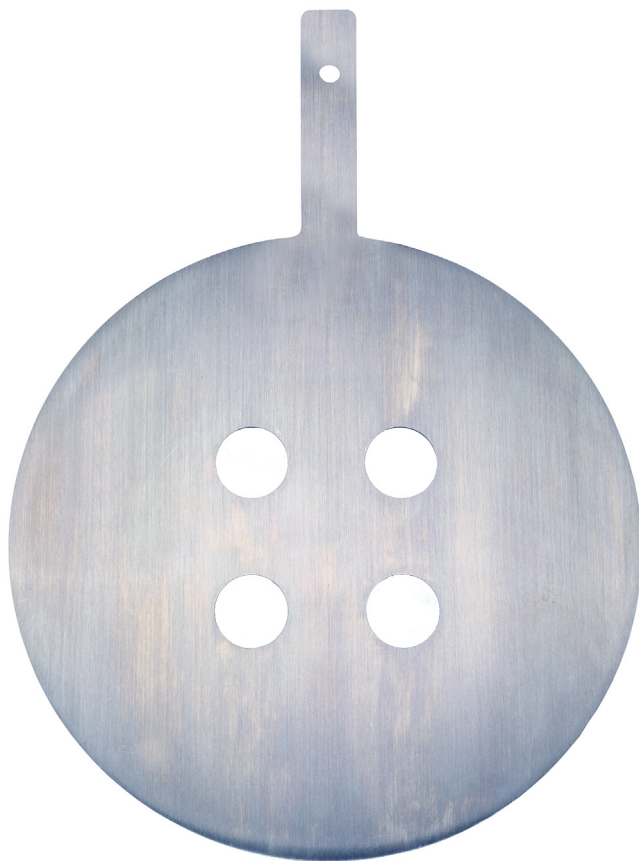


# Rosemount® 1595 Conditioning Orifice Plate





# Rosemount® 1595 Conditioning Orifice Plate

## NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

The United States has two toll-free assistance numbers and one International number.

**Customer Central**

1-800-999-9307 (7:00 a.m. to 7:00 P.M. CST)

**International**

1-(952) 906-8888

**National Response Center**

1-800-654-7768 (24 hours a day)

Equipment service needs

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## ▲ CAUTION

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Process Management Representative.

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# Section 1 Introduction

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## 1.1 Using this manual

This product manual provides installation, configuration, calibration, troubleshooting, and maintenance instructions for the Rosemount® 1595 Conditioning Orifice Plate.

Section 1: Introduction

Section 2: Installation

Appendix A: Reference Data

Appendix B: Product Certifications

## 1.2 Receiving and inspection

Flowmeters are available in different models and with different options, so it is important to inspect and verify that the appropriate model was delivered before installation.

Upon receipt of the shipment, check the packing list against the material received and the purchase order. All items are tagged with a model number, serial number, and customer tag number. Report any damage to the carrier.

## 1.3 Returning the product

To expedite the return process, call the Rosemount National Response Center toll-free at 800-654-7768. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for the following information:

- Product model
- Serial numbers
- The last process material to which the product was exposed

The center will provide

- A Return Material Authorization (RMA) number
- Instructions and procedures that are necessary to return goods that were exposed to hazardous substances

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**Note**

If a hazardous substance is identified, a Material Safety Data Sheet (MSDS), required by law to be available to people exposed to specific hazardous substances, must be included with the returned materials.

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# Section 2 Installation

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Safety messages .....	page 3
Location and orientation .....	page 4
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## 2.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please refer to the following safety messages before performing any operation in this section.

### WARNING

**Failure to follow these installation guidelines could result in death or serious injury:**

- Make sure only qualified personnel perform the installation.
- Remove pressure and drain the pipe assembly prior to installing or removing the orifice plate.
- If the process fluid is caustic or otherwise hazardous, follow the instruction closely to prevent mishap.

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### 2.1.1 Checklist

The following is a summary of the steps required to complete a 1595 installation.

If this is a new installation, begin with [Step 1](#).

If the mounting is already in place, verify that the orifice flange size and rating match the recommended specification and begin with [Step 4](#).

1. Determine where the 1595 is to be placed within the piping system.
2. Establish the proper orientation as determined by the intended service for the orifice plate.
3. Orient the 1595 Conditioning Orifice Plate so the pressure taps are centered between any two (of four) orifice bore holes. In addition, the pressure taps should be located at 90° to the plane of the last elbow.
4. Review “[Location and orientation](#)” on [page 4](#).
5. Measure the pipe’s internal diameter (I.D.), preferably at 1 x I.D. from the orifice flange (upstream or downstream).

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**Note**

Providing the pipe's I.D. at the time of purchasing the 1595 is necessary to maintain published orifice plate accuracy.

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6. Install the orifice plate.
7. Check for leaks.
8. Commission the orifice plate.
9. Confirm the 1595 is installed so that it is centered in the pipes as recommended by ISO-5167.

## 2.2 Location and orientation

The orifice plate electronics must be installed in the proper orientation relative to the pipe and the fluid measured.

### 2.2.1 Horizontal pipe installation

#### Operating temperature limits

##### For line sizes 2-in. (50 mm) to 24-in. (600mm)

Temperature Range:

-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.

#### Pressure tap orientation

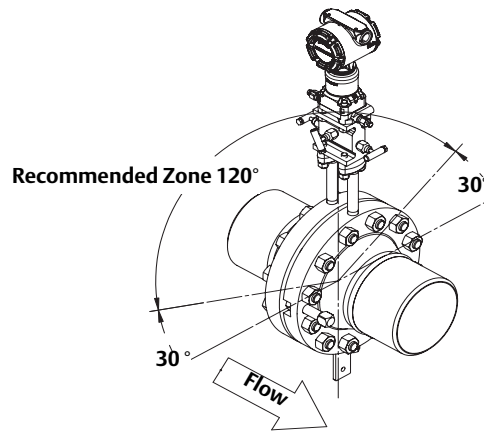
Orient the 1595 Conditioning Orifice Plate so that the pressure taps are centered between any 2 (of 4) orifice bore holes. In addition, the pressure taps should be located at 90° to the plane of the last elbow.

