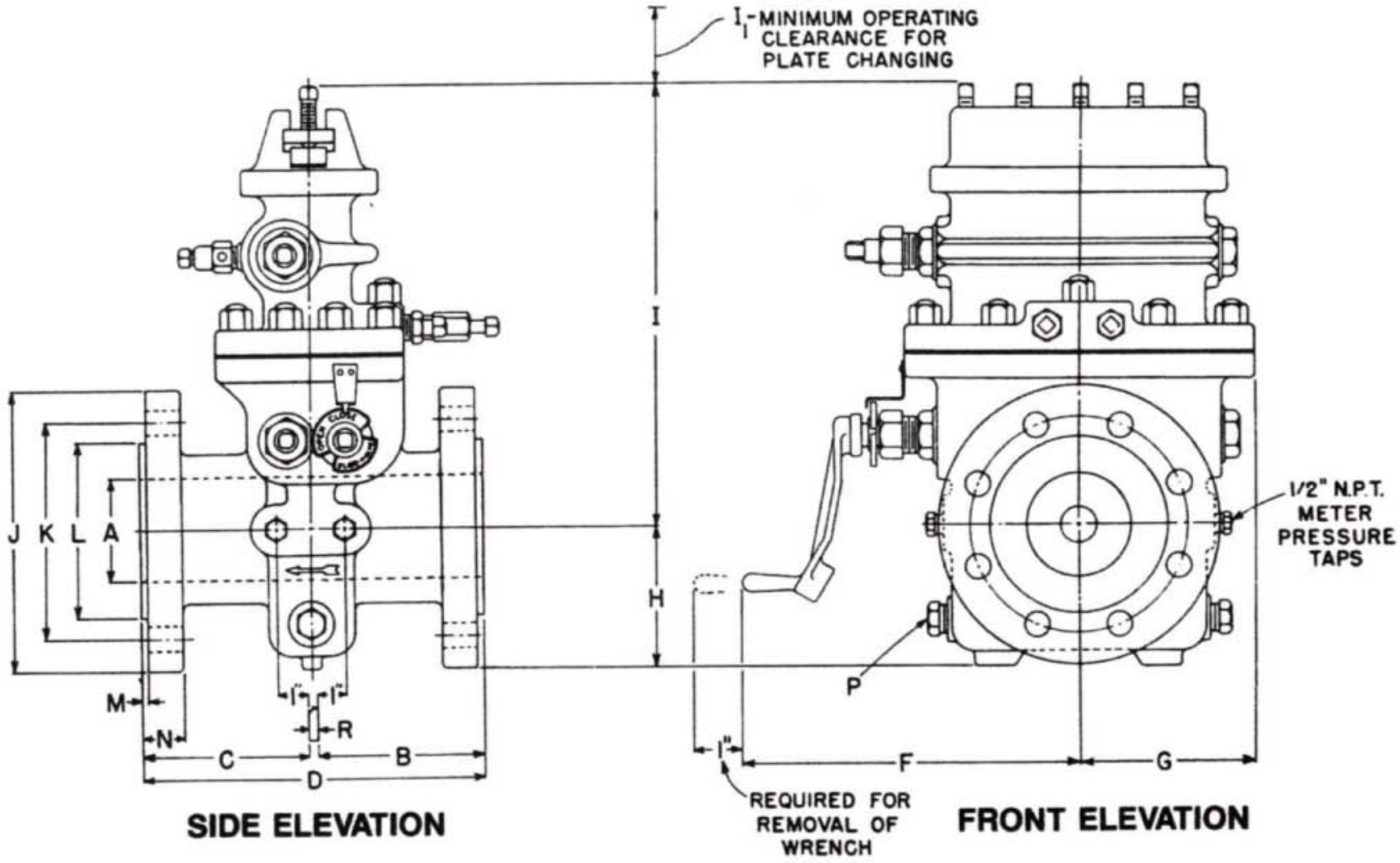
FLANGNEK™ - RING JOINT
2"-12" Daniel 1500 & 2"- 6" Daniel 2500



SIZE	A.P.I. Ring Number	Diam. Internal Line Bore A	Upstream Face of Orifice Plate to Face of End B	Downstream Face of Orifice Plate to Face of End C	Overall Face to Face D	Operating Clearance From Center F	Body Clearance From Center G	Centerline to Bottom H	Centerline to Top I	Clearance for Plate Changing I1	Diameter of Flange J	Diameter of Bolt Circle K	Pitch Diameter of Ring and Groove L2	Depth of Groove M1	Width of Groove M2	Flange Thickness N1	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Diameter of Hub at Point of Welding O	Size of Drain Plug P	Orifice Plate Thickness R	Approximate Weight (Pounds)	SIZE
Catalog No. 0147-TS-Daniel 1500 -Teflon Seal																							
2	R-24	†	7	7	14 1/8	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3 3/4	5/16	15/32	1 3/16	8- 7/8	6	2.375	1/8	1/8	205	2
3	R-35	†	8 1/4	7 3/4	16 1/8	13 3/4	5 5/8	5 1/4	14 7/8	6 1/16	10 1/2	8	5 3/8	5/16	15/32	2 3/16	8- 1 1/8	7 1/4	3.500	1/2	1/8	275	3
4	R-39	†	8 7/16	7 15/16	16 1/2	15	6 1/2	6 1/8	16 1/8	7	12 1/4	9 1/2	6 3/8	5/16	15/32	2 7/16	8- 1 1/4	8	4.500	3/4	1/8	445	4
6	R-46	†	10 7/8	10 5/16	21 5/16	16 1/8	7 3/4	7 3/4	19 1/8	9	15 1/2	12 1/2	8 5/16	3/8	17/32	3 5/8	12- 1 3/8	10 1/2	6.625	3/4	1/8	710	6
8	R-50	†	11 29/32	11 11/32	23 1/2	17 1/4	9 3/4	9 1/2	22 1/8	11	19	15 1/2	10 5/8	7/16	21/32	4 1/16	12- 1/5/8	12	8.625	3/4	1/4	1240	8
10	R-54	†	12 1/2	12 1/2	25 1/4	18 3/8	11	11 1/2	26	13 1/8	23	19	12 3/4	7/16	21/32	4 11/16	12- 1 7/8	13 3/4	10.750	3/4	1/4	1745	10
12	R-58	†	13 5/8	13 5/8	27 1/2	20 1/4	12 3/8	13 1/4	28 1/4	15	26 1/2	22 1/2	15	9/16	29/32	5 7/16	16- 2	15 1/4	12.750	3/4	1/4	2805	12
Catalog No. 0148-TS-Daniel 2500 -Teflon Seal																							
2	R-26	†	8 11/16	8 11/16	17 1/2	15 1/8	7 1/4	6	16 7/8	7	9 1/4	6 3/4	4	5/16	15/32	2 5/16	8- 1	7 1/4	2.375	1/2	1/8	520	2
3	R-32	†	9 11/16	9 11/16	19 1/2	15 1/8	7 1/4	6	16 7/8	7	12	9	5	3/8	17/32	3	8- 1 1/4	9	3.500	1/2	1/8	575	3
4	R-38	†	10 11/16	10 11/16	21 1/2	16 1/4	7 3/4	7	17	7 3/8	14	10 3/4	6 3/16	7/16	21/32	3 7/16	8- 1 1/2	10 1/2	4.500	3/4	1/8	715	4
6	R-47	†	12 3/4	12 3/4	25 5/8	17 1/2	9 1/2	9 1/2	19 /18	9	19	14 1/2	9	1/2	25/32	4 3/4	8- 2	14 1/4	6.625	3/4	1/8	1195	6

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel 900 Contain "DVS" Seal Vulcanized to plate.

