

# Rosemount 1595 Conditioning Orifice Plate



Rosemount 1595 Conditioning Orifice combines a flow conditioner with an orifice plate into a highly accurate primary element.

- Requires only 2 diameters of straight pipe run upstream and downstream from most flow disturbances
- Suitable for most gas, liquid, and steam applications
- Available in 2 to 24-in. (50 - 600 mm) line sizes

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## Ordering information

**Table 1. Rosemount 1595 Conditioning Orifice Plate Ordering Table**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product description	
1595	Conditioning Orifice Plate	
<b>Plate type</b>		
P	Paddle, Square Edged	★
U <sup>(1)(2)</sup>	Universal, Square Edged	★
<b>Line size</b>		
020	2-in. (50 mm)	★
030	3-in. (76 mm)	★
040	4-in. (100 mm)	★
060	6-in. (150 mm)	★
080	8-in. (200 mm)	★
100	10-in. (250 mm)	★
120	12-in. (300 mm)	★
140	14-in. (350 mm)	
160	16-in. (400 mm)	
180	18-in. (450 mm)	
200	20-in. (500 mm)	
240	24-in. (600 mm)	
<b>Flange rating</b>		
A1	ANSI Class 150 Raised Face (not compatible with standard ASME B16.36 Orifice Flanges)	★
A3	ANSI Class 300 Raised Face	★
A6	ANSI Class 600 Raised Face	★
A9	ANSI Class 900 Raised Face	★
AF	ANSI Class 1500 Raised Face	★
AT	ANSI Class 2500 Raised Face	★

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D1 <sup>(1)</sup>	DIN PN 10 (only available with Plate Type P)			★
D2 <sup>(1)</sup>	DIN PN 16 (only available with Plate Type P)			★
D3 <sup>(1)</sup>	DIN PN 25 (only available with Plate Type P)			★
D4 <sup>(1)</sup>	DIN PN40 (only available with Plate Type P)			★
D5 <sup>(1)</sup>	DIN PN 63 (only available with Plate Type P)			★
D6 <sup>(1)</sup>	DIN PN 100 (only available with Plate Type P)			★
R3 <sup>(1)</sup>	ANSI Class 300 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)			
R6 <sup>(1)</sup>	ANSI Class 600 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)			
R9 <sup>(1)</sup>	ANSI Class 900 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)			
RF <sup>(1)</sup>	ANSI Class 1500 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)			
RT <sup>(1)</sup>	ANSI Class 2500 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)			
<b>Material type</b>				
S	316/316L Stainless Steel			★
M	Alloy 400			
H	Alloy C-276			
<b>Orifice plate thickness</b>		<b>Plate type P</b>		<b>Plate type U</b>
A	0.125-in.	Line sizes 2 to 4-in. (50 to 100 mm)		Line size 2 to 6-in. (50 to 150 mm) ★
B	0.250-in.	Line sizes 6 to 12-in. (150 to 300 mm)		Line size 8 to 12-in. (200 to 300 mm) ★
C	0.375-in.	Line sizes 14 to 20-in. (350 to 500 mm)		N/A
D	0.500-in.	Line size 24-in. (600 mm)		N/A
<b>Beta ratio</b>				
020	0.20 Beta Ratio			★
040	0.40 Beta Ratio			★
050	0.50 Beta Ratio			★
065	0.65 Beta Ratio (0.60 beta ratio for Line Size option 020 only)			★

**Options** (include with selected model number)

<b>Extended product warranty</b>				
WR3	3-year limited warranty			★
WR5	5-year limited warranty			★
<b>Flow calibration</b>				
WD	Discharge Coefficient Verification (full 10 points)			
<b>Plate holder</b>				
PH <sup>(1)</sup>	Plate Holder for Universal Type Orifice Plate for use with RTJ flange or section			

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<b>Special cleaning</b>		
P2	Cleaning for Special Services	
<b>Special inspection</b>		
QC1	Visual and dimensional Inspection with certification	★
QC7	Inspection and performance certificate	★
<b>Material traceability certification</b>		
Q8	Material Certification per ISO 10474 3.1-B and EN 10204 3.1	★
<b>Code conformance</b>		
J5 <sup>(3)</sup>	NACE MR-0175/ISO 15156	
<b>Country certification</b>		
J1	Canadian Registration	
<b>Typical model number: 1595 P 060 A3 S A 040</b>		

(1) Currently available up to 12-in. (300 mm) line size.

(2) For use with a plate holder device in RTJ type flanges or orifice fittings.

(3) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

# Specifications

## Performance specifications

### Flow coefficient uncertainty

**Table 2. Discharge Coefficient Uncertainty**

Beta ratio <sup>(1)</sup>	Cd uncertainty <sup>(2)</sup>	
	With WD calibration	Standard
$\beta = 0.20$	$\pm 0.50\%$	$\pm 0.50\%$
$\beta = 0.40$	$\pm 0.50\%$	$\pm 1.00\%$
$\beta = 0.50$	$\pm 1.00\%$	$\pm 1.50\%$
$\beta = 0.65$	$\pm 1.00\%$	$\pm 1.50\%$

(1) For 0.65 beta and  $ReD < 10,000$ , add an additional 0.5% to the Discharge Coefficient Uncertainty.

(2) When using the Calibration Factor ( $F_c$ ) supplied.