The following figures show paddle style conditioning orifice plate, but orientation pertains to both paddle and universal plate styles.

### ⚠ Gas in horizontal pipes

The electronics should be mounted above the pipe to ensure that condensate does not collect on the transmitter sensing diaphragms. Orient the unit within the 120° recommended zone as shown in Figure 2-1.

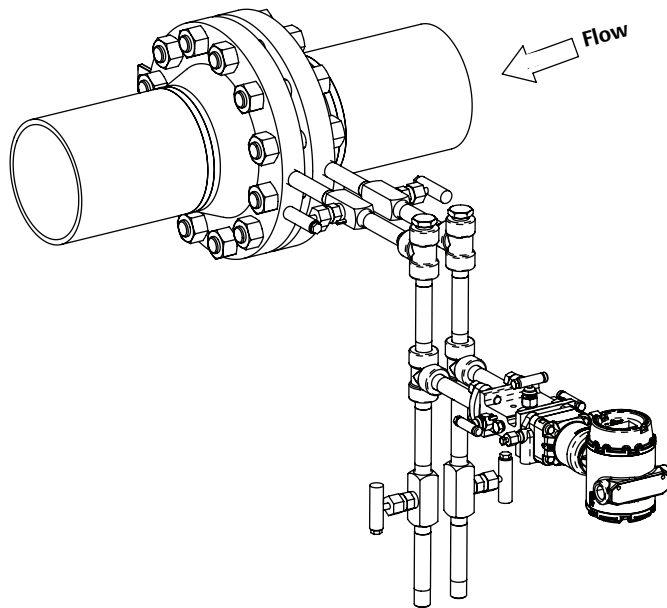
Figure 2-1. Gas in Horizontal Pipes



### ⚠ Liquid or steam in horizontal pipes

The electronics should be mounted below the pipe to ensure that gases do not collect on the transmitter sensing diaphragms.

Figure 2-2. Liquid and Steam in Horizontal Pipes

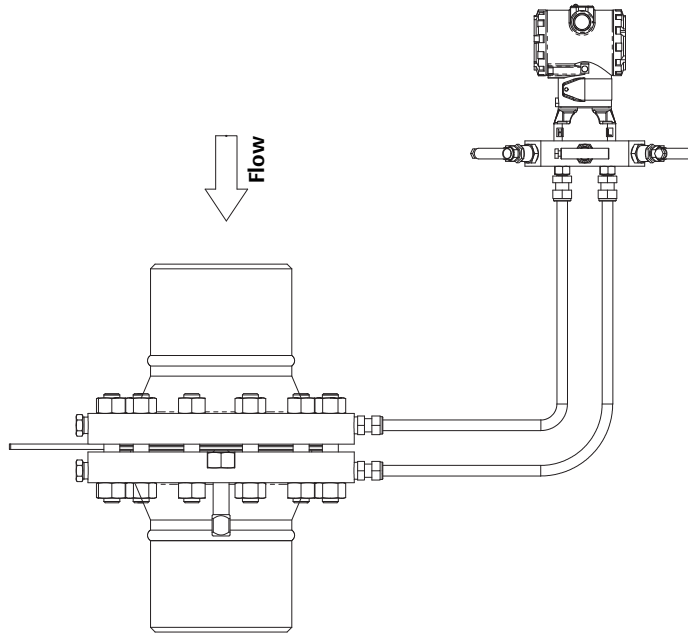


## 2.2.2 Vertical pipe installation

### ⚠ Gas in vertical pipes

Mount the electronics above the pipe with the instrument lines sloping down.

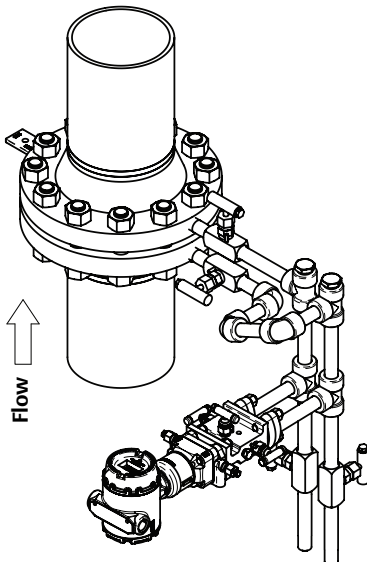
Figure 2-3. Gas in Vertical Pipes



### ⚠ Liquid or steam in vertical pipes

Mount the transmitter below the pipe with the instrument lines sloping up.

Figure 2-4. Liquid and Steam in Vertical Pipes



## 2.2.3 1595 straight pipe requirements

Use the appropriate lengths of straight pipe upstream and downstream of the 1595 to minimize the effects of moderate flow disturbances in the pipe.

**Table 2-1. 1595 Straight Pipe Requirements<sup>(1)</sup>**

	<b>Beta</b>	<b>0.20</b>	<b>0.40</b>	<b>0.50</b>	<b>0.65</b>
<b>Upstream (inlet) side of primary</b>	Single 90° bend or tee	2	2	2	2
	Two or more 90° bends in the same plane	2	2	2	2
	Two or more 90° bends in different plane	2	2	2	2
	Up to 10° of swirl <sup>(2)</sup>	2	2	2	2
	Reducer (1 line size) <sup>(2)</sup>	2	2	2	2
	Butterfly valve (75% to 100% open) <sup>(2)</sup>	2	2	N/A	N/A
<b>Downstream (outlet) side of primary</b>		2	2	2	2

<sup>(1)</sup> Consult an Emerson Process Management representative if the type of disturbance is not listed.

<sup>(2)</sup> Not applicable in line sizes greater than 24-in. (600 mm).