FLANGED - RAISED FACE
2"-14" Daniel 150 - 900



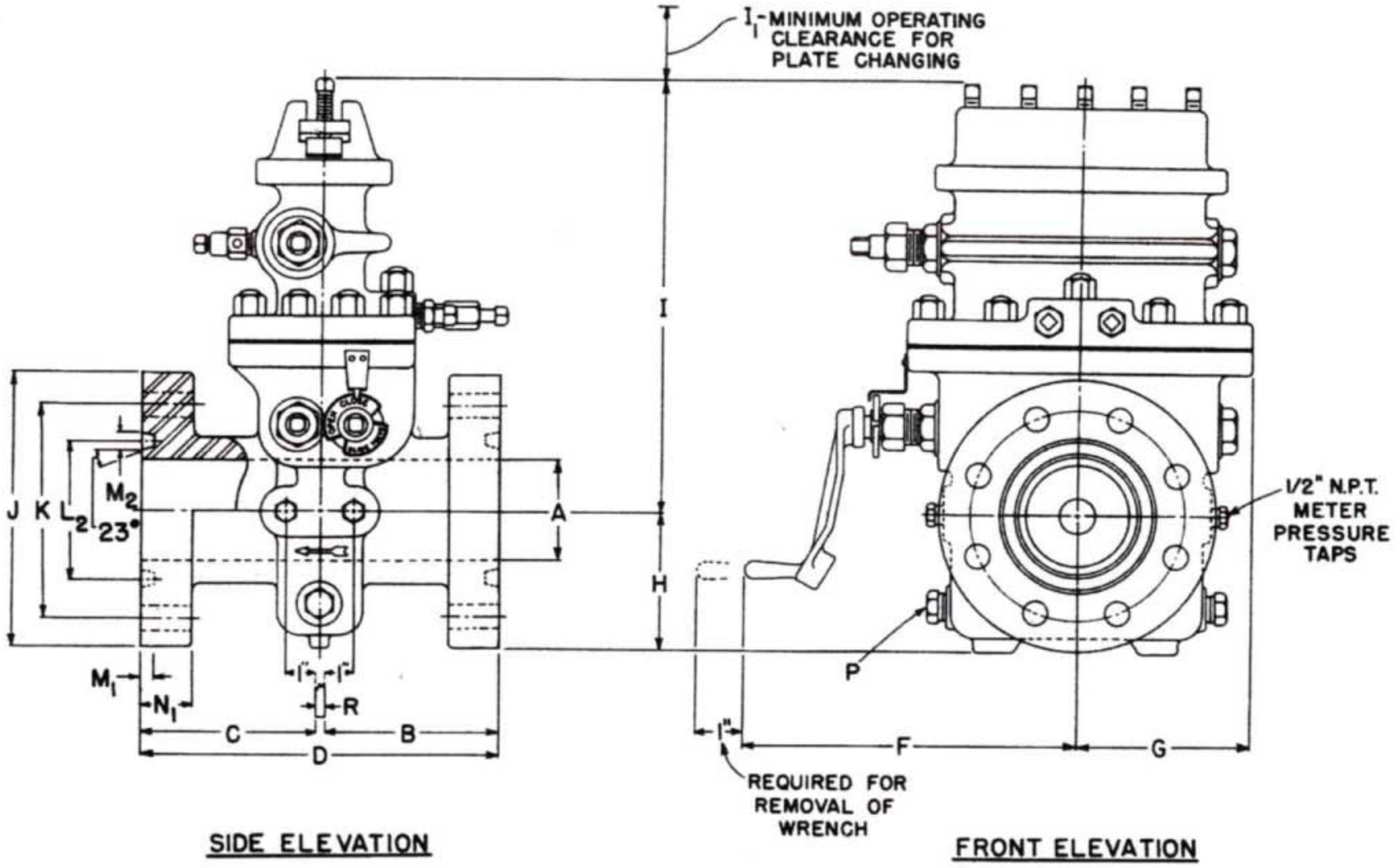
SIDE ELEVATION

FRONT ELEVATION

	Diam. Internal Line Bore	Upstream face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter of Flange	Diameter of Bolt Circle	Diameter of Raised Face +.000 -.005	Height of Raised Face	Flange Thickness	Number and Diameter of Bolts or Studs (per Flange)	Length of Bolts (Sq. Head with Hex. Nut)	Length of Bolt-Studs with 2 Hex. Nuts	Size of Drain Plugs	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE	A	B	C	D	F	G	H	I	I1	J	K	L	M	N				P	R		SIZE
Catalog No. 101DS-Daniel 150 -Dual Seal																					
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6	4 3/4	3 5/8	1/16	3/4	4- 5/8	2 3/4	3 1/4	1/2	1/8	105	2
3	3.068	5 5/16	5 5/16	10 3/4	13 3/4	5 3/8	4	14 1/2	6 1/16	7 1/2	6	5	1/16	15/16	4- 5/8	3	3 3/4	1/2	1/8	150	3
4	4.026	5 7/16	5 7/16	11	14 1/8	5 7/8	4 1/2	15 3/4	7	9	7 1/2	6 3/16	1/16	15/16	8- 5/8	3	3 3/4	3/4	1/8	245	4
6	6.065	5 9/16	5 9/16	11 1/4	15 1/2	6 3/4	5 1/2	18 3/4	8	11	9 1/2	8 1/2	1/16	1	8- 3/4	3 1/4	4	3/4	1/8	285	6
8	8.071	6 1/8	6 1/8	12 1/2	16 1/2	8	6 3/4	21 3/4	11	13 1/2	11 3/4	10 5/8	1/16	1 1/8	8- 3/4	3 1/2	4 1/4	3/4	1/4	375	8
10	10.136	6 3/8	6 3/8	13	17 3/8	9	8	24 7/8	13 1/8	16	14 1/4	12 3/4	1/16	1 3/16	12- 7/8	3 3/4	4 3/4	3/4	1/4	510	10
12	12.090	7 3/8	6 3/8	14	18 7/8	10 3/4	9 1/2	28	15	19	17	15	1/16	1 1/4	12- 7/8	4	4 3/4	3/4	1/4	720	12
14	13.250	7 3/8	7 3/8	15	20 1/8	11	10 1/2	31 5/8	17 9/16	21	18 3/4	16 1/4	1/16	1 3/8	12- 1	4 1/4	5 1/2	3/4	1/4	1030	14
Catalog No. 103DS-Daniel 300 -Dual Seal																					
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6 1/2	5	3 5/8	1/16	7/8	8- 5/8	3	3 1/2	1/2	1/8	110	2
3	3.068	5 1/2	5 1/2	11 1/8	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	5	1/16	1 1/8	8- 3/4	3 1/2	4 1/4	1/2	1/8	165	3
4	4.026	6 1/4	5 5/8	12	14 1/8	5 7/8	5	15 3/4	7	10	7 1/8	6 3/16	1/16	1 1/4	8- 3/4	3 3/4	4 1/2	3/4	1/8	220	4
6	6.065	7 1/4	6 5/8	14	15 1/2	7	6 1/4	18 3/4	8	12 1/2	10 5/8	8 1/2	1/16	1 7/16	12- 3/4	4 1/4	5	3/4	1/8	370	6
8	8.071	6 7/8	6 7/8	14	16 1/2	8	7 1/2	21 3/4	11	15	13	10 5/8	1/16	1 5/8	12- 7/8	4 3/4	5 1/2	3/4	1/4	540	8
10	10.136	8 1/8	7 1/8	15 1/2	17 3/8	9	8 3/4	24 7/8	13 1/8	17 1/2	15 1/4	12 3/4	1/16	1 7/8	16-1	5 1/4	6 1/4	3/4	1/4	695	10
