Product Data Sheet
00813-0100-4828, Rev EA
April 2005

Rosemount 1595 Conditioning Orifice Plate

- *Designed to provide superior performance in short straight pipe run, tight fit applications, and upstream flow disturbances.*
- *Requires only two diameters of straight pipe run after an upstream flow disturbance.*
- *Accurate and repeatable*
- *Comprehensive offering*
- *Suitable for most gas, liquid, and steam applications*
- *Patent-pending technology*

Content

Rosemount 1595 Conditioning Orifice Plate

The 1595 conditioning Orifice Plate is designed to provide superior performance in short straight pipe run, tight fit applications, and upstream flow disturbances.

1595 Conditioning Orifice Plate

- A revolutionary innovative technology based on the most common differential primary element in the industry
- Requires only two diameters of straight pipe run after an upstream flow disturbance
- Reduced installation costs
- Easy to use, prove, and troubleshoot
- Good for most gas, liquid, and steam as well as high temperature and high pressure applications

1595 Tailored Use

The 1595 can be used in conjunction with the Rosemount 1496 Flange Union / 1497 Meter Section. See Product Data Sheet document number 00813-0100-4792 and Figure 2 and 3 for 1496 and 1497 products.

FIGURE 1. Rosemount 1595 Conditioning Orifice Plate

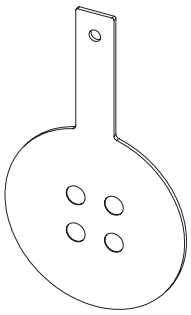


FIGURE 2. Rosemount 1496 Flange Union

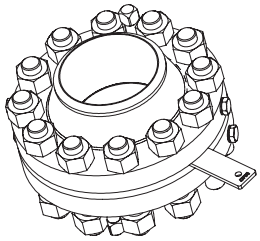
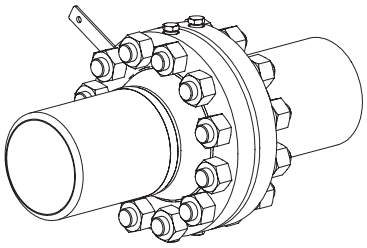


FIGURE 3. Rosemount 1497 Meter Section



Rosemount DP-Flow Solutions

Annubar Flowmeter Series: Rosemount 3051SFA, 3095MFA, 485, and 285

The state-of-the-art, fifth generation Rosemount 485 *Annubar* combined with the 3051S or 3095MV MultiVariable transmitter creates an accurate, repeatable and dependable insertion-type flowmeter. The Rosemount 285 provides a commercial product offering for your general purpose applications.

Compact Orifice Flowmeter Series: Rosemount 3051SFC, 3095MFC, and 405

Compact Orifice Flowmeters can be installed between existing flanges, up to a Class 600 (PN100) rating. In tight fit applications, a conditioning orifice plate version is available, requiring only two diameters of straight run upstream.

Integral Orifice Flowmeter Series: Rosemount 3051SFP, 3095MFP, and 1195

These integral orifice flowmeters eliminate the inaccuracies that become more pronounced in small orifice line installations. The completely assembled, ready to install flowmeters reduce cost and simplify installation.

Orifice Plate Primary Element Systems: Rosemount 1495 and 1595 Orifice Plates, 1496 Flange Unions and 1497 Meter Sections

A comprehensive offering of orifice plates, flange unions and meter sections that is easy to specify and order. The 1595 Conditioning Orifice provides superior performance in tight fit applications.

Specification

The Rosemount 1595 can be used with Rosemount 1496 Orifice Flange Unions and Rosemount 1497 Meter Sections. For product offering see document number 00813-0100-4792.

Performance

Flow Coefficient Uncertainty

TABLE 1. Discharge Coefficient Uncertainty

Beta Ratio(1)	Accuracy
β = 0.20	0.50%
β = 0.40	0.50%
β = 0.65	0.75%

(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)” on page 11” 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 2 lists recommended lengths of straight pipe.

TABLE 2. 1595 Straight Pipe Requirements(1) (2)

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

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

(2) Refer to ISO 5167 for recommended lengths when using flow straighteners.

Pressure Tap Orientation

Orient the 1595 Conditioning Orifice Plate to the effect that the pressure taps are centered between any 2 (of 4) orifice bore holes.

