Daniel™ Senior™ Orifice Fitting
Differential Pressure Flow Meter
Senior Dual-Chamber Orifice Fitting

Proving its worth every day

The Daniel Senior Orifice Fitting is a dual-chamber device that reigns as the most widely used means of measurement for natural gas. With an installed base of well over one million orifice fittings worldwide, more natural gas is measured with the Daniel Senior Orifice Fitting than any other type of device.

The Senior Orifice Fitting (Figure 1) saves users time and money by providing a fast, safe and extremely simple method of changing orifice plates under pressure without flow interruption, preventing unscheduled shutdowns. In addition, its dual-chamber design eliminates the need for costly piping bypasses or additional valves and fittings required with conventional orifice flange installations.

The Senior Orifice Fitting meets all requirements and recommendations for accurate flow measurement of gas and liquid, including AGA 3 / API 14.3 requirements, without compromise.

From duplex stainless steel fittings to carbon steel and severe service trims (i.e. Monel®, Hastelloy®-C and Alloy-20), Daniel delivers fittings to meet the stringent requirements of corrosive environments or specific temperature and pressure needs.

The Senior Orifice Fitting requires no beta ratio range restrictions and no added uncertainty to published values. It is available in 2’ through 48’ line sizes, and up to 2500# ANSI or 10,000 WOG in 3’ to 6’ only.

Typical Applications

- Gas transmission / pipeline
- Gas distribution
- Offshore and onshore gas production, including shale
- Gas plants
- Floating Production, Storage and Offloading (FPSO)
- CO₂ injection
- Bi-directional high pressure storage

Features and Benefits

- Highly reliable, field proven technology
- Field-repairable, reducing downtime and costs associated with shipping to a repair site
- Available in compliance with ISO-5167, PED, NORSOK and other code standards / requirements (1)
- Corrosion resistant and other special casting materials, including Wrought Carbon Steel (WCC, WCB), Low Temperature Carbon Steel (LCC), 316 Stainless Steel and Duplex, make this fitting suitable for sour gas service and other special applications
- Slide valve / isolation mechanism featuring a metal-to-metal seat (hard seat(2)) with injected lubricant/ sealant is standard on all Daniel Senior Orifice Fittings, providing an optimal seal in the production environment where particulate matter is common
- Optional soft seat slide valve(3) (O-ring seal without lubricant) is available in 2’ to 12’ sizes, up to 600# ANSI, for use with gas products such as ethylene

Figure 1: Daniel Senior Orifice Fitting

(1) Please consult Daniel factory for severe service and other code requirements, including low-temp, high H₂S, high CO₂, and special applications.
(2) Hard-seat using injected grease / sealant is recommended for production applications where sand, grit and other particulate matter is present.
(3) Soft-seat, greaseless seal is not recommended / intended for production applications where sand, grit and other particulate matter is commonly present (e.g., shale gas production).
Operational Sequence of Removing an Orifice Plate Under Pressure

A. Under flow conditions

B. Equalize pressure
   1. Open equalizer valve

C. Raise orifice plate
   2. Open slide valve carrier (isolation mechanism)
   3. Raise plate to upper chamber

D. Bleed upper chamber and lubricate valve seat
   4. Close slide valve carrier (isolation mechanism)
   5. Close equalizer valve and inject sealant
   6. Open bleeder valve (blow-down valve)

(1) **CAUTION:** This operational sequence is representational only and is not intended for use as a field guide to operations. **NOTICE:** See operation manual and always read and follow the detailed operating instructions provided with each fitting before attempting to operate.
E. Remove orifice plate
7. Remove clamping bar, sealing bar and gasket
8. Remove orifice plate from top chamber

The slide valve seat and the slide valve strip are field-replaceable or repairable (re-lapping) without removing the fitting from the line, reducing downtime.
Standard Specifications

Differential Pressure Taps

Internal Tap Hole Sizes
- In accordance with API 14.3 (AGA Report #3)
- In accordance with ISO-5167 (optional)

1/2" NPT Process Connection (Standard)
- In accordance with API 14.3 (standard)
- Flanged differential taps (optional)