12	12.090	8 7/8	7 7/8	17	18 7/8	10 3/4	10 1/4	28	15	20 1/2	17 3/4	15	1/16	2	16-1 1/8	5 3/4	6 3/4	3/4	1/4	1225	12
14	13.250	9 3/8	9 3/8	19	20 1/8	11	11 1/2	31 5/8	17 9/16	23	20 1/4	16 1/4	1/16	2 1/8	20-1 1/8	6	7	3/4	1/4	1270	14
Catalog No. 105DS-Daniel 600 -Dual Seal																					
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6	5	3.625	1/4	1 1/4	8- 5/8	....	4 1/4	1/2	1/8	115	2
3	3.068	6 15/16	6 15/16	14	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	5.000	1/4	1 1/2	8- 3/4	....	5	1/2	1/8	175	3
4	4.026	6 9/16	6 9/16	13 1/4	14 1/8	6 1/8	5 3/8	15 3/4	7	10 3/4	8 1/2	6.188	1/4	1 3/4	8- 7/8	....	5 3/4	3/4	1/8	300	4
6	6.065	7 15/16	7 15/16	16	15 1/2	7	7	18 3/4	8	14	11 1/2	8.500	1/4	2 1/4	12- 1	....	6 3/4	3/4	1/8	480	6
8	7.981	8 5/8	8 5/8	17 1/2	16 1/2	8	8 1/4	21 3/4	11	16 1/2	13 3/4	10.625	1/4	2 7/16	12-1 1/8	....	7 3/4	3/4	1/4	710	8
10	10.020	9	8	17 1/4	17 3/8	9	10	24 7/8	13 1/8	20	17	12.750	1/4	2 3/4	16-1 1/4	....	8 1/2	3/4	1/4	920	10
12	11.938	9 13/16	8 13/14	18 7/8	18 7/8	10 3/4	11	28	15	22	19 1/4	15.000	1/4	2 7/8	20-1 1/4	....	8 3/4	3/4	1/4	1430	12
14	13.125	10 1/4	10 1/4	20 3/4	20 1/8	11 7/8	11 7/8	31 5/8	17 9/16	23 3/4	20 3/4	16.250	1/4	3	20-1 3/8	....	9 1/2	3/4	1/4	1735	14
Catalog No. 106TS-Daniel 900 -Teflon Seal																					
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3.625	1/4	1 3/4	8- 7/8	....	5 3/4	1/2	1/8	230	2
3	†	6 15/16	6 15/16	14	13 3/4	5 3/8	4 3/4	14 1/2	6 1/16	9 1/2	7 1/2	5.000	1/4	1 3/4	8- 7/8	....	5 3/4	1/2	1/8	245	3
4	†	7 13/16	7 1/16	15	14 1/8	6 1/8	5 3/4	15 3/4	7	11 1/2	9 1/4	6.188	1/4	2	8-1 1/8	....	6 3/4	3/4	1/8	355	4
6	†	8 9/16	7 15/16	16 5/8	15 1/2	7	7 1/2	18 3/4	8	15	12 1/2	8.500	1/4	2 7/16	12-1 1/8	....	7 3/4	3/4	1/8	600	6
8	†	9 1/16	9 1/16	18 3/8	17 1/4	9 1/8	9 1/4	21 3/4	11	18 1/2	15 1/2	10.625	1/4	2 3/4	12-1 3/8	....	8 3/4	3/4	1/4	1265	8
10	†	10 13/16	10 13/16	21 7/8	18 3/8	11	10 3/4	24 7/8	13 1/8	21 1/2	18 1/2	12.750	1/4	3	16-1 3/8	....	9 1/4	3/4	1/4	1800	10
12	†	11 9/16	11 9/16	23 3/8	20 3/8	12	12	28	15	24	21	15.000	1/4	3 3/8	20-1 3/8	....	10	3/4	1/4	2260	12
14	†	11 1/16	11 1/6	22 3/8	21	12 3/8	12 3/16	31 1/16	17 9/16	25 1/4	22	16.750	1/4	3 5/8	20-1 1/2	....	11 1/4	3/4	1/4	2495	14

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel 900 Contain "DVS" Seal Vulcanized to plate.