Centering Requirements

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

Functional

Service and Flow Range

Liquid, gas or vapor turbulent flow, for pipe Reynold’s Numbers greater than 2,000. 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

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_20
- 800 to 1200 °F (427 to 649 °C) and differential pressure up to 400 inH_20

Maximum Working Pressure

- Flange rating per ANSI B16.5.

Physical Specifications

Materials of Construction

Orifice Plate
TABLE 3.

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)
L	304/304L SST	A240 Gr 304/304L	S30400 / S30403	1.4301 / 1.4306
H	Hastelloy C-276	B575 Gr N10376	N10276	2.4819
M	Monel 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 and, if required, the Rosemount 1497 Meter Section. See Figures 2 and 3 and Product Data Sheet 00813-0100-4792 for more information regarding the Rosemount 1496 and 1497.

Orifice Bore Sizes

Beta (β) is calculated by 2 x d / pipe size.
TABLE 4.

Line Size	Beta (β) = 0.20	Beta (β) = 0.40	Beta (β) = 0.65
2-in (50.8 mm)	0.207 (5.26)	0.413 (10.49)	0.620 (15.75)
3-in. (76.2 mm)	0.307 (7.80)	0.614 (15.60)	0.997 (25.32)
4-in. (101.6 mm)	0.403 (10.25)	0.805 (20.45)	1.308 (32.22)
6-in. (152.4 mm)	0.607 (15.42)	1.213 (30.81)	1.971 (50.06)
8-in. (203.2 mm)	0.798 (20.27)	1.596 (40.54)	2.594 (65.89)
10-in. (254.0 mm)	1.002 (25.45)	2.004 (50.90)	3.257 (82.73)
12-in. (304.8 mm)	1.200 (30.48)	2.400 (60.96)	3.900 (99.06)
14-in. (355.0 mm)	1.312 (33.32)	2.625 (66.68)	4.265 (108.33)
16-in. (406.4 mm)	1.500 (38.10)	3.000 (76.20)	4.875 (123.83)
18-in. (457.2 mm)	1.688 (42.88)	3.375 (85.73)	5.485 (139.32)
20-in. (508.0 mm)	1.881 (47.78)	3.762 (95.55)	6.114 (155.30)
24-in. (609.6 mm)	2.262 (57.45)	4.525 (114.94)	7.353 (186.77)

Orifice Type

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

Dimensional Drawings

Rosemount 1595 Conditioning Orifice Plate

(ANSI, Paddle, Square edged, Concentric)

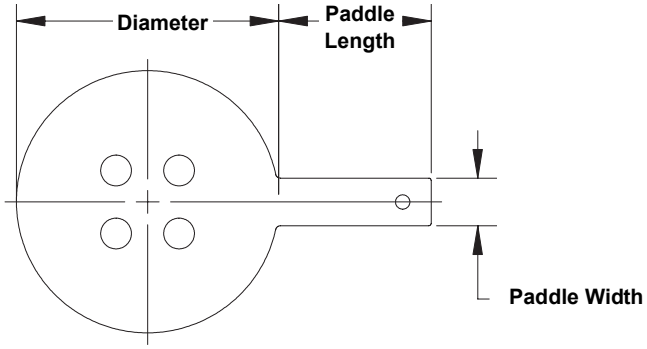


TABLE 5. Orifice Plate Dimensions in inches (millimeters)