### 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 elbow.

### Centering requirements

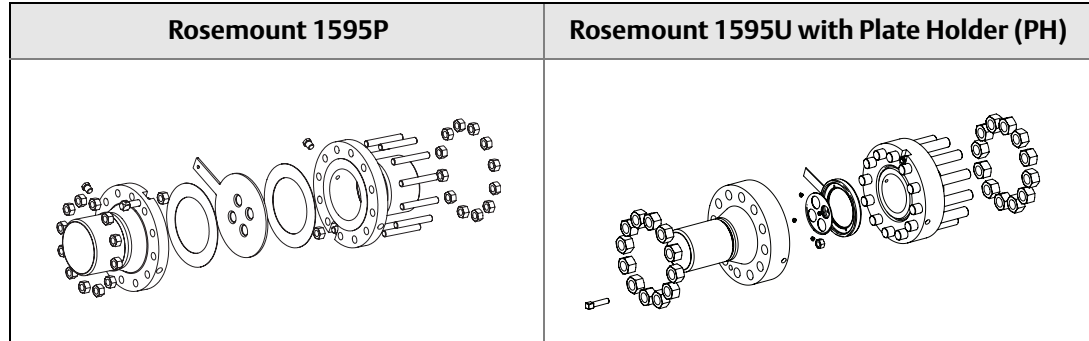
The 1595 should be installed so that it is centered in the pipes as recommended by ISO-5167.

#### Note

The Rosemount® 1595 can be used with Rosemount 1496 Orifice Flange Unions. For product offering see document number 00813-0100-4792.

## 2.3 Installation

### 2.3.1 Rosemount 1595 types



#### Note

For 1496 Flange Union installation, refer to the Rosemount 1595 Conditioning Orifice Plate reference manual (document number 00809-0100-4828).

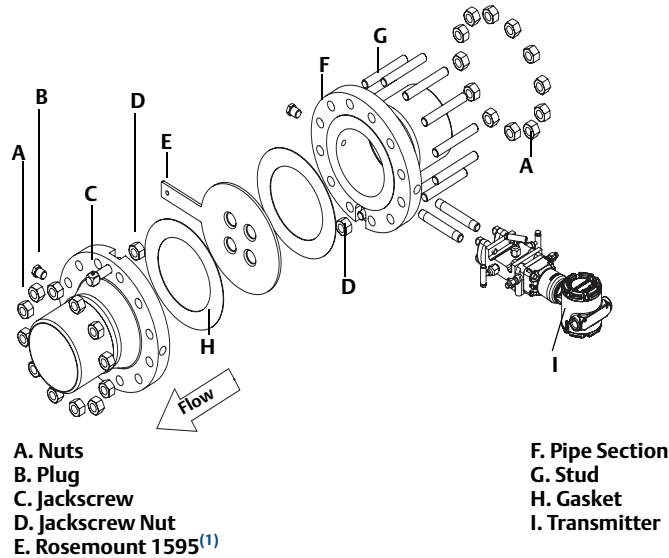
Use the following steps to install the 1595 conditioning orifice plate (paddle or universal plate style).

1. Determine location and orientation (see [page 4](#)).
2. Install the Orifice Plate.
  - a. Depressurize the line using site-specific requirements.
  - b. Loosen all studs and nuts.
  - c. Remove the studs in one-half of the flange union.
  - d. Spread flange union by turning jackscrews clockwise.
  - e. For line sizes > 24-in (600 mm), refer to [Figure 2-7](#) and instructions using alignment tool.
  - f. Install the new plate or remove the existing plate for replacement or inspection.
  - g. Install the new gaskets when installing the plate. It is recommended that new gaskets be installed each time the orifice flange union is separated.
  - h. Center the plate in the pipe I.D.
  - i. Release the flange union by turning the jackscrews counter-clockwise.
  - j. Replace the studs.
  - k. Tighten studs in a star pattern.

#### Note

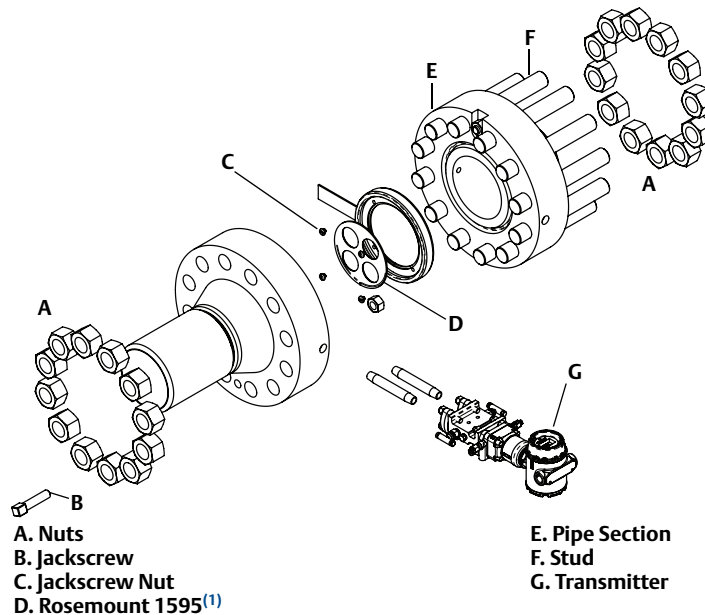
Standard  $1/16$ -in. thick fiber gaskets are recommended for use with the 1595. Using other gaskets could potentially affect the measurement.

**Figure 2-5. Rosemount 1595P Installation**



(1) The installation drawings applies when using the Rosemount 2051C, Rosemount 3051C, Rosemount 3051S and Rosemount 3051SMV. See the following documents for quick installation instruction of the transmitters.  
Rosemount 2051C: document number 00825-0100-4101  
Rosemount 3051C: document number 00825-0100-4001  
Rosemount 3051S: document number 00825-0100-4801  
Rosemount 3051SMV: document number 00825-0100-4803

**Figure 2-6. Rosemount 1595U with Plate Holder (PH) Installation**



(1) The installation drawings applies when using the Rosemount 2051C, Rosemount 3051C, Rosemount 3051S and Rosemount 3051SMV. See the following documents for quick installation instruction of the transmitters.  
Rosemount 2051C: document number 00825-0100-4101  
Rosemount 3051C: document number 00825-0100-4001  
Rosemount 3051S: document number 00825-0100-4801  
Rosemount 3051SMV: document number 00825-0100-4803