FLANGED - RING JOINT
2"-14" Daniel 600 & 900



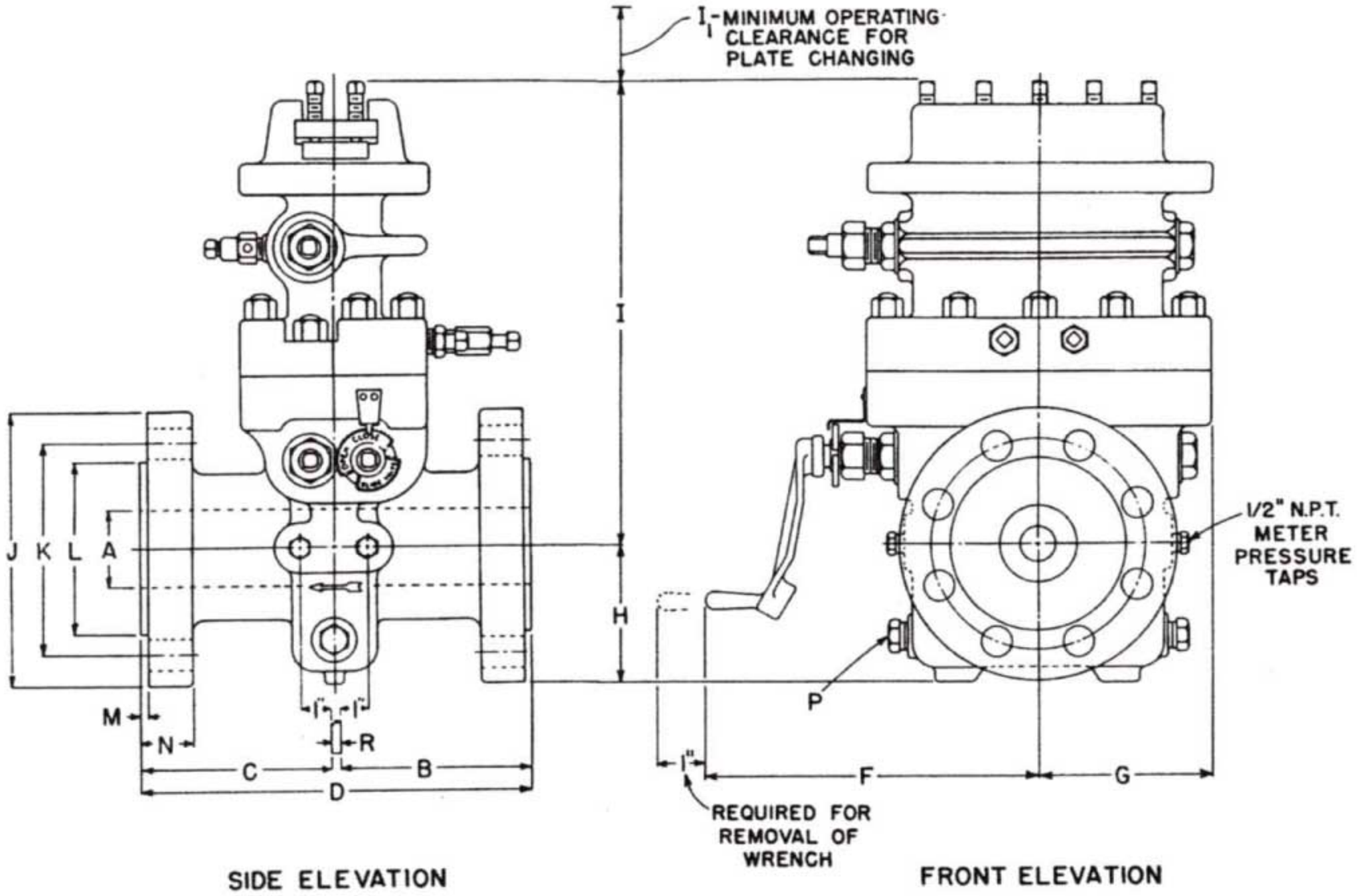
SIDE ELEVATION

FRONT ELEVATION

SIZE	A.P.I. Ring Number	Diam. Internal Line Bore A	Upstream Face of Orifice Plate to Face of End B	Downstream Face of Orifice Plate to Face of End C	Overall Face to Face D	Operating Clearance From Center F	Body Clearance From Center G	Centerling to Bottom H	Centerline to Top I	Clearance for Plate Changing I1	Diameter of Flange J	Diameter of Bolt Circle K	Pitch Diameter of Ring and Groove L2	Depth of Groove M1	Width of Groove M2	Flange Thickness N1	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Size of Drain Plug P	Orifice Plate Thickness R	Approximate Weight (Pounds)	SIZE
Catalog No. 145DS-Daniel 600 -Dual Seal																						
2	R-23	2.067	5 5/16	5 5/16	10 3/4	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	6 1/2	5	3 1/4	5/16	15/32	1 5/16	8- 5/8	4 1/2	1/2	1/8	115	2
3	R-31	3.068	7	7	14 1/8	13 3/4	5 3/8	4 1/8	14 1/2	6 1/16	8 1/4	6 5/8	4 7/8	5/16	15/32	1 9/16	8- 3/4	5 1/4	1/2	1/8	175	3
4	R-37	4.026	6 5/8	6 5/8	13 3/8	14 1/8	6 1/8	5 3/8	15 3/4	7	10 3/4	8 1/2	5 7/8	5/16	15/32	1 13/16	8- 7/8	6	3/4	1/8	300	4
6	R-45	6.065	8	8	16 1/8	15 1/2	7	7	18 3/4	9	14	11 1/2	8 5/16	5/16	15/32	2 3/16	12-1	7	3/4	1/8	480	6
8	R-49	7.981	8 11/16	8 11/16	17 5/8	16 1/2	8	8 1/4	21 3/4	11	16 1/2	13 3/4	10 5/8	5/16	15/32	2 1/2	12-1 1/8	8	3/4	1/4	710	8
10	R-53	10.020	9 9/16	8 1/16	17 3/8	17 3/8	9	10	24 7/8	13 1/8	20	17	12 3/4	5/16	15/32	2 13/16	16-1 1/4	8 3/4	3/4	1/4	920	10
12	R-57	11.938	9 7/8	8 7/8	19	18 7/8	10 3/4	11	28	15	22	19 1/4	15	5/16	15/32	2 15/16	12-1 1/4	9	3/4	1/4	1430	12
14	R-61	13.125	10 5/16	10 5/16	20 7/8	20 1/8	11 7/8	11 7/8	31 5/8	17 9/16	23 3/4	20 3/4	16 1/2	5/16	15/32	3 1/16	20-1 3/8	9 3/4	3/4	1/4	1735	14
Catalog No. 146TS-Daniel 900 -Teflon Seal																						
2	R-24	†	7	7	14 1/8	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3 3/4	5/16	15/32	1 13/16	8- 7/8	6	1/2	1/8	230	2
3	R-31	†	7	7	14 1/8	13 3/4	5 3/8	4 3/4	14 1/2	6 1/16	9 1/2	7 1/2	4 7/8	5/16	15/32	1 13/16	8- 7/8	6	1/2	1/8	245	3
4	R-37	†	7 7/8	7 1/8	15 1/8	14 1/8	6 1/8	5 3/4	15 3/4	7	11 1/2	9 1/4	5 7/8	5/16	15/32	2 1/16	8-1 1/8	7	3/4	1/8	355	4
6	R-45	†	8 5/8	8	16 3/4	15 1/2	7	7 1/2	18 3/4	9	15	12 1/2	8 5/16	5/16	15/32	2 1/2	12-1 1/8	8	3/4	1/8	600	6
8	R-49	†	9 1/8	9 1/8	18 1/2	17 1/4	9 1/8	9 1/4	21 3/4	11	18 1/2	15 1/2	10 5/8	5/16	15/32	2 13/16	12-1 3/8	9	3/4	1/4	1265	8
10	R-53	†	10 7/8	10 7/8	22	18 3/8	11	10 3/4	24 7/8	13 1/8	21 1/2	18 1/2	12 3/4	5/16	15/32	3 1/16	16-1 3/8	9 1/2	3/4	1/4	1800	10
12	R-57	†	11 5/8	11 5/8	23 1/2	20 3/8	12 1/4	12	28	15	24	21	15	5/16	15/32	3 7/16	20-1 3/8	10 1/4	3/4	1/4	2260	12
14	R-62	†	13	12 15/16	26 1/8	21	12 1/8	12 13/16	31 /16	17 9/16	25 1/4	22	16 1/2	7/16	15/32	3 13/16	20-1 1/2	11 3/4	3/4	1/4	2495	14