	Diameter for Paddle Type						
Line Size	**300#**	**600#**	**900#**	**1500#**	**2500#**	**Paddle Length**	**Paddle Width**
2 -in. (50.8 mm)	4.375-in. (111.13 mm)	4.375-in. (111.13 mm)	5.625-in. (142.875 mm)	5.625-in. (142.875 mm)	5.750-in. (146.050mm)	4-in. (101.6 mm)	1-in. (25.4 mm)
3-in. (76.2 mm)	5.875-in. (149.23 mm)	5.875-in. (149.23 mm)	6.625-in. (168.275 mm)	6.875-in. (174.625 mm)	7.750-in. (196.85 mm)	4-in. (101.6 mm)	1 1/4-in. (31.75 mm)
4-in. (101.6 mm)	7.125-in. (180.98 mm)	7.125-in. (180.98 mm)	8.125-in. (206.35 mm)	8.250-in. (209.550 mm)	9.250-in. (234.95 mm)	4-in. (101.6 mm)	1 1/4-in. (31.75 mm)
6-in. (152.4 mm)	9.875-in. (250.83 mm)	10.500-in. (266.7 mm)	11.375-in. (288.925 mm)	11.125-in. (282.575 mm)		5-in. (127 mm)	1 1/2-in. (38.1 mm)
8-in. (203.2 mm)	12.125-in. (307.98 mm)	12.625-in. (320.675 mm)	14.125-in. (358.775 mm)			5-in. (127 mm)	1 1/2-in. (38.1 mm)
10-in. (254.0 mm)	14.250-in. (361.95 mm)	15.750-in. (400.05 mm)	17.125-in. (434.975 mm)			6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
12-in. (304.8 mm)	16.625-in. (422.26 mm)	18.000-in. (457.2 mm)				6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
14-in. (355.6 mm)	19.125-in. (485.78 mm)	13.375-in. (339.725 mm)				6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
16-in (406.4 mm)	21.250-in. (539.75 mm)	22.250-in. (565.15 mm)	Consult factory	Consult factory	Consult factory	6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
18-in. (457.2 mm)	23.375-in. (593.725 mm)	24.000-in. (609.6 mm)				6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
20-in. (580.0 mm)	25.625-in. (650.875 mm)	26.750-in. (679.45 mm)				6-in. (152.4 mm)	1 1/2-in. (38.1 mm)
24-in. (609.6 mm)	30.375-in. (771.525 mm)	31.000-in. (787.4 mm)				6-in. (152.4 mm)	1 1/2-in. (38.1 mm)

1595U Orifice Universal Type

(Universal, Square edged, Concentric

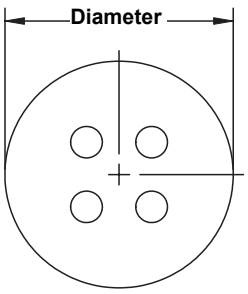


TABLE 6. Orifice Plate Dimensions in inches (millimeters)

Line Size (1)	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)

(1) Consult Factory for sizes larger than 10-inch.

Rosemount 1595 Conditioning Orifice Plate

(DIN, Paddle, Square edged, Concentric)

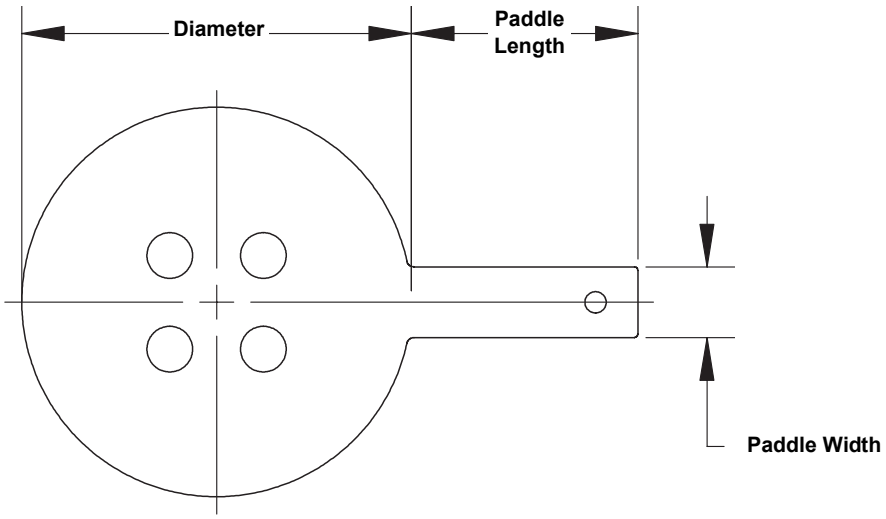


TABLE 7. Orifice Plate Dimensions in millimeters (inches)

DN	Diameter (max) – by flange rating						Handle Length	Handle 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)	160 (6.299)	40 (1.575)
DN 80 (3-in.)	142 (5.60)	142 (5.60)	142 (5.60)	142 (5.60)	148 (5.82)	154 (6.06)	160 (6.299)	40 (1.575)
DN 100 (4-in.)	162 (6.38)	162 (6.38)	168 (6.61)	168 (6.61)	174 (6.85)	180 (7.09)	160 (6.299)	40 (1.575)
DN 150 (6-in.)	218 (8.58)	218 (8.58)	224 (8.82)	224 (8.82)	247 (9.72)	257 (10.12)	160 (6.299)	40 (1.575)
DN 200 (8-in.)	273 (10.74)	273 (10.74)	284 (11.18)	290 (11.42)	309 (12.17)	324 (12.76)	160 (6.299)	40 (1.575)
DN 250 (10-in.)	12.91 (328)	329 (12.95)	340 (13.39)	352 (13.86)	364 (14.33)	391 (15.39)	160 (6.299)	40 (1.575)
DN 300 (12-in.)	378 (14.88)	384 (15.11)	400 (15.75)	417 (16.42)	424 (16.69)	458 (18.03)	160 (6.299)	40 (1.575)

NOTE:
Available with Paddle type (P) only up to DN 300 (12-in.) and PN 100.