Telemetering Taps
- Standard on all 2" to 12" 600# ANSI
- Available on all other sizes and ANSI classes

Line Bore Tolerances
- 2" and 3": ±.003"
- 4", 6", 8", 10": ±.004"
- 12" and 16": ±.005"

Operating Shafts
- Stainless steel, double-ended (standard)
  ▪ Eliminates the need to reverse shafts in the field

Application Temperature

Temperature Range
- 150# to 900# ANSI: -29°C to +232°C (-20°F to +450°F)
- 1500# and 2500# ANSI: -29°C to +135°C (-20°F to +275°F)

Indicator Plates

Standard on all Senior Orifice Fittings, the indicator plate clearly shows the direction of the open and closed position of the slide valve.

Operating Wrench

An operating wrench is provided with each fitting for safe operation of the shaft and pinions, equalizer valve, grease gun, bleeder valve and clamping bar screws.

Hydrostatic Testing

All Daniel Senior Orifice Fittings are hydrostatically tested to 1.5 times operating pressure.

Trim

- NACE Trim (MR-0175-2002) standard on 2" to 8" 150# to 600# ANSI RFFN Fittings
- A-trim standard on 10" and larger fittings and on 900# ANSI and larger fittings
- Other optional trims available for severe service and other code requirements (High H₂S, High CO₂, NORSOK, Daniel “AASG” and special applications)

(1) Please consult Daniel if your requirements are outside the specifications. Other product and material offerings may be available depending on the application.

(2) Orifice Plate Seal used may limit the service temperatures and special trims will be required for high temperature applications. Maximum temperature is contingent on limited pressure. Please consult factory.
Special Features

High Pressure Fitting Parts

Figure 2 shows the extra-heavy construction of the wall sections and the essential parts on the 1500# ANSI and larger Senior Orifice Fitting.

All seal ring units for use in 900# to 2500# ANSI fittings are required to be Snap Seal or PTFE Seal Rings.

Figure 2: Partial Side Sectional Elevation
Daniel1500# and 2500# ANSI(1) Fittings

(1) NOTE: Body / Top Gasket peroxide-cured Nitrile O-ring for 1500# ANSI Orifice Fittings. Male and female gasket joint with Parker™ seal gaskets for 2500# ANSI Orifice Fitting.
Alignment of Meter Tube Flange to Orifice Fitting Flange

On 300# ANSI fittings or smaller, three dowel pin flange-alignment holes are drilled in the flanges.

On Daniel 400# ANSI fittings or larger, 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 they will not, under compression, extend into the internal bore of the fitting. Refer to Figure 3.

The Importance of Slide Valve™ Lubrication

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

Before the slide valve (Figure 4) is opened, sealant (lubricant) is injected using the 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 slide valve strip allows the slide valve to move freely without wear. The metal-to-metal hard seat seal (with injected sealant / lubricant) provides an optimal and reliable seal in the production environment where sand and particulate matter are common.

(1) **CAUTION:** This view is representational only and is not intended for use as a field guide to operations. **NOTICE:** See operation manual and always read and follow the detailed operating instructions provided with each fitting before attempting to operate.

(2) **Slide valve / Isolation mechanism does not comply with or adhere to API 598 valve criteria.** Hard seat (using sealant / lubricant) is standard on all Daniel Senior Orifice Fittings. Soft seat (O-ring seal using no grease) is available in size 2" to 12” up to 600# ANSI. Not intended for production applications.
Plate Alignment

The plate carriers in all 2” to 8” Senior Orifice Fittings are centered using a fixed three-point positioning system. This assures orifice plate concentricity in accordance with current API 14.3 (AGA Report #3) tolerances while the fitting is positioned in the vertical and horizontal planes.

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

The side sectional view, Figure 5, demonstrates the slide valve in the closed position and the orifice plate concentrically aligned with the flow. The slide valve cannot be closed unless the orifice plate is concentric to the bore of the fitting or in the upper chamber during plate removal.