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel 900 Contain "DVS" Seal Vulcanized to plate.

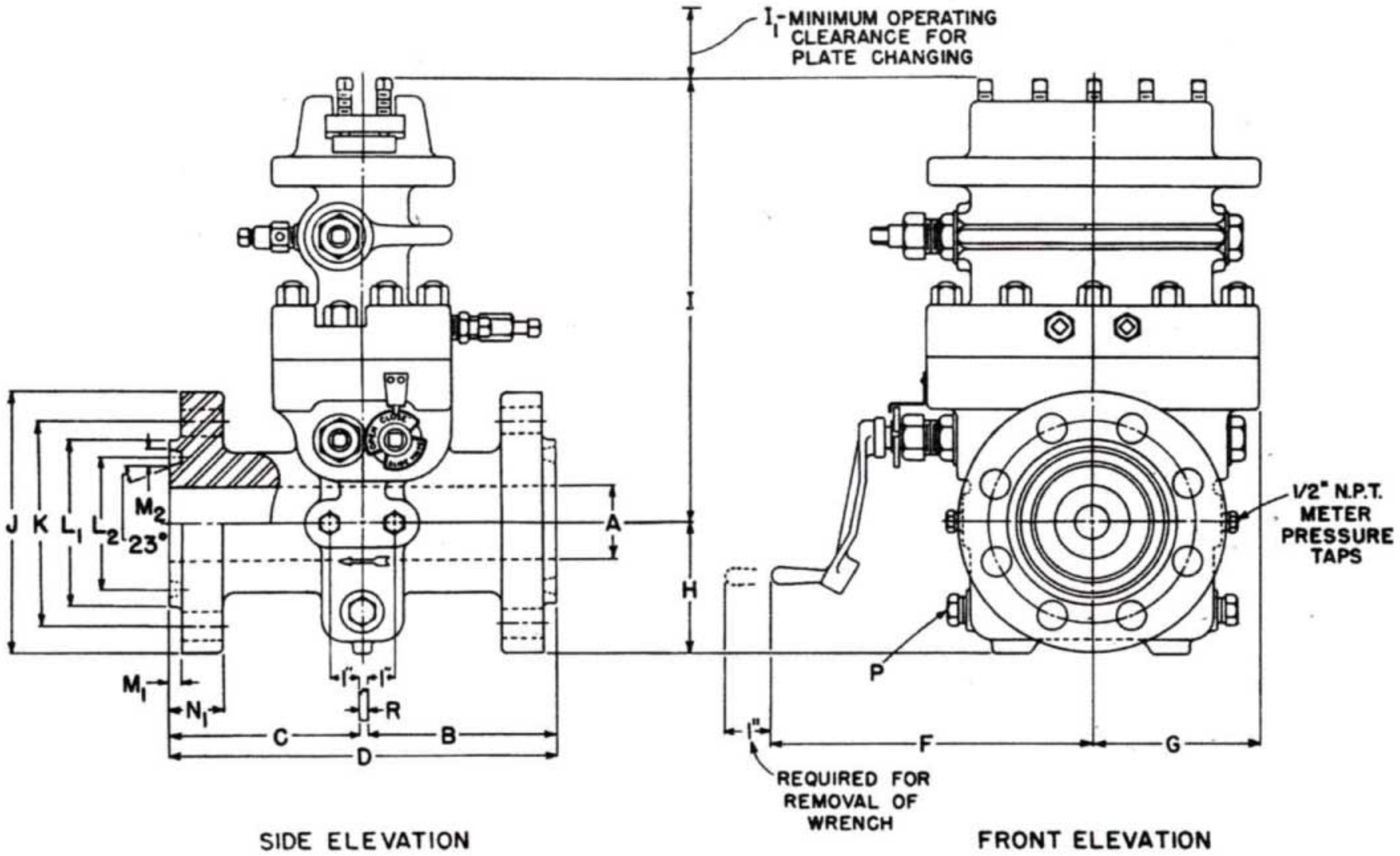
FLANGED - RAISED FACE
2"-12" Daniel 1500 & 2"- 6" Daniel 2500