TABLE 8. A.P.I Ring No.'s and Rating

Line Size	A.P.I Ring No.	Rating (lbs.)
02	R-23	300-600
02	R-24	900-1500
02	R-26	2500
03	R-31	300-600 & 900
03	R-35	1500
04	R-37	300-600 & 900
04	R-39	1500
06	R-45	300-600 & 900
06	R-46	1500
08	R-49	300-600 & 900
10	R-53	300-600 & 900
12	R-57	300-600 & 900
14	R-61	300-600
14	R-62	900
16	R-65	300-600
16	R-66	900
18	R-69	300-600
18	R-70	900
20	R-73	300-600
20	R-74	900
24	R-77	300-600
24	R-78	900

NOTE
Refer to Table 5 for line size and pressure rating availability.

TABLE 9. Available Beta Ratio (β)

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

Line Size	Pipe Schedule	Beta (β) Available
2	≤80	0.20, 0.40, 0.60
2	160	0.20
2	XXS	0.20
3	≤80	0.20, 0.40, 0.65
3	160	0.20, 0.40
3	XXS	0.20
4	≤80	0.20, 0.40, 0.65
4	120	0.20, 0.40
4	160	0.20, 0.40
4	XXS	0.20
6	≤80	0.20, 0.40, 0.65
6	120	0.20, 0.40
6	160	0.20, 0.40
6	XXS	0.20
8	≤80	0.20, 0.40, 0.65
8	100	0.20, 0.40, 0.65
8	120	0.20, 0.40
8	140	0.20, 0.40
8	160	0.20, 0.40
8	XXS	0.20, 0.40
10	≤80	0.20, 0.40, 0.65
10	100	0.20, 0.40, 0.65
10	120	0.20, 0.40
10	140	0.20, 0.40
10	160	0.20, 0.40
10	XXS	0.20, 0.40
12	≤80	0.20, 0.40, 0.65
12	100	0.20, 0.40
12	120	0.20, 0.40
12	140	0.20, 0.40
12	160	0.20, 0.40
12	XXS	0.20, 0.40
14	≤80	0.20, 0.40, 0.65
14	100	0.20, 0.40
14	120	0.20, 0.40
14	140	0.20, 0.40
14	160	0.20, 0.40
14	XXS	0.20, 0.40
16	≤80	0.20, 0.40, 0.65
16	100	0.20, 0.40
16	120	0.20, 0.40
16	140	0.20, 0.40
16	160	0.20, 0.40
16	XXS	0.20, 0.40
18	≤80	0.20, 0.40, 0.65
18	100	0.20, 0.40, 0.65
18	120	0.20, 0.40
18	140	0.20, 0.40
18	160	0.20, 0.40
18	XXS	0.20, 0.40
20	≤80	0.20, 0.40, 0.65
20	100	0.20, 0.40, 0.65
20	120	0.20, 0.40
20	140	0.20, 0.40
20	160	0.20, 0.40
20	XXS	0.20, 0.40
24	≤80	0.20, 0.40, 0.65
24	100	0.20, 0.40
24	120	0.20, 0.40
24	140	0.20, 0.40
24	160	0.20, 0.40
24	XXS	0.20, 0.40

Ordering Information

Rosemount 1595 Orifice Plate Ordering Table

Model	Product Description
1595	Conditioning Orifice Plate
Code	**Plate Type**
P	Paddle, Square Edged
U [1]	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	24-in. (600 mm)
260[2]	26-in. (650 mm)
280[2]	28-in. (700 mm)
300[2]	30-in. (750 mm)
Code	**Flange Rating**
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	Flange DIN PN 10 (only available with Plate Type P)
D2	Flange DIN PN 16 (only available with Plate Type P)
D3	Flange DIN PN 25 (only available with Plate Type P)
D4	Flange DIN PN40 (only available with Plate Type P)
D5[3]	Flange DIN PN 63 (only available with Plate Type P)
D6	Flange DIN PN 100 (only available with Plate Type P)
R3	ANSI Class 300 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)
R6	ANSI Class 600 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)
R9	ANSI Class 900 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)
RF	ANSI Class 1500 Ring Joint (only available with Orifice Plate Type code U and requires Plate Holder code PH)
RT	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
L	304/304L Stainless Steel
M	*Monel*®
H	*Hastelloy*® C-276
Code	**Orifice Plate Thickness**
A	0.125-in. (default for Line Sizes 2 to 4-in. (50 mm to 100 mm))
B [4]	0.250-in. (default for Line Sizes 6 to 12-in. (150 to 300 mm))
C [5]	0.375-in. (default for line sizes 14 to 20-in. (350 to 500 mm))
D	0.500-in. (default for line sizes 24-in. (600 mm))