Figure 6 demonstrates the Daniel top chamber in the opened position with the plate carrier in place for change or inspection of the orifice plate. Only a few turns of the operating wrench are required to loosen screws to remove or replace clamping and sealing bars. Set screws always remain in the clamping bar. This feature adds greatly to speed and ease of operation.

The plate carrier is raised and lowered by a double rack and pinion mechanism with power applied through an operating wrench. This method provides the safest means of operation with the least amount of effort and assures positive control of the plate carrier at all times\(^{(1)}\).

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

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The Senior Orifice Fitting Advantage

Orifice Plate Sealing Units

Designed by Daniel, the plate sealing units provide a secure seal between orifice plate and body seats and can be used for a variety of services.

Plate Carrier

The plate carrier protects the orifice plate at all times while inserting or removing the plate from the fitting and can be easily inserted while the fitting is rolled in the horizontal position.

Indicator Plate

The indicator plate clearly shows the position of the slide valve within the fitting.

PTFE Shaft Packing and Centering Rings

The PTFE shaft packing and centering rings are standard equipment on all Daniel Senior Orifice Fittings in all sizes and ratings.

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\(^{(1)}\) CAUTION: This is not intended for use as a field guide to operations. NOTICE: See operation manual and always read and follow the detailed operating instructions provided with each fitting before attempting to operate.
Orifice Plate Sealing Units

Orifice plates manufactured by Daniel are quality-controlled from the selection of raw materials to the packaging of finished products. The orifice plate sealing unit provides a seal between the orifice plate and body seats and it is available for a variety of services.

Dual Seal (DSC, DS and DVS)

The Dual Seal (DSC) is the simplest and most practical orifice plate sealing device for normal flowing streams. It is precision molded from 70-80 shore nitrile synthetic rubber\(^1\) and provides four rubber-to-metal sealing surfaces 360° around the plate. The units securely seal against both outer faces of the plate and against both seats of the orifice fitting to prevent leakage.

In 16” sizes and up, DS rings are not available. The Dual Vulcanized Seal (DVS) that bonds 80-90 shore rubber directly to the outer edge of the orifice plate at the factory is recommended for 12” fittings and larger. If damaged, the DVS and plate may be returned to the factory to be rebonded. Both DSC and DVS are used in Daniel fittings up to 600# ANSI, for temperatures from -28°C to +135°C (-20°F to +275°F).

Snap Seal Ring (SSRC and SSR)

The Snap Seal Ring (SSR) unit is a removable orifice plate holder designed for use where elastomer seal swelling is a problem. Certain media, such as ethylene or carbon dioxide, may cause seal swelling when other types of 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 secure seal on the plate side and the fitting side of the ring. The orifice plate is centered and secured between these rings. The assembled unit provides a full 360° rubber-to-metal seal around both sides even in the absence of pressure differential.

No special tools are required for assembly or disassembly. When ordering, please specify nominal line size, schedule, plate thickness, and flowing media or material choice.

Dual Seals:

DSC (2” to 8”), DS (10” to 12”) and DVS (12” and larger)

**Materials**
- 70-80 shore nitrile synthetic rubber\(^1\): 2” to 10” only
- 80-90 shore rubber: 12” and larger

**Operating Temperature Range**
- -28°C to +135°C (-20°F to +275°F)

**ANSI**
- Up to 600#

Snap Seal Rings:

SSRC (2” to 8”) and SSR (10” to 24”)

**Materials**
- 316 stainless steel
- Zinc-plated carbon steel
- Duplex and Inconel® available

**Operating Temperature Range**
- Standard O-rings: -6°C to +135°C (-20°F to +275°F)
- FKM Fluoroelastomer O-rings: -55°C to +225°C (-67°F to +437°F \(^2\))

**ANSI**
- 900# to 2500#

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\(^1\) Also available in FKM Fluoroelastomer.