SIZE	Diam. Internal Line Bore A	Upstream Face of Orifice Plate to Face of End B	Downstream Face of Orifice Plate to Face of End C	Overall Face to Face D	Operating Clearance From Center F	Body Clearance From Center G	Centerline to Bottom H	Centerline to Top I	Clearance for Plate Changing I1	Diameter of Flange J	Diameter of Bolt Circle K	Diameter of Raised Face +.000 -.005 L	Height of Raised Face M	Flange Thickness N	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Size of Drain Plugs P	Orifice Plate Thickness R	Approximate Weight (Pounds)	SIZE
Catalog No. 107-TS-Daniel 1500 -Teflon Seal																				
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3.625	1/4	1 3/4	8- 7/8	5 3/4	1/2	1/8	230	2
3	†	8 3/16	7 11/16	16	13 3/4	5 5/8	5 1/4	14 7/8	6 1/16	10 1/2	8	5.000	1/4	2 1/8	8-1 1/8	7	1/2	1/8	275	3
4	†	8 3/8	7 7/8	16 3/8	15	6 1/2	6 1/8	16 1/8	7	12 1/4	9 1/2	6.188	1/4	2 3/8	8-1 1/4	7 3/4	3/4	1/8	520	4
6	†	10 3/4	10 3/16	21 1/16	16	7 3/4	7 3/4	19 1/8	9	15 1/2	12 1/2	8.500	1/4	3 1/2	12-1 3/8	10 1/4	3/4	1/8	875	6
8	†	11 23/32	11 5/32	23 1/8	17 1/4	9 3/4	9 1/2	22 1/8	11	19	15 1/2	10.625	1/4	3 7/8	12-1 5/8	11 1/2	3/4	1/4	1500	8
10	†	12 5/16	12 5/16	24 7/8	18 3/8	11	11 1/2	26	13 1/8	23	19	12.750	1/4	4 1/2	12-1 7/8	13 1/2	3/4	1/4	2180	10
12	†	13 5/16	13 5/16	26 7/8	20 1/4	12 3/8	13 1/4	28 1/4	15	26 1/2	22 1/2	15.000	1/4	5 1/8	16- 2	14 3/4	3/4	1/4	3470	12
Catalog No. 108-TS-Daniel 2500 -Teflon Seal																				
2	†	8 5/8	8 5/8	17 3/8	15 1/8	7 1/4	6	16 7/8	7	9 1/4	6 3/4	3.625	1/4	2 1/4	8- 1	7	1/2	1/8	560	2
3	†	9 9/16	9 9/16	19 1/4	15 1/8	7 1/4	6	16 7/8	7	12	9	5.000	1/4	2 7/8	8-1 1/4	8 3/4	1/2	1/8	660	3
4	†	10 1/2	10 1/2	21 1/8	16 1/4	7 3/4	7	17	7 3/8	14	10 3/4	6.188	1/4	3 1/4	8-1 1/2	10	3/4	1/8	840	4
6	†	12 1/2	12 1/2	25 1/8	17 1/2	9 1/2	9 1/2	19 1/8	9	19	14 1/2	8.500	1/4	4 1/2	8- 2	13 /34	3/4	1/8	1520	6

† To be specified by purchaser.

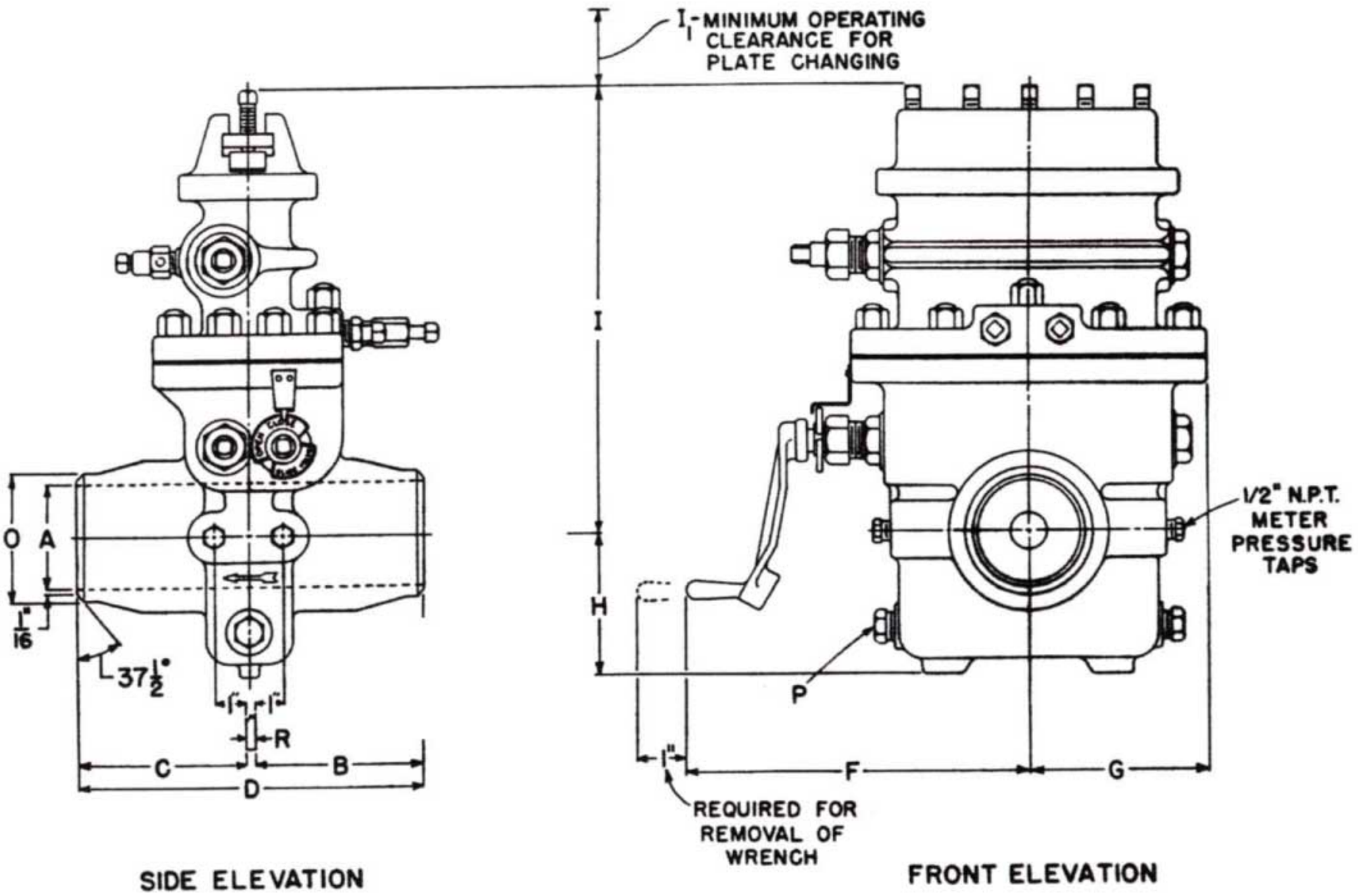
FLANGED - RING JOINT
2"-12" Daniel 1500 & 2"- 6" Daniel 2500