Rosemount 1595 Orifice Plate Ordering Table

Code	Beta Ratio
020	0.20 Beta Ratio
040	0.40 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 (full 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.B
Code Conformance	
J5(6)	NACE MR-0175 / ISO 15156
Country Certification	
J1	Canadian Registration
Typical Model Number: 1595 P 060 A3 S A 040	

(1) Available up to 10-in. (250 mm) line size.

(2) Consult factory for availability.

(3) Previously PN64.

(4) For a Universal plate style in a 6-in. line size, the plate thickness is 0.125-in. and you will need to select code A.

(5) For a Universal plate style in a 14-in. line size, the plate thickness is 0.250-in. and you will need to select code B.

(6) Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 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.

Calculation Data Sheet

This Calculation Data Sheet can be provided. The detailed sizing calculation may be done through the “Configuration Data Sheet (CDS)” on page 11.

ROSEMOUNT INC.
1595 CONDITIONING ORIFICE PLATE
CALCULATION DATA SHEET

GENERAL DATA

Customer:	Customer Name
Project:	2004 Official Calculations
S. O. No:	Sales Order Number
P. O. No:	Customer Name
Calc. Date:	4/7/2004
Model No:	1595P080A3SB040
Tag No:	Tag Number

PRODUCT DESCRIPTION

Plate Type:	Paddle, Square-Edged	Tap Type:	Flange tapping
Plate Material:	316 SST	Tap Location:	Upstream
		Line Size:	8-in. (200 mm) (DN 200)
Process Connection:		Pipe Schedule:	40
		Pipe Material:	Carbon Steel

INPUT DATA

Fluid Type:	Steam		Calibration Factor:	1.000
Fluid Description:				
Pipe I.D.:	7.981	inch		
Pressure:	60.000023	psig	Base Pressure	
Temperature at Flow:	307.33	F	Base Temperature	
Absolute Viscosity:	0.01409	cP		
Isentropic Exponent:	1.31746			
Compressibility at Flow:			Base Compressibility	
Density at Flow:	0.171328	lb/ft^3	Base Density	
			Atmospheric Pressure:	14.696 psia
Flow Rates:				
Minimum:	6000.00	lb/hr		
Normal:	8000.00	lb/hr		
Maximum:	10000.00	lb/hr		
Full Scale:	10000.00	lb/hr		

CALCULATED DATA (Calculation performed at normal conditions)

Orifice Bore Size:	0.596	inch	Bore Reynolds Number (Normal):	1120650	
Orifice Effective Bore Size:	3.192	inch	Pipe Reynolds Number (Normal):	448514	
DP at Minimum Flow:	42.859	in H_2O at 68 °F	Gas Expansion Factor:	0.9900	
DP at Normal Flow:	76.194	in H_2O at 68 °F	Permanent Pressure Loss:		
DP at Maximum Flow:	119.054	in H_2O at 68 °F	at Normal Flow:	62.671	in H_2O at 68 °F
URV (DP at Full Scale):	119.054	in H_2O at 68 °F	at Max Flow:	97.928	in H_2O at 68 °F
Beta:	0.400		Velocity at Max. Flow:	46.669	ft/sec
Discharge Coefficient:	0.6009		Minimum Accurate Flow:	1313.27	lb/hr
Max. Allow. Pressure at Temp:	555.500	psig @ 310 °F			

Warnings

Gas Expansion Factor Notice at Normal Flow.
Calculation by HL

Notes

Version: 3.0 (Build 109B) Printed on: 8-Apr-04

Configuration Data Sheet (CDS)

DP FLOW CDS

Complete this form to define a custom flow configuration for DP Flowmeters. Unless specified, the flowmeter will be shipped with the default values identified by the H symbol.