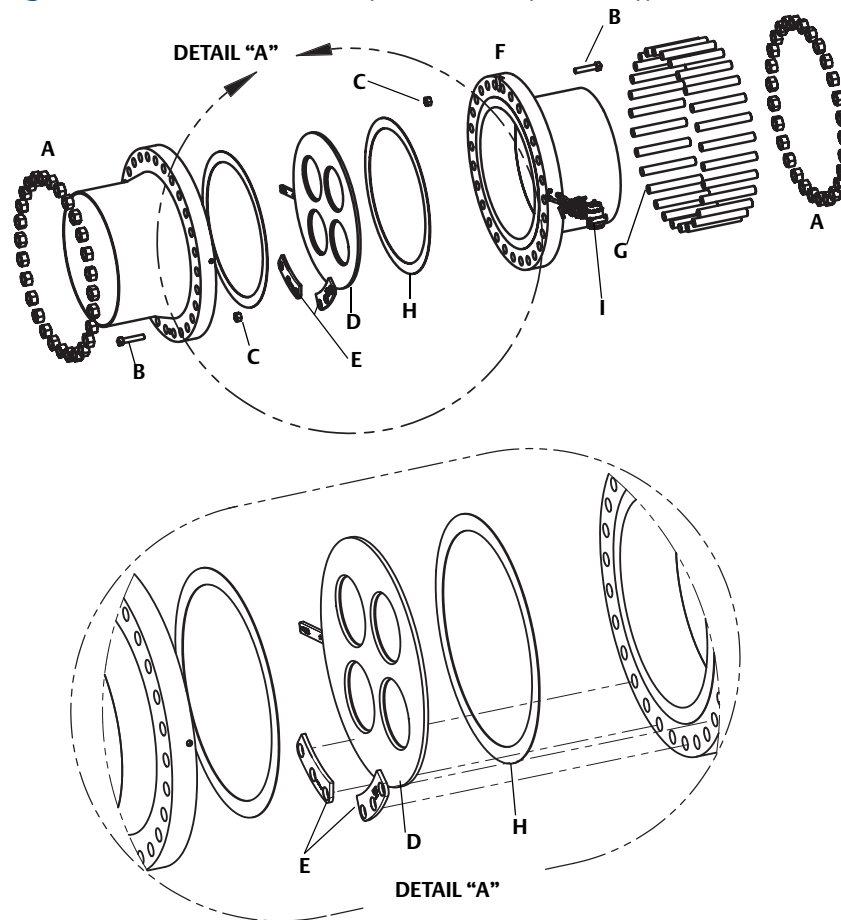
**Note**

For 1595U Universal Conditioning Orifice Plate style, refer to manufacturer's orifice fitting installation manual for installation details.

**For sizes > 24-in. (600 mm) and use with alignment tool.**

1. When an alignment tool is provided, install the alignment tool on the flange studs shown in Figure 2-7.
2. For Horizontal installation, use the horizontal lift hole (stamped HLH on paddle) to lift the conditioning orifice plate from a horizontal position and guide into location between the flanges.
3. For Vertical installation, first use the horizontal lift hole (HLH) to lift the conditioning orifice plate from a horizontal position to vertical, then use the vertical lift hole (stamped VLH on paddle) to lift the conditioning orifice plate vertically and guide into location between the flanges.

**Figure 2-7. Rosemount 1595P (sizes > 24-in (600 mm)) installation**



- |  |                        |
|--|------------------------|
| <b>A. Nuts</b>                         | <b>F. Pipe Section</b> |
| <b>B. Jackscrew</b>                    | <b>G. Stud</b>         |
| <b>C. Jackscrew Nut</b>                | <b>H. Gasket</b>       |
| <b>D. Rosemount 1595<sup>(1)</sup></b> | <b>I. Transmitter</b>  |
| <b>E. Alignment Tools</b>              |                        |

(1) The installation drawings applies when using the Rosemount 2051C, Rosemount 3051C, Rosemount 3051S and Rosemount 3051SMV. See the following documents for quick installation instruction of the transmitters.  
Rosemount 2051C: document number 00825-0100-4101  
Rosemount 3051C: document number 00825-0100-4001  
Rosemount 3051S: document number 00825-0100-4801  
Rosemount 3051SMV: document number 00825-0100-4803



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**Note**

To ensure the best possible flow measurement accuracy, Emerson will provide an Official DP Calculation Sheet when the WD calibrated option for 1595 is ordered. The official DP calculation sheet uses the calibration factor which is unique to that device and is also stamped on the orifice plate. The Official DP Calculation Sheet displays the expected full scale flow value and the calculated full scale DP value and is corrected for the unique calibration factor which is also displayed on the sheet. This full scale DP value should be used to range a DP transmitter for the referenced application. Or, the calibration factor should be used as a correction factor when configuring a flow computer for the Rosemount Conditioning Orifice Plate.

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## 2.3.2 Rosemount 1496 types

- 1496 WN
- 1496 SO
- 1496 RJ

### Step 1: Determine the proper orientation

See “Location and orientation” on page 4.

### Step 2: Weld the flange union

Follow these steps to weld the orifice flanges to the pipe.

1. Depressurize the line using site-specific requirements.
2. Prepare the pipe ends.
  - a. For flanged models, ensure the pipe mounting flange is the same size or rating.
  - b. For threaded models, ensure the pipe union or coupling is the same size pipe thread as the meter section.
3. Ensure the pipe mounting flange is the correct size and rating.
4. Ensure the flange taps are aligned and level.
5. Weld the orifice flange to the pipe.

---

**Note**

To avoid serious burns, allow the orifice flanges to cool before continuing.

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# Appendix A Reference Data

Specifications .....	page 13
Dimensional drawings .....	page 17
Ordering information .....	page 22

## A.1 Specifications

The Rosemount® 1595 can be used with Rosemount 1496 Orifice Flange Unions. For product offering see document number 00813-0100-4792.