SIZE	A.P.I. Ring Number	Diam. Internal Line Bore A	Upstream Face of Orifice Plate to Face of End B	Downstream Face of Orifice Plate to Face of End C	Overall Face to Face D	Operating Clearance From Center F	Body Clearance From Center G	Centerline to Bottom H	Centerline to Top I	Clearance for Plate Changing I1	Diameter of Flange J	Diameter of Bolt Circle K	Pitch Diameter of Ring and Groove L2	Depth of Groove M1	Width of Groove M2	Flange Thickness N1	Number and Diameter of Bolt-Studs (Per Flange)	Length of Bolt-Studs with 2 Hex. Nuts	Size of Drain Plugs P	Orifice Plate Thickness R	Approximate Weight (Pounds)	SIZE
Catalog No. 148-TS-Daniel 2500 -Teflon Seal																						
2	R-24	†	7	7	14 1/8	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	8 1/2	6 1/2	3 3/4	5/16	15/32	1 3/16	8- 7/8	6	1/2	1/8	230	2
3	R-35	†	8 1/4	7 3/4	16 1/8	13 3/4	5 5/8	5 1/4	14 7/8	6 1/16	10 1/2	8	5 3/8	5/16	15/32	2 3/16	8-1 1/8	7 1/4	1/2	1/8	325	3
4	R-39	†	8 7/16	7 15/16	16 1/2	15	6 1/2	6 1/8	16 1/8	7	12 1/4	9 1/2	6 3/8	5/16	15/32	2 7/16	8-1 1/4	8	3/4	1/8	520	4
6	R-46	†	10 7/8	10 5/16	21 9/16	16 1/8	7 3/4	7 3/4	19 1/8	9	15 1/2	12 1/2	8 5/16	3/8	17/32	3 5/8	12-1 3/8	10 1/2	3/4	1/8	875	6
8	R-50	†	11 29/32	11 11/32	23 1/2	17 1/4	9 3/4	9 1/2	22 1/8	11	19	15 1/2	10 5/8	7/16	21/32	4 1/16	12-1 5/8	12	3/4	1/4	1500	8
10	R-54	†	12 1/2	12 1/2	25 1/4	18 3/8	11	11 1/2	26	13 1/8	23	19	12 3/4	7/16	21/32	4 11/16	12-1 7/8	13 3/4	3/4	1/4	2180	10
12	R-58	†	13 5/8	13 5/8	27 1/2	20 1/4	12 3/8	13 1/4	27 13/16	15	26 1/2	22 1/2	15	9/16	29/32	5 7/16	16- 2	15 1/4	3/4	1/4	3470	12
Catalog No. 148-TS-Daniel 2500 -Teflon Seal																						
2	R-26	†	8 11/16	8 11/16	17 1/2	15 1/8	7 1/4	6	16 7/8	7	9 1/4	6 3/4	4	5/16	15/32	2 5/16	8- 1	7 1/4	1/2	1/8	560	2
3	R-32	†	9 11/16	9 11/16	19 1/2	15 1/8	7 1/4	6	16 7/8	7	12	9	5	3/8	17/32	3	8-1 1/4	9	1/2	1/8	660	3
4	R-38	†	10 11/16	10 11/16	21 1/2	16 1/4	7 3/4	7	17	7 3/8	14	10 3/4	6 3/16	7/16	21/32	3 7/16	8-1 1/2	10 1/2	3/4	1/8	840	4
6	R-47	†	12 3/4	12 3/4	25 5/8	17 1/2	9 1/2	9 1/2	19 1/8	9	19	14 1/2	9	1/2	25/32	4 3/4	8- 2	14 1/4	3/4	1/8	1520	6

† To be specified by purchaser.