For technical assistance in filling out this CDS, call a Rosemount representative.

NOTE
Any missing information will be processed with the indicated default values.

* = Required Item
★ = Default

Customer Information

Customer: Contact Name:

Customer Phone: Customer Fax:

Customer Approval Sign-Off: Customer PO:

Calculation Approval

❑ Check this box if you require a calculation for approval prior to manufacturing

Application and Configuration Data Sheet (Required with Order)

Tag:

Model No (1)

* **Select fluid type** ❑ Liquid ❑ Gas ❑ Steam

* **Fluid name**(2)

Flowmeter Information (optional)

* Failure Mode Alarm Direction (select one) ❑ Alarm High★ ❑ Alarm Low

Software Tag: ___ ___ ___ ___ ___ ___ ___ ___ (8 characters)

Descriptor: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ (16 characters)

Message: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ (32 characters)

Date: Day __ __ (numeric) Month __ __ (numeric) Year __ __ (numeric)

(1) A complete model number is required before Rosemount Inc. can process the order.

(2) If the Fluid is not located in Table 10 on page 13, the "Fluid Data Sheet (FDS)" on page 14 must be completed.

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S.O.: LI

CHAMP: DATE:

ADMIN:

* = Required Item
★ = Default

Primary Element Information

* Select Differential Producer (Select One)

Annubar
❑ 485 *Annubar*/ 3095MFA Mass *ProBar*, 3051SFA *ProBar*
❑ 285 *Annubar* Primary Element Series
❑ *Annubar* Diamond II + / Mass *Probar*
❑ Long Radius Wall Taps, ASME
❑ Long Radius Wall Taps, ISO
❑ ISA 1932, ISO

Venturi
❑ Nozzle, ISO
❑ Rough Cast/Fabricated Inlet, ASME
❑ Round Cast Inlet, ISO
❑ Machined Inlet, ASME
❑ Machined Inlet, ISO
❑ Welded Inlet, ISO

Other (All options require a discharge coefficient value)
❑ Calibrated Orifice: Flange, Corner, or D & D/2 Taps.
Discharge coefficient: _____
❑ Calibrated Orifice: $2^1/_2$ D & 8D Taps
Discharge coefficient: _____
❑ Calibrating Nozzle
Discharge coefficient: _____
❑ Calibrating Venturi
Discharge coefficient: _____
❑ Area Averaging Meter
Discharge coefficient: _____
❑ V-Cone®
Discharge coefficient: _____

Orifice
❑ 3051SFP, 3095MFP, 1195
❑ 405C, 405P, 3051SFC, 3095MFC
❑ 1595 Conditioning Orifice
❑ $2^1/_2$D & 8D Taps, ASME
❑ Corner Taps, ASME
❑ Corner Taps, ISO
❑ D & D/2 Taps, ASME
❑ D & D/2 Taps, ISO
❑ D & D/2 Taps, ISO 99 Amendment 1
❑ Flange Taps, AGA
❑ Flange Taps, ASME
❑ Flange Taps, ISO
❑ Flange Taps, ISO 99 Amendment 1
❑ Small Bore, Flange Taps, ASME

Diameter (d) _____ ❑ inch★ ❑ millimeters at _____ ❑ °F ❑ °C ❑ 68 °F★

Special *Annubar* dimension (required if customer supplies mounting hardware). ❑ ODF _____ ❑ ODT _____

Pipe Information

* Orientation / Flow Direction: ❑ Vertical Up ❑ Vertical Down ❑ Horizontal

* Line Size / Schedule: _____ Body I.D. (D): _____

Materials of Construction

* Pipe Material ❑ Carbon Steel ❑ 304 SST ❑ 316 SST ❑ *Hastelloy* ❑ Other _____

* Primary Element Material ❑ 316 SST ❑ *Hastelloy* ❑ Other _____ (Please verify material availability)

Operating Conditions

	4 mA value	Minimum	Normal	Maximum	Full Scale:20 mA flow rate (design to P and T)	Design
Flow Rate	0	*(1)	*	*		
Pressure (P)	—	*(1)	*	*(1)	*(2)	
Temperature (T)	—	*(1)	*	*(1)	*	

RTD Mode

❑ Normal Mode ★ (Requires a RTD to be connected. If the RTD is disconnected or fails, the 3095MV output goes to alarm value)