### A.1.1 Performance specifications

#### Flow coefficient uncertainty

**Table A-1. Discharge Coefficient Uncertainty**

Beta ratio <sup>(1)</sup>	Cd uncertainty
$\beta = 0.20$	$\pm 0.50\%$
$\beta = 0.40$	$\pm 0.50\%$
$\beta = 0.50$	$\pm 1.00\%$
$\beta = 0.65$	$\pm 1.00\%$

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

#### Sizing

Perform a flow calculation using the Instrument Toolkit™ software package. Alternatively, contact an Emerson Process Management® representative. The “Configuration Data Sheet (CDS)” is required prior to order for application verification.

#### Straight pipe requirement

Use the appropriate lengths of straight pipe upstream and downstream of the 1595 to minimize the effects of moderate flow disturbances in the pipe. Table A-2 lists recommended lengths of straight pipe.

**Table A-2. 1595 Straight Pipe Requirements<sup>(1)</sup>**

	Beta	0.20	0.40	0.50	0.65
Upstream (inlet) side of primary	Single 90° bend or tee	2	2	2	2
	Two or more 90° bends in the same plane	2	2	2	2
	Two or more 90° bends in different plane	2	2	2	2
	Up to 10° of swirl <sup>(2)</sup>	2	2	2	2
	Reducer (1 line size) <sup>(2)</sup>	2	2	2	2
	Butterfly valve (75% to 100% open) <sup>(2)</sup>	2	2	N/A	N/A
<b>Downstream (outlet) side of primary</b>		2	2	2	2

(1) Consult an Emerson Process Management representative if disturbance is not listed.

(2) Not applicable in line sizes greater than 24-in. (600 mm).

## Pressure tap orientation

Orient the 1595 so 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 elbow.

## Centering requirements

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

## A.1.2 Functional specifications

### Service and flow range

Liquid, gas, or vapor 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 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

## A.1.3 Physical specifications

### Materials of construction

Orifice Plate

**Table A-3. Orifice Plate**

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 tailored for use in conjunction with the Rosemount 1496 Flange Union. See Product Data Sheet 00813-0100-4792 for more information regarding the Rosemount 1496.

### 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 ( $d_C = 2d$ ). The table below shows the diameter of each of the four typical orifice holes.

**Table A-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)

**Table A-4. Typical Orifice Hole Sizes**

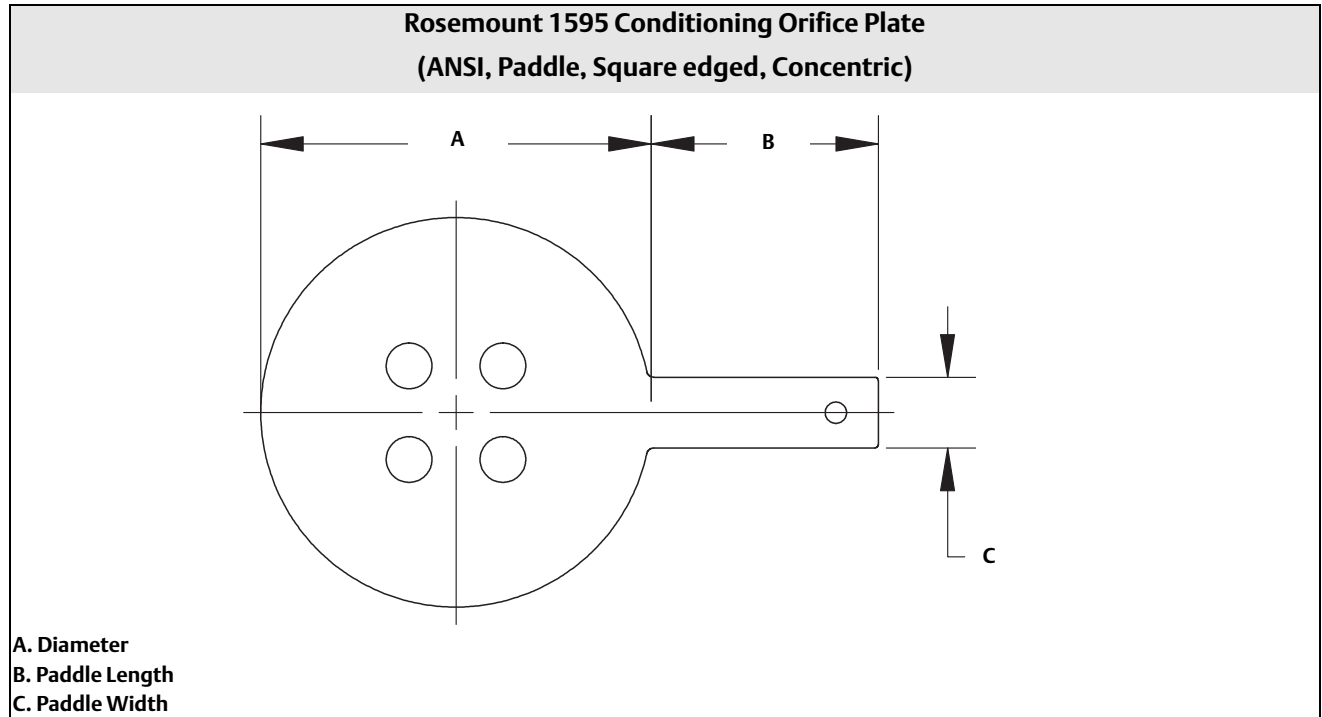
Line size	Pipe ID	Beta ( $\beta$ ) = 0.20 d	Beta ( $\beta$ ) = 0.40 d	Beta ( $\beta$ ) = 0.50 d	Beta ( $\beta$ ) = 0.65 d
20-in. (508.0 mm)	18.812-in. (477.82 mm)	1.881 (47.78)	3.762 (95.55)	4.703 (119.46)	6.114 (155.30)
24-in. (609.6 mm)	22.624-in. (574.65 mm)	2.262 (57.45)	4.525 (114.94)	5.656 (143.66)	7.353 (186.77)