\(^2\) FKM is the designation for a class of fluoroelastomers as defined in ASTM D1418 and ISO 1629.
PTFE Seal (TSC and TS)

The PTFE Seal (TSC) is a superior orifice plate seal unit for difficult, corrosive flows and for higher temperatures than the Dual Seal (DSC) unit can handle. The TSC has proven effective in flows such as dilute sulphuric acid, fuming nitric acid, hydrazine, liquid oxygen and other unusual flows, from -53°C to +260°C (-65°F to +500°F).

The two-piece unit consists of an inlet ring which fits around the outer diameter of the plate, and a downstream ring fitted with metal clips for assembling the orifice plate sealing unit. A unique, annular groove on the ring provides compression to effectively seal off the plate.

The TSC unit can be assembled or taken apart by hand and is interchangeable in 2" to 10" sizes with Daniel Dual (DSC) and Metal (MSC) Seal units. The TSC is recommended with Daniel 900# to 2500# ANSI fittings or lower pressure where rubber seals may not be satisfactory.

Metal Seal (MSC and MS)

The Metal Seal (MSC) is a stainless or zinc-plated carbon steel clip-ring assembly recommended for high pressures and for temperatures up to +648°C (+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. A seal is created by clamping the plate between the rings, thereby providing the necessary compression to seat the plate against the downstream ring.

Metal Seal units of zinc-plated carbon steel are recommended for services to +315°C (+600°F), standard 316 stainless steel units to +537°C (+1000°F), and 316 stainless steel units with an Inconel® spring to +648°C (+1200°F).

The Metal Seal unit can be assembled or taken apart by hand and is interchangeable in 2" to 12" sizes with Dual Seal (DSC) and PTFE Seal (TSC) units.

PTFE Seals:

TSC (2" to 8") and TS (10" to 24")

- **Materials**
  - PTFE Seal (900# to 2500#)

- **Operating Temperature Range**
  - -53°C to +260°C (-65°F to +500°F)

- **ANSI**
  - 900# to 2500#

Metal Seals:

MSC (2" to 8") and MS (10" to 24")

- **Materials**
  - 316 stainless steel seal (standard)
  - Zinc-plated carbon steel seal (optional)

- **Maximum Operating Temperature**

  - 316 stainless steel (standard): +232°C (+450°F)
  - 316 stainless steel (with an Inconel® spring): +232°C (+450°F)
  - Zinc-plated carbon steel: +232°C (+450°F)

- **ANSI**
  - 900# to 2500#
Orifice Plate Carrier

The new Daniel plate carrier reduces measurement uncertainty using a three-point positioning system. This assures concentricity within the fitting in accordance with API 14.3 (AGA Report #3) and ISO-5167 standards. Metal-to-metal contact of the plate outer diameter with the inner diameter of the plate carrier, coupled with precision contact points of the plate carrier to the fitting affords users consistent compliance with AGA eccentricity requirements in a vertical or horizontal plane.

Design Features

1. Precision ground corner tabs keep the orifice plate carrier in the proper position and allow the fitting to be mounted in the nine, twelve or three o’clock position (See Figure 7)
2. Notched seal ring design provides metal-to-metal contact for reliable alignment and centering of the orifice plate
3. The fitting’s pin and the spring loaded button located at the top of the orifice plate carrier ensure tight positioning of the plate carrier when the slide valve is closed and the Senior Orifice Fitting is in the vertical or horizontal metering position
4. Wide flow ports reduce differential pressure load across the plate surface
5. A 360° seal ring support shelf secures the plate in place

The new plate carrier is compatible with Daniel Senior Orifice Fittings manufactured after 1991. To upgrade the plate carrier of your Senior Orifice Fitting, please contact your local Daniel representative.

Figure 7: Mounting Options Available
Daniel Lubricant

Daniel lubricant is specifically designed for lubricating the slide valve\(^{(1)}\) of Senior Orifice Fittings, ensuring maximum operating performance. Because it is a chemical compound rather than a petroleum based product, this lubricant has significant advantages:

- Effective over a wide range of demanding temperatures (-20°F to +160°F) and pressures (0 to 1,400 psig)
- Contains no fillers or inert materials, eliminating hardening or oxidizing
- Reduces friction and wear, extending equipment life in severe conditions
- Insoluble in water and extremely resistant to hydrocarbons within its temperature range
- Different types of lubricants are available to meet the various demanding needs of gas applications

Daniel lubricant is available in B-sized sticks (3/8” diameter, 1.5” long) in 24-stick boxes. The cylindrical shape of the grease stick fits neatly into the fitting’s grease gun (Figure 8).