❑ Fixed Temperature Mode: Specify the fixed temperature value _____ ❑ °F ❑ °C

❑ Backup Mode (Uses the connected RTD for temperature measurement. If the RTD is disconnected or fails, the transmitter uses a fixed temperature value as a backup. This will not cause the mA output to go to alarm value and can potentially cause inaccurate flow measurement.) Fixed temperature value to be used as backup_____ ❑ °F ❑ °C

* = Required Item
★ = Default

Base Conditions

❑ Standard Base (P=14.696 psia / 101.325 kPa abs, T= 60 °F (15.56 °C))

❑ Normal Base (P=14.696 psia / 101.325 kPa abs, T= 32 °F (0 °C))

❑ Standard Base for Natural Gas (AGA) (P=14.73 psia, T= 60°F (15.56 °C))

❑ User Defined: P= _____ Units: _____ T= _____ Units = _____

Compressibility at Base: _____ OR Density at Base: _____

(1) Operating ranges for pressure and temperature are needed for transmitter configuration.

(2) Required to verify that the product selection meets design criteria.

TABLE 10. Rosemount Fluids Database(1)

Acetic Acid	Divinyl Ether	Methane	n-Hexane	1-Heptanol
Acetone	Ethane	Methanol	n-Octane	1-Heptene
Acetonitrile	Ethanol	Methyl Acrylate	n-Pentane	1-Hexene
Acetylene	Ethylamine	Methyl Ethyl Ketone	Oxygen	1-Hexadecanol
Acrylonitrile	Ethylbenzene	Methyl Vinyl Ether	Pentafluorothane	1-0ctanol
Air	Ethylene	m-Chloronitrobenzene	Phenol	1-Octene
Allyl Alcohol	Ethylene	Neon	Propadiene	1-Nonanol
Ammonia	GlycolEthylene	Neopentane	Pyrene	1-Pentadecanol
Argon	Oxide	Nitric Acid	Propylene	1-Pentanol
Benzene	Fluorene	Nitric Oxide	Styrene	1-Pentene
Benzaldehyde	Furan	Nitrobenzene	Sulfer Dioxide	1-Undecanol
Benzyl Alcohol	Helium-4	m-Dichlorobenzene	Propane	1-Nonanal
Biphenyl	Hydrazine	Nitroethane	Toluene	1,2,4- Trichlorobenzene
Carbon Dioxide	Hydrogen	Nitrogen	Trichloroethylene	1,1,2- Trichloroethane
Carbon Monoxide	Hydrogen Chloride	Nitromethane	Vinyl Acetate	1,1,2,2- Tetrafluoroethane
Carbon Tetrachloride	Hydrogen Cyanide	Nitrous Oxide	Vinyl Chloride	1,2-Butadiene
Chlorine	Hydrogen Peroxide	n-Butane	Vinyl Cyclohexane	1,3-Butadiene
Chlorotrifluoroethylene	Hydrogen Sulfide	n-Butanol	Water	1,3,5- Trichlorobenzene
Chloroprene	Isobutane	n-Butyraldehyde	1-Butene	1,4-Dioxane
Cycloheptane	Isobutene	n-Butyronitrile	1-Decene	1,4-Hexadiene
Cyclohexane	Isobutyl benzene	n-Decane	1-Decanal	2-Methyl-1-Pentene
Cyclopentane	Isopentane	n-Dodecane	1-Decanol	2,2-Dimethylbutane
Cyclopentene	Isoprene	n-Heptadecane	1-Dodecene	
Cyclopropane	Isopropanol	n-Heptane	1-Dodecanol	

(1) This list is subject to change without notice. Steam per ASME Steam tables. All other fluids per AIChE.

Drawing/Notes

Fluid Data Sheet (FDS)

For custom fluid not in the Rosemount Fluid Database

For technical assistance in filling out this CDS, call your local Rosemount representative. Complete this form to define a custom fluid. The H symbol identifies the default value.

NOTE
This form is not required if using the Rosemount Fluid Database.

* = Required Item
★ = Default

Customer Information	
Customer:	Contact Name:
Customer Phone:	Customer Fax:
	Customer PO:

Fluid Properties	
❑ Custom Liquid– Complete Table	❑ Liquid
❑ Custom Gas– Complete Table	❑ Gas
❑ Custom Natural Gas– Complete Table	❑ Natural Gas

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S.O.:	LI
CHAMP:	DATE:
	ADMIN:

TABLE 11. Custom Liquid Worksheet

* = Required Item

★ = Default

Mass Liquid Density and Viscosity Information

1. Fill in the following operating temperatures

   a) _____ min

   b) _____ [1/3 (max - min))] + min

   c) _____ [2/3 (max - min))] + min

   d) _____ max

2. **Transfer the values from the above section to the numbered lines below.**
3. Check one Density box, then enter the values for each temperature and the standard density.
4. Check one Viscosity box, then enter values for each temperature. (At least one viscosity value is required).