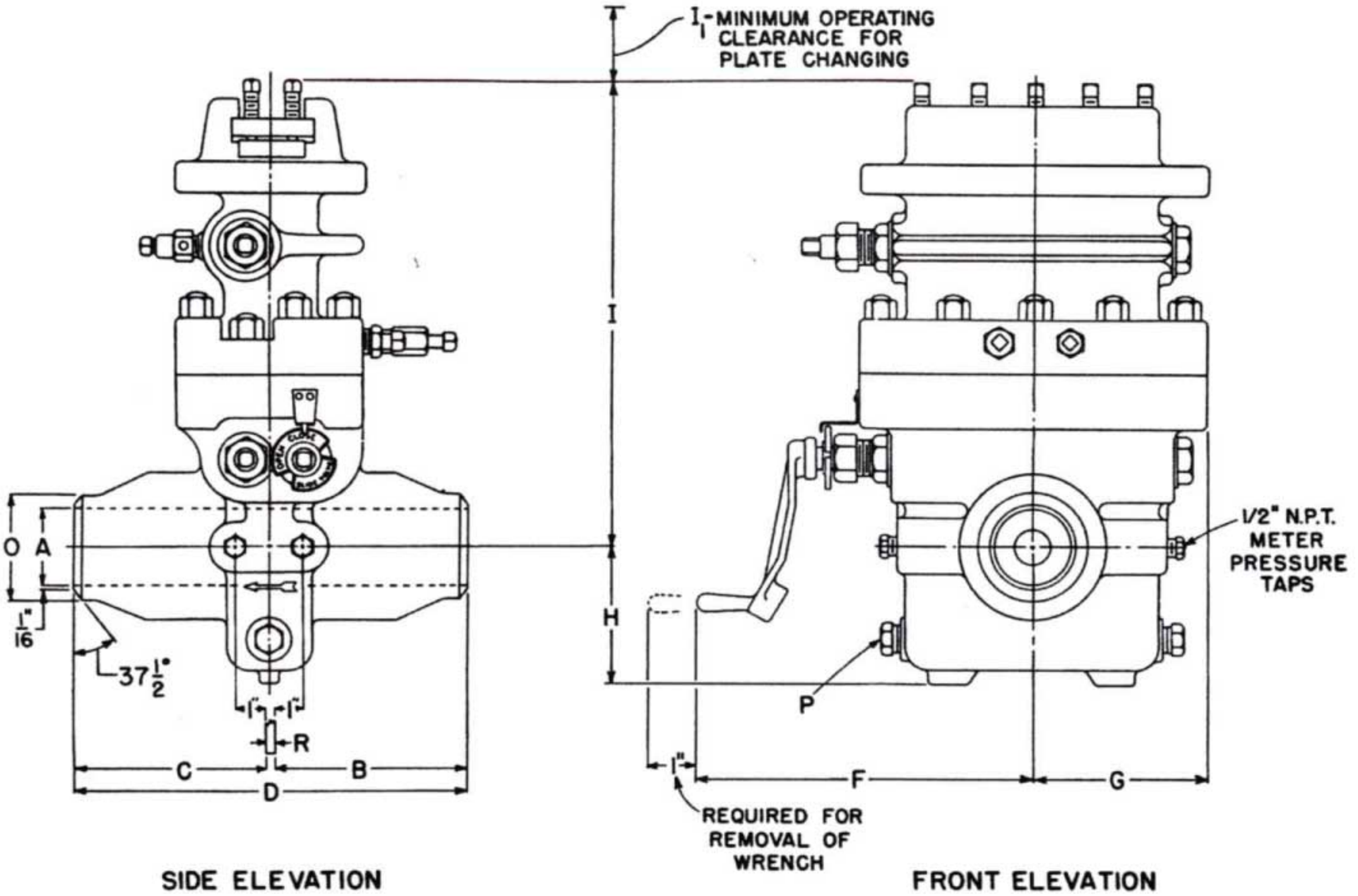
WELDNEK™
2"-14" Daniel 600 & 900



	Diam. Internal Line Bore	Upstream Face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter of Hub at Point of Welding	Size of Drain Plugs	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE	A	B	C	D	F	G	H	I	I1	O	P	R		SIZE
Catalog No. 185DS-Daniel 600 -Dual Seal														
2	2.067	5 1/4	5 1/4	10 5/8	12 7/8	4 1/4	3 3/4	13 1/4	5 9/16	2.375	1/2	1/8	95	2
3	3.068	6 15/16	6 15/16	14	13 3/4	5 5/8	4 1/8	14 1/2	6 1/16	3.500	1/2	1/8	145	3
4	4.026	7 3/16	7 3/16	14 1/2	14 1/8	6 1/8	5 3/8	1 3/4	7	4.500	3/4	1/8	230	4
6	6.065	7 15/16	7 15/16	16	15 1/2	7	7	18 3/4	9	6.625	3/4	1/8	320	6
8	7.981	8 5/8	8 5/8	17 1/2	16 1/2	8	8 1/4	21 3/4	11	8.625	3/4	1/4	480	8
10	10.020	9	8	17 1/4	17 3/8	9	10	24 7/8	13 1/8	10.750	3/4	1/4	570	10
12	11.938	9 4/5	8 13/16	18 7/8	18 7/8	10 3/8	11	28	15	12.750	3/4	1/4	1000	12
14	13.125	10 1/4	10 1/4	20 3/4	20 1/8	11 7/8	11 7/8	31 5/8	17 9/16	14.000	3/4	1/4	1215	14
Catalog No. 186TS-Daniel 900 -Teflon Seal														
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	2.375	1/2	1/8	180	2
3	†	6 15/16	6 15/16	14	13 3/4	5 3/8	4 3/4	14 1/2	6 1/16	3.500	1/2	1/8	185	3
4	†	7 13/16	7 1/16	15	14 1/8	6 1/8	5 3/4	15 3/4	7	4.500	3/4	1/8	245	4
6	†	8 9/16	7 13/16	16 5/8	15 1/2	7	7 1/2	18 3/4	9	6.625	3/4	1/8	380	6
8	†	9 1/16	9 1/16	18 3/8	17 1/4	9 1/8	9 1/4	21 3/4	11	8.625	3/4	1/4	925	8
10	†	10 13/16	10 13/16	21 7/8	18 3/8	11	10 3/4	24 7/8	13 1/8	10.750	3/4	1/4	1310	10
12	†	11 9/16	11 9/16	23 3/8	20 3/8	12 1/4	12	28	15	12.750	3/4	1/4	1610	12
14	†	11 1/16	11 1/16	22 3/8	21	12 3/8	12 13/16	31 11/16	17 9/16	14.000	3/4	1/4	1735	14

† To be specified by purchaser.
Sizes 12" and 14" up to Daniel 900 contain "DVS" Seal Vulcanized to plate.

WELDNEK™
2”-12” Daniel 1500 & 2”- 6” Daniel 2500



SIDE ELEVATION

FRONT ELEVATION

	Diam. Internal Line Bore	Upstream Face of Orifice Plate to Face of End	Downstream Face of Orifice Plate to Face of End	Overall Face to Face	Operating Clearance From Center	Body Clearance From Center	Centerline to Bottom	Centerline to Top	Clearance for Plate Changing	Diameter of Hub at Point of Welding	Size of Drain Plugs	Orifice Plate Thickness	Approximate Weight (Pounds)	
SIZE	A	B	C	D	F	G	H	I	I1	O	P	R		SIZE
Catalog No. 187-TS-Daniel 1500 -Teflon Seal														
2	†	6 15/16	6 15/16	14	12 7/8	5 3/4	4 1/4	13 3/4	5 9/16	2.375	1/2	1/8	180	2
3	†	8 3/16	7 11/16	16	13 3/4	5 5/8	5 1/4	14 7/8	6 1/16	3.500	1/2	1/8	225	3
4	†	8 3/8	7 7/8	16 3/8	15	6 1/2	6 1/8	16 1/8	7	4.500	3/4	1/8	370	4
6	†	10 3/4	10 3/16	21 1/16	16	7 3/4	7 3/4	19 1/8	9	6.625	3/4	1/8	545	6
8	†	11 23/32	11 5/32	23 1/8	17 1/4	9 3/4	9 1/2	22 1/8	11	8.625	3/4	1/4	980	8
10	†	12 5/16	12 5/16	24 7/8	18 3/8	11	11 1/2	26	13 1/8	10.750	3/4	1/4	1310	10
12	†	13 5/16	13 5/16	26 7/8	20 1/4	12 3/8	13 1/4	28 1/4	15	12.750	3/4	1/4	2140	12
Catalog No. 188-TS-Daniel 2500 -Teflon Seal														
2	†	8 5/8	8 5/8	17 3/8	15 1/8	7 1/4	6	17 7/8	7	2.375	1/2	1/8	480	2
3	†	9 9/16	9 9/16	19 1/4	15 1/2	7 1/4	6	16 7/8	7	3.500	1/2	1/8	490	3
4	†	10 1/2	10 1/2	21 1/8	16 1/4	7 3/4	7	17	7 3/8	4.500	3/4	1/8	590	4
6	†	12 1/2	12 1/2	25 1/8	17 1/2	9 1/2	9 1/2	19 1/8	9	6.625	3/4	1/8	870	6
† To be specified by purchaser.														

Orifice Plate Sealing Units

"DSC" DUAL SEAL*

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

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 360º 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 Daniel fittings sizes up to Daniel 600, in temperatures from -20ºF to +275ºF.

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

"SSR" SNAP SEAL RING*

"SSRC" 2"-8", "SSR" 10" and up

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 360º 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 -20ºF to +275ºF (standard O-rings) to -67ºF to +437ºF (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.

*US Patent # 4,478,251.

"TSC" TEFLON SEAL

"TSC" 2"-8", "TS" 10" and up

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 -65ºF to +500ºF. 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 Daniel 900, 1500, 2500 fittings 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.

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

"MSC" METAL SEAL

"MSC" 2"-8", "MS" 10" and up

The Daniel Metal Seal is a stainless or cadmium-plated carbon steel clip-ring assembly recommended for high pressures and for temperatures up to 1200ºF. 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 +600ºF, standard 316 stainless steel units to +1000ºF, and 316 stainless steel units with an iconel spring to +1200ºF. 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.

Technical Guide
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October 2003

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