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

### Orifice type

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

## A.2 Dimensional drawings

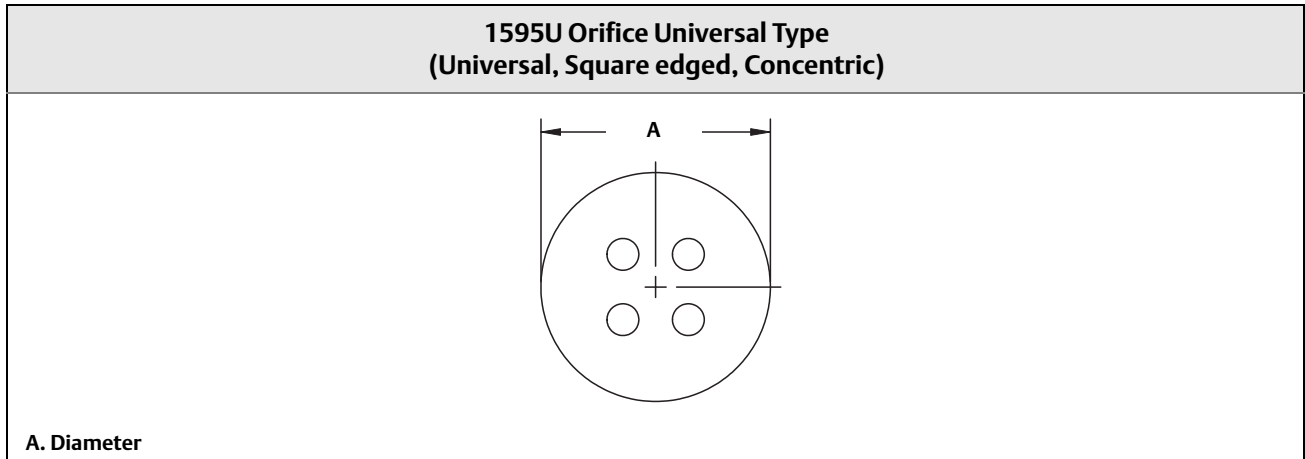


**Table A-5. Orifice Plate Dimensions in inches (millimeters)**

Line size	Diameter for paddle type						Paddle length	Paddle width
	150#	300#	600#	900#	1500#	2500#		
2-in. (50.8 mm)	4.125 (104.78)	4.375 (111.13)	4.375 (111.13)	5.625 (142.875)	5.625 (142.875)	5.750 (146.050)	4.0 (101.6)	1.0 (25.4)
3-in. (76.2 mm)	5.375 (136.53)	5.875 (149.23)	5.875 (149.23)	6.625 (168.275)	6.875 (174.625)	7.750 (196.85)	4.0 (101.6)	1.0 (25.4)
4-in. (101.6 mm)	6.875 (174.63)	7.125 (180.98)	7.625 (193.68)	8.125 (206.35)	8.250 (209.550)	9.250 (234.95)	4.0 (101.6)	1.0 (25.4)
6-in. (152.4 mm)	8.750 (222.25)	9.875 (250.83)	10.500 (266.7)	11.375 (288.925)	11.125 (282.575)	12.500 (317.50)	4.0 (101.6)	1.0 (25.4)
8-in. (203.2 mm)	11.000 (279.4)	12.125 (307.98)	12.625 (320.675)	14.125 (358.775)	13.875 (352.425)	15.250 (387.350)	6.0 (152.4)	1.5 (38.1)
10-in. (254.0 mm)	13.375 (339.725)	14.250 (361.95)	15.750 (400.05)	17.125 (434.975)	17.125 (434.975)	18.750 (476.25)	6.0 (152.4)	1.5 (38.1)
12-in. (304.8 mm)	16.125 (409.58)	16.625 (422.26)	18.000 (457.2)	19.625 (498.475)	20.500 (520.7)	21.625 (549.275)	6.0 (152.4)	1.5 (38.1)
14-in. (355.6 mm)	17.750 (450.85)	19.125 (485.78)	19.375 (492.125)	N/A	N/A	N/A	6.0 (152.4)	1.5 (38.1)
16-in. (406.4 mm)	20.250 (514.35)	21.250 (539.75)	22.250 (565.15)	N/A	N/A	N/A	6.0 (152.4)	1.5 (38.1)
18-in. (457.2 mm)	21.500 (546.1)	23.375 (593.725)	24.000 (609.6)	N/A	N/A	N/A	6.0 (152.4)	1.5 (38.1)
20-in. (508.0 mm)	23.750 (603.25)	25.625 (650.875)	26.750 (679.45)	N/A	N/A	N/A	6.0 (152.4)	1.5 (38.1)
24-in. (609.6 mm)	28.125 (714.375)	30.375 (771.525)	31.000 (787.4)	N/A	N/A	N/A	6.0 (152.4)	1.5 (38.1)

**Note**

Consult factory for availability of line sizes and flange ratings not shown in the above table.