**Note**

Hard seat (using sealant / grease sticks) is standard on all Daniel Senior Orifice Fittings, providing an optimal seal in the production environment where fractionation sand and other particulate matter are common.

Soft seat (O-ring seal using no grease) is available in 2” to 12” and up to 600# ANSI for use with gas products such as ethylene.

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\(^{(1)}\) Daniel slide valve / isolation mechanism does not comply with or adhere to API 598 valve criteria and does not guarantee zero leak seal.
**Flangnek® - Raised Face**

2" to 16" 150 to 900# ANSI

(1) Double-ended operating shafts are standard.
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(1) Flanged process connections available.
(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel "AASG", and special applications.
Flangnek® - Ring Joint(1) 2" to 16" 600# ANSI and 2" to 16" 900# ANSI

(1) Double-ended operating shafts are standard.
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(1) Flanged process connections available.
(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel "A ASC", and special applications.
Flangnek® - Raised Face (1) 2" to 16" 1500# ANSI and 2" to 12" 2500# ANSI

(1) Double-ended operating shafts are standard.
<table>
<thead>
<tr>
<th>Minimum Clearance for Clamping Bar Removal</th>
<th>Weight (lb)</th>
<th>Orifice Plate Thickness</th>
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<td>Size of Drain Plugs</td>
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<td>Length of Bolts / Studs with 2 Hex Nuts</td>
<td>Diameter of Flange</td>
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<td>Diameter of Bolts / Studs per Flange</td>
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<td>Flange Thickness</td>
<td>Height of Raised Face</td>
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<td>Diameter of Bolt Circle</td>
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<td>Diameter of Bolt Circle</td>
<td>Clearance for Plate Changing</td>
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<td>Centerline to Top</td>
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<td>Body Clearance from Center</td>
<td>Operating Clearance from Center</td>
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<td>Overall Face to Face</td>
<td>Downstream Face of Orifice Plate to Face of End</td>
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<tr>
<td>Upstream Face of Orifice Plate to Face of End</td>
<td>Diameter Internal Line Bore</td>
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<td>Standard Trim</td>
<td>Technical Guide</td>
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**Catalog No. 017 - Daniel 2-16" Flanghek-Raised Face 1500 ANSI (use PTFE Seal Ring or SSR only)**

| Size | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W |
| 2   | A | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 3   | A | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 4   | A | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 5   | A | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |

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**Catalog No. 018 - Daniel 2-12" Flanghek-Raised Face 2500 ANSI (use PTFE Seal Ring or SSR only)**

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(1) Flanged process connections available. *(2)* Please consult Daniel factory or representative for other trim available for severe service and other code requirements, including low-temperature, high H2S, High CO2, NORSOK, ISO 5167, PED, Daniel "AASG", and special applications.
Flangnek™ - Ring Joint\(^{(1)}\) 2" to 16" 1500# ANSI and 2" to 12" 2500# ANSI

(1) Double-ended operating shafts are standard.
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Catalog No. 0147-Daniel 2-16’ Flange- Ring Joint 1500 ANSI (use T PTFE Seal Ring or SSR only)