### Sizing

Contact an Emerson Process Management representative for assistance. A Configuration Data Sheet is required prior to order for application verification. To complete the Configuration Data Sheet go to:

[http://www3.emersonprocess.com/Rosemount/DP\\_Flow/Application/Pages/PCDefault.aspx](http://www3.emersonprocess.com/Rosemount/DP_Flow/Application/Pages/PCDefault.aspx)

### Pressure tap orientation

Orient the 1595 Conditioning Orifice Plate so that the pressure taps are centered between any 2 (of 4) orifice bore holes. In addition, the pressure taps should be located at 90° to the plane of the last upstream elbow under any of these conditions:

- with less than 6 upstream pipe diameters
- with a 0.65 Beta

The 1595 Conditioning Orifice Plate can be used with the following pressure taps:

- Corner pressure taps - all beta sizes
- Flange pressure taps - all beta sizes
- Radius pressure taps (D and D/2) - 0.4 beta size or smaller

### Centering requirements

The 1595 should be installed so that it is centered in the pipes as recommended by ISO-5167.

## Functional specifications

### Service and flow range

Liquid, gas or steam turbulent flow, for pipe Reynold's Numbers greater than 5,000. For pipe Reynold's Numbers less than 10,000 add an additional +0.5% uncertainty to the discharge coefficient uncertainty.

### Pipe sizes

2 to 24-in. (50 to 600 mm). Contact Emerson Process Management for other pipe sizes.

### Operating limits

For line sizes 2-in. (50 mm) to 24-in. (600 mm)  
Temperature Range:  $-320$  to  $1200$  °F ( $-196$  to  $649$  °C)

- $-320$  to  $800$  °F ( $-196$  to  $427$  °C) and differential pressure up to  $800$  inH<sub>2</sub>O
- $800$  to  $1200$  °F ( $427$  to  $649$  °C) and differential pressure up to  $400$  inH<sub>2</sub>O

### Maximum working pressure

- Flange rating per ANSI B16.5 and DIN EN 1092-1

## Physical specifications

### Material of construction

**Table 3. 1595 Materials of Construction**

Code	Description	ASTM	UNS	DIN (W.-Nr.)
S	316/316L SST	A240 Gr 316/316L	S31600/ S31603	1.4401/1.4404 (1.4436/1.4435)
H	Alloy C-276	B575 Gr N10376	N10276	2.4819
M	Alloy 400	B127 Gr N04400	N04400	2.4360

### Flange mounting hardware

- The 1595 can be used with the Rosemount 1496 Flange Union.

### Orifice type

- Paddle, square-edge
- Universal, square-edge

### Typical orifice hole sizes

Beta is calculated by:  $\beta = d_c / \text{Pipe ID}$ , where the calculated bore is equal to 2 x typical orifice hole size ( $d_c = 2d$ ). Table 4 shows the diameter of each of the four orifice holes.

**Table 4. Typical Orifice Hole Sizes**

Line size	Pipe ID	Beta ( $\beta$ ) = 0.20 d	Beta ( $\beta$ ) = 0.40 d	Beta ( $\beta$ ) = 0.50 d	Beta ( $\beta$ ) = 0.65 d
2-in. (50.8 mm)	2.067-in. (52.502 mm)	0.207 (5.26)	0.413 (10.49)	0.517 (13.13)	0.620 (15.75) <sup>(1)</sup>
3-in. (76.2 mm)	3.068-in. (77.927 mm)	0.307 (7.80)	0.614 (15.60)	0.767 (19.48)	0.997 (25.32)
4-in. (101.6 mm)	4.026-in. (102.26 mm)	0.403 (10.25)	0.805 (20.45)	1.007 (25.57)	1.308 (32.22)
6-in. (152.4 mm)	6.065-in. (154.051 mm)	0.607 (15.42)	1.213 (30.81)	1.516 (38.52)	1.971 (50.06)
8-in. (203.2 mm)	7.981-in. (202.717 mm)	0.798 (20.27)	1.596 (40.54)	1.995 (50.68)	2.594 (65.89)
10-in. (254.0 mm)	10.02-in. (254.508 mm)	1.002 (25.45)	2.004 (50.90)	2.505 (63.63)	3.257 (82.73)
12-in. (304.8 mm)	12.00-in. (304.8 mm)	1.200 (30.48)	2.400 (60.96)	3.000 (76.2)	3.900 (99.06)
14-in. (355.6 mm)	13.124-in. (333.35 mm)	1.312 (33.32)	2.625 (66.68)	3.281 (83.34)	4.265 (108.33)
16-in. (406.4 mm)	15.000-in. (381.00 mm)	1.500 (38.10)	3.000 (76.20)	3.750 (95.25)	4.875 (123.83)
18-in. (457.2 mm)	16.876-in. (428.65 mm)	1.688 (42.88)	3.375 (85.73)	4.219 (107.16)	5.485 (139.32)
20-in. (508.0 mm)	18.812-in. (477.82 mm)	1.881 (47.78)	3.762 (95.55)	4.703 (119.46)	6.114 (155.30)
24-in. (609.6 mm)	22.624-in. (574.65 mm)	2.262 (57.45)	4.525 (114.94)	5.656 (143.66)	7.353 (186.77)

(1) For 2-in. (50.8 mm) line size, the beta ( $\beta$ ) is 0.60.