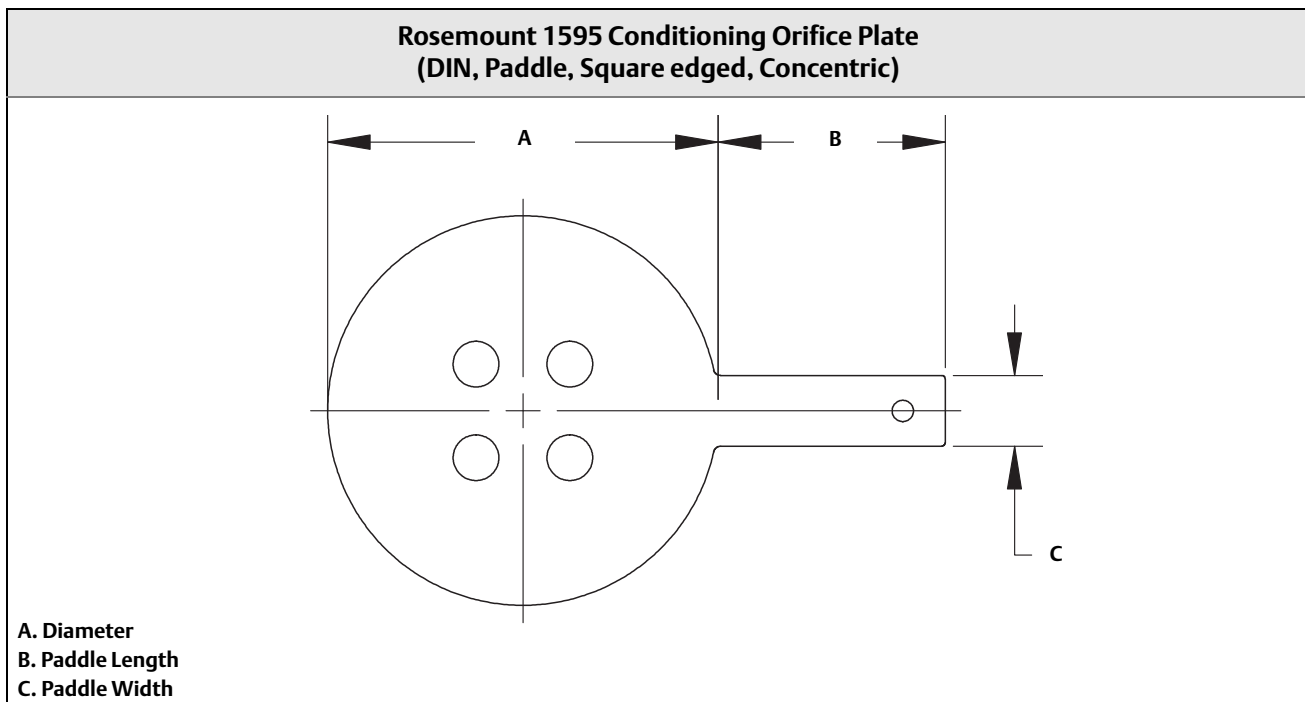


**Table A-6. Orifice Plate Dimensions in inches (millimeters)**

Line size	Diameter for universal type
2-in.	2.437-in. (61.8998 mm)
3-in.	3.437-in. (87.2998 mm)
4-in.	4.406-in. (111.912 mm)
6-in.	6.437-in. (163.5 mm)
8-in.	8.437-in. (214.3 mm)
10-in.	10.687-in. (271.45 mm)
12-in.	12.593-in. (319.862 mm)

**Note**

Consult factory for availability of line sizes not shown in the above table.





**Table A-7. Orifice Plate Dimensions in millimeters (inches)**

Line size	Diameter (max) – by flange rating						Paddle length	Paddle width
	PN 10	PN 16	PN 25	PN 40	PN 63/64	PN 100		
DN 50 (2-in.)	107 (4.21)	107 (4.21)	107 (4.21)	107 (4.21)	113 (4.45)	119 (4.69)	101.6 (4.0)	25.4 (1.0)
DN 80 (3-in.)	142 (5.60)	142 (5.60)	142 (5.60)	142 (5.60)	148 (5.82)	154 (6.06)	101.6 (4.0)	25.4 (1.0)
DN 100 (4-in.)	162 (6.38)	162 (6.38)	168 (6.61)	168 (6.61)	174 (6.85)	180 (7.09)	101.6 (4.0)	25.4 (1.0)
DN 150 (6-in.)	218 (8.58)	218 (8.58)	224 (8.82)	224 (8.82)	247 (9.72)	257 (10.12)	101.6 (4.0)	25.4 (1.0)
DN 200 (8-in.)	273 (10.74)	273 (10.74)	284 (11.18)	290 (11.42)	309 (12.17)	324 (12.76)	152.4 (6.0)	38.1 (1.5)
DN 250 (10-in.)	328 (12.91)	329 (12.95)	340 (13.39)	352 (13.86)	364 (14.33)	391 (15.39)	152.4 (6.0)	38.1 (1.5)
DN 300 (12-in.)	378 (14.88)	384 (15.12)	400 (15.75)	417 (16.42)	424 (16.69)	458 (18.03)	152.4 (6.0)	38.1 (1.5)
DN 350 (14-in.)	438 (17.244)	444 (17.48)	457 (17.99)	474 (18.66)	486 (19.13)	512 (20.16)	152.4 (6.0)	38.1 (1.5)
DN 400 (16-in.)	489 (19.252)	495 (19.49)	514 (20.24)	546 (21.50)	543 (21.38)	572 (22.52)	152.4 (6.0)	38.1 (1.5)
DN 450 (18-in.)	538.9 (21.220)	555 (21.85)	N/A	571 (22.48)	N/A	N/A	152.4 (6.0)	38.1 (1.5)
DN 500 (20-in.)	594 (23.386)	617 (24.29)	624 (24.57)	628 (24.72)	657 (25.87)	704 (27.72)	152.4 (6.0)	38.1 (1.5)
DN 600 (24-in.)	694.9 (27.36)	734 (28.90)	731 (28.78)	747 (29.41)	7641 (30.08)	813 (32.01)	152.4 (6.0)	38.1 (1.5)

**Note**

Consult Factory for availability of line sizes not shown in the above table.

**Table A-8. A.P.I Ring No.'s and Rating**

Line size	A.P.I ring no.	Rating (lbs.)	Line size	A.P.I ring no.	Rating (lbs.)
02	R-23	300-600	08	R-49	300-600 & 900
02	R-24	900-1500	08	R-50	1500
02	R-26	2500	08	R-51	2500
03	R-31	300-600 & 900	10	R-53	300-600 & 900
03	R-32	2500	10	R-54	1500
03	R-35	1500	10	R-55	2500
04	R-37	300-600 & 900	12	R-57	300-600 & 900
04	R-38	2500	12	R-58	1500
04	R-39	1500	12	R-59	2500
06	R-45	300-600 & 900			
06	R-46	1500			
06	R-47	2500			

**Note**

Refer to [Table A-5](#) for line size and pressure rating availability.

**Table A-9. Available Beta Ratio ( $\beta$ )**

The table below shows the available Beta Ratio ( $\beta$ ) for line size vs. pipe schedule.