A 2” R-26  * 8 1/16  8 1/16  17 1/2  16 10  6 17  8 9 1/4  6 3/4  4 5/16  15/16  2 8 1 7 1/4  2 3/4  1/2  1/8  520  13
A 3” R-32  * 9 11/16  9 11/16  19 12  10 6 9  8 1/2  9 5 3/8  17/32  2 5/8  8 1 1/4  9 3.500  1/2  1/8  575  13
A 4” R-38  * 10 11/16  10 11/16  21 12  12 11  7 17  8 10 1/4  10 3/4  6 3/16  7 1/4  21/32  3 8 1 1/2  10 1/2  4.500  3/4  1/8  715  15
A 6” R-42  * 12 7/8  12 7/8  25 12  18 12  10 28  10 19  14 7/8  9 1/2  23/32  4 1/4  8 2 14 1/4  6.625  3/4  1/8  1,195  20
A 10” R-55  * 23 1/16  23 1/16  44 3/16  27 21  14 41  21 26 1/2  21 1/4  13 1/2  11/16  1 3/16  6 1/2  12 2 1/2  20 10.750  3/4  1/4  — 17
A 12” R60  * 23 13/16  23 13/16  44 15/16  27 21  15 41  21 30  24 3/8  16 11/16  1 5/16  7 1/4  12 2 3/4  22 12.750  3/4  1/4  — 17

Catalog No. 0148-Daniel 2-12’ Flange- Ring Joint 2500 ANSI (use SSR only)

A 2” R-26  * 8 11/16  8 11/16  17 1/2  16 10  6 17  8 9 1/4  6 3/4  4 5/16  15/16  2 8 1 7 1/4  2 3/4  1/2  1/8  520  13
A 3” R-32  * 9 11/16  9 11/16  19 12  10 6 9  8 1/2  9 5 3/8  17/32  2 5/8  8 1 1/4  9 3.500  1/2  1/8  575  13
A 4” R-38  * 10 11/16  10 11/16  21 12  12 11  7 17  8 10 1/4  10 3/4  6 3/16  7 1/4  21/32  3 8 1 1/2  10 1/2  4.500  3/4  1/8  715  15
A 6” R-42  * 12 7/8  12 7/8  25 12  18 12  10 28  10 19  14 7/8  9 1/2  23/32  4 1/4  8 2 14 1/4  6.625  3/4  1/8  1,195  20
A 10” R-55  * 23 1/16  23 1/16  44 3/16  27 21  14 41  21 26 1/2  21 1/4  13 1/2  11/16  1 3/16  6 1/2  12 2 1/2  20 10.750  3/4  1/4  — 17
A 12” R60  * 23 13/16  23 13/16  44 15/16  27 21  15 41  21 30  24 3/8  16 11/16  1 5/16  7 1/4  12 2 3/4  22 12.750  3/4  1/4  — 17

(1) Flanged process connections available.
(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel “AASG”, and special applications.
(3) 2500 ANSI Senior Orifice Fittings are available up to 12”. Consult factory for larger line sizes.
Flanged - Raised Face

10" to 16" 150 to 600# ANSI
2" to 16" 900# ANSI

(1) Double-ended operating shafts are standard.
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(1) Flanged process connections available.

(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel "AASG", and special applications.
Flanged - Raised Face

2" to 8" 150# to 600# ANSI

(1) Double-ended operating shafts are standard.
### Differential Pressure Flow Meters

**Technical Guide**

**Catalog No. 101-Daniel 2-8” Flanged-Raised Face 150 ANSI**

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**Catalog No. 103-Daniel 2-8” Flanged-Raised Face 300 ANSI**

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**Catalog No. 105-Daniel 2-8” Flanged-Raised Face 600 ANSI**

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1. Flanged process connections available.
2. The flange-by-flange (F x F) configuration of the 2” to 8” Senior Orifice Fittings has changed. This change applies to ANSI classes 150# to 600# only. The flange-by-flange configuration has been replaced with a raised-face or ring-type-joint Flangnek (RFFN or RTJ FN) configuration featuring a flange welded to the upstream side (inlet) of the Flangnek fitting. This means the face-to-face dimensions are longer than previous versions and will not retrofit into the void of any old style F x F Senior Orifice Fitting purchased prior to August 2012. To replace discontinued F x F models, existing piping must be modified to accommodate the added length.
3. Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel “AASG”, and special applications.
Flanged - Ring Joint 10” to 16” 600# and 2” to 16” 900# ANSI

(1) Double-ended operating shafts are standard.