Line size	Pipe schedule	Beta ( $\beta$ ) available	Line size	Pipe schedule	Beta ( $\beta$ ) available
2	≤ 80	0.20,0.40,0.50,0.60	8	140	0.20, 0.40, 0.50
2	160	0.20	8	160	0.20, 0.40
2	XXS	0.20	8	XXS	0.20, 0.40, 0.50
3	≤ 80	0.20, 0.40, 0.50, 0.65	10	≤ 80	0.20, 0.40, 0.50, 0.65
3	160	0.20, 0.40, 0.50	10	100	0.20, 0.40, 0.50, 0.65
3	XXS	0.20	10	120	0.20, 0.40, 0.50
4	≤ 80	0.20, 0.40, 0.50, 0.65	10	140	0.20, 0.40, 0.50
4	120	0.20, 0.40, 0.50	10	160	0.20, 0.40
4	160	0.20, 0.40, 0.50	10	XXS	0.20, 0.40, 0.50
4	XXS	0.20	12	≤ 80	0.20, 0.40, 0.50, 0.65
6	≤ 80	0.20, 0.40, 0.50, 0.65	12	100	0.20, 0.40, 0.50
6	120	0.20, 0.40, 0.50	12	120	0.20, 0.40, 0.50
6	160	0.20, 0.40	12	140	0.20, 0.40, 0.50
6	XXS	0.20	12	160	0.20, 0.40
8	≤ 80	0.20, 0.40, 0.50, 0.65	12	XXS	0.20, 0.40, 0.50
8	100	0.20, 0.40, 0.50, 0.65			
8	120	0.20, 0.40, 0.50			

**Table A-9. Available Beta Ratio ( $\beta$ )**  
The table below shows the available Beta Ratio ( $\beta$ ) for line size vs. pipe schedule.

Line size	Pipe schedule	Beta ( $\beta$ ) available	Line size	Pipe schedule	Beta ( $\beta$ ) available
14	≤ 80	0.20, 0.40, 0.50, 0.65	20	≤ 80	0.20, 0.40, 0.50, 0.65
14	100	0.20, 0.40, 0.50	20	100	0.20, 0.40, 0.50, 0.65
14	120	0.20, 0.40, 0.50	20	120	0.20, 0.40, 0.50
14	140	0.20, 0.40, 0.50	20	140	0.20, 0.40, 0.50
14	160	0.20, 0.40	20	160	0.20, 0.40, 0.50
16	≤ 80	0.20, 0.40, 0.50, 0.65	24	≤ 80	0.20, 0.40, 0.50, 0.65
16	100	0.20, 0.40, 0.50	24	100	0.20, 0.40
16	120	0.20, 0.40, 0.50	24	120	0.20, 0.40, 0.50
16	140	0.20, 0.40, 0.50	24	140	0.20, 0.40, 0.50
16	160	0.20, 0.40	24	160	0.20, 0.40, 0.50
18	≤ 80	0.20, 0.40, 0.50, 0.65			
18	100	0.20, 0.40, 0.50, 0.65			
18	120	0.20, 0.40, 0.50			
18	140	0.20, 0.40, 0.50			
18	160	0.20, 0.40, 0.50			

## A.3 Ordering information

Table A-10. Rosemount 1595 Orifice Plate Ordering Table

Model	Product description
1595	Conditioning Orifice Plate
Code	Plate type
P	Paddle, Square Edged
U <sup>(1)</sup>	Universal, Square Edge
Code	Line size
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 <sup>(2)</sup>	24-in. (600 mm)
Code	Flange rating
A1	ANSI Class 150 Raised Face ( <i>Note: Not compatible with standard ASME B16.36 Orifice Flanges</i> )
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
D1	DIN PN 10 (only available with Plate Type P)
D2	DIN PN 16 (only available with Plate Type P)
D3	DIN PN 25 (only available with Plate Type P)
D4	DIN PN40 (only available with Plate Type P)
D5 <sup>(3)</sup>	DIN PN 63 (only available with Plate Type P)
D6	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)
Code	Material type
S	316/316L Stainless Steel
M	Alloy 400
H	Alloy C-276

**Table A-10. Rosemount 1595 Orifice Plate Ordering Table**

Code	Orifice plate thickness	Plate type T	Plate type U
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)	See footnote <sup>(2)</sup>
D	0.500-in.	Line Size 24-in. (600 mm)	See footnote <sup>(2)</sup>
Code	Beta ratio		
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)		
Code	Options		
Flow calibration			
WC	Discharge Coefficient Verification (3 points)		
WD	Discharge Coefficient Verification (10 points)		
Plate holder			
PH	Plate Holder for Universal Type Orifice Plate for use with RTJ flange or section		
Special cleaning			
P2	Cleaning for special processes		
Special inspection			
QC1	Visual and dimensional Inspection with certification		
QC7	Inspection and performance certificate		
Material traceability certification			
Q8	Material Certification per ISO 10474 3.1-B and EN 10204 3.1		
Code conformance			
J5 <sup>(4)</sup>	NACE MR-0175 / ISO 15156		
Country certification			
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) Consult factory for availability of line sizes, flange ratings and plate thicknesses not shown.

(3) Previously PN64.

(4) 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.



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# Appendix B Product Certifications

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## B.1 Approved Manufacturing Locations

Rosemount Inc. — Chanhassen, Minnesota USA

## B.2 European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at [www.rosemount.com](http://www.rosemount.com). A hard copy may be obtained by contacting our local sales office.

### B.2.1 European Pressure Equipment Directive (PED) (97/23/EC)

Rosemount 1595 Conditioning Orifice Plate  
— Sound Engineering Practice (SEP)  
Pressure Transmitter  
— See appropriate Pressure Transmitter QIG

## B.3 Hazardous Locations Certifications

For information regarding the electronics product certification, see the appropriate transmitter QIG:

- Rosemount 3051SF Series Flowmeter Electronics with HART Protocol (document number 00825-0100-4801)
- Rosemount 3095MF Mass Flowmeter Electronics (document number 00825-0100-4716)







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