MINIMUM CLEARANCE FOR CLAMPS AND REMOVAL

MINIMUM CLEARANCE FOR PLATE CHANGING

1/2” NPT METRIC

PRESSURE TAPS

REQUIRES FOR RING WRENCH

MATERIALS OF CONSTRUCTION
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(1) Flanged process connections available.
(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, high CO₂, NORSOK, ISO 5167, PED, Daniel "AASG", and special applications.
Flanged - Ring Joint 2" to 8" 600# ANSI

Double-ended operating shafts are standard.

1/8" NPT ERP PRESSURE PANS

MINIMUM CLEARANCE FOR CLAMPING SHUTTER VALVE

MINIMUM OPERATING CLEARANCE FOR PLATE OPERATIONS

RTJ FLANGE
### Standard Trim (3)
- A.P.I. Ring Number
- Diameter Internal Line Bore
- Upstream Face of Orifice Plate to Face of End (1)
- Downstream Face of Orifice Plate to Face of End (1)
- Overall Face to Face (2)
- Operating Clearance from Center
- Body Clearance from Center
- Clearance to Bottom
- Centerline to Top
- Diameter of Flange
- Pitch Diameter of Flange and Groove
- Depth of Groove
- Width of Groove
- Flange Thickness
- Number of Bolt / Studs per Flange
- Diameter Flange Bolt / Studs
- Length of Bolts / Studs with 2 Hex Nuts
- Size of Drain Plugs (1)
- Orifice Plate Thickness
- Weight (lb)

Minimum Clearance for Clamping Bar Removal

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(1) Flanged process connections available.

(2) The flange-by-flange (F x F) configuration of the 2" to 8" Senior Orifice Fittings has changed. This change applies to ANSI classes 150# to 600# only. The flange-by-flange configuration has been replaced with a raised-face or ring-type-joint Flangnek (RFFN or RTJ FN) configuration featuring a flange welded to the upstream side (inlet) of the Flangnek fitting. This means the face-to-face dimensions are longer than previous versions and will not retrofit into the void of any old style F x F Senior Orifice Fitting purchased prior to August 2012. To replace discontinued F x F models, existing piping must be modified to accommodate the added length.

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Flanged - Raised Face\(^{(1)}\) 2" to 16" 1500# ANSI and 2" to 12" 2500# ANSI

\(^{(1)}\) Double-ended operating shafts are standard.
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Catalog No. 107-Daniel 2-16" Flanged-Raised Face 1500 ANSI (use PTFE Seal Ring or SSR only)

Catalog No. 108-Daniel 2-12" Flanged-Raised Face 2500 ANSI (use SNC only)

(1) Flanged process connections available.

(2) Please consult Daniel factory or representative for other trims available for severe service and other code requirements, including low-temperature, high H₂S, High CO₂, NORSOK, ISO 5167, PED, Daniel "AASG", and special applications.
Flanged - Ring Joint\(^{(1)}\) 2" to 16" 1500# ANSI and 2" to 12" 2500# ANSI

\(^{(1)}\) Double-ended operating shafts are standard.
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### Daniel™ Senior™ Orifice Fitting Selection Matrix

**BASIC TYPE / PRIMARY FUNCTION**

Nominal line size (2" to 48")

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<th>Size</th>
<th>Internal Diameter</th>
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**Fitting Style**

- Raised Face Flangek: 01
- Raised Face Flanged: 10
- Ring Joint Flangek: 014
- Ring Joint Flanged: 14

**ANSI**

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<th>Class</th>
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<td>2500#</td>
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**Orifice Plate Seals**

- Removable Dual Seal*(up to 12")*: DSC
- Dual Vulcanized Seal*(16" and up)*: 3DVS
- Removable PTFE Seal (up to 24")*: TSC
- Removable Metal Seal (up to 24")*: MSC
- Removable Snap Seal*(up to 20")*: SNC

**Internal Trim Material**

- Standard: A
- Sour Gas / Corrosive Service: AASG
- NACE (standard 2" to 8") 150# - 600# ANSI: NACE

---

When ordering, please specify: Catalog Number, Plate Material, Plate Bore(s) and Quantity.

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