Density	Viscosity
❑ Density in lbs/CuFt	❑ Viscosity in centipoise
❑ Density in kg/CuM	❑ Viscosity in lbs/ft sec
	❑ Viscosity in pascal sec
Temperature	Temperature
a) _____ min	a) _____ min.
b) _____ [1/3 (max - min))] + min	b) _____ [1/3 (max - min))] + min
c) _____ [2/3 (max - min))] + min	c) _____ [2/3 (max - min))] + min
d) _____ max	d) _____ max

Base density: _____
(at base reference conditions specified)

Volumetric Liquid Density and Viscosity Information

* Density at Flow: _____ Units: ❑ lb/ft^3 ❑ Kg/m^3 ❑ Other:

OR

Specific Gravity at Flow: _____

* Viscosity at Flow: _____ Units: ❑ Centipoise ❑ Other:

TABLE 12. Custom Gas Worksheet

* = Required Item

★ = Default

Mass Gas Compressibility and Viscosity Information

1. Fill in the following operating pressures and operating temperatures

Operating Pressures	Operating Temperatures
1) _____ min	5) _____ min
2) _____ [1/3 (max - min))] + min	6) _____ [1/2 (max - min))] + min
3) _____ [2/3 (max - min))] + min	7) _____ max
4) _____ max	8) _____ [1/3 (max - min))] + min
	9) _____ [2/3 (max - min))] + min

2. **Transfer the values from the above section to the numbered lines below**
3. Check one Density/Compressibility box, then enter the 12 values for each pressure/temperature range.
4. Check one Viscosity box, then enter values for each temperature. (At least one viscosity value is required).
5. Enter values for molecular weight, isentropic exponent, and standard density (or standard compressibility).

Density
- ❑ Density in lbs/CuFt
- ❑ Density in kg/CuM
- ❑ Compressibility

Viscosity
- ❑ Viscosity in centipoise
- ❑ Viscosity in lbs/ft sec
- ❑ Viscosity in pascal sec

Pressure	Temperature	Viscosity Temperature
1) _____	5) _____	5) _____
2) _____	5) _____	8) _____
3) _____	5) _____	9) _____
4) _____	5) _____	7) _____
1) _____	6) _____	
2) _____	6) _____	Molecular Weight: _____
3) _____	6) _____	Isentropic Exponent: _____ 1.4 ★
4) _____	6) _____	
1) _____	7) _____	
2) _____	7) _____	
3) _____	7) _____	
4) _____	7) _____	

Standard density/compressibility: _____

Volumetric Gas Compressibility and Viscosity Information

* Density at Flow: _____ Units: ❑ lb/ft^3 ❑ Kg/m^3 ❑ Other:

OR

M.W. / Specific Gravity at Flow: _____

Compressibility at Flow: _____

Compressibility at Base: _____

* Viscosity at Flow: _____ Units: ❑ Centipoise ❑ Other: Isentropic Exponent (K):_____ 1.4 ★

TABLE 13. Natural Gas Worksheet

NOTE
The minimum requirement for the Volumetric options is highlighted gray on page 17.

Compressibility Factor Information

Choose desired characterization method and only enter values for that method.

❑ Detail Characterization Method (AGA8 1992)			Mole	Valid Range
CH_4	Methane mole percent	_____	%	0 – 100 percent
N_2	Nitrogen mole percent	_____	%	0 – 100 percent
CO_2	Carbon Dioxide mole percent	_____	%	0 – 100 percent
C_2H_6	Ethane mole percent	_____	%	0 – 100 percent
C_3H_8	Propane mole percent	_____	%	0 – 12 percent
H_2O	Water mole percent	_____	%	0 – Dew point
H_2S	Hydrogen Sulfide mole percent	_____	%	0 – 100 percent
H_2	Hydrogen mole percent	_____	%	0 – 100 percent
CO	Carbon monoxide mole percent	_____	%	0 – 3.0 percent
O_2	Oxygen mole percent	_____	%	0 – 21 percent
C_4H_{10}	i-Butane mole percent	_____	%	0 – 6 percent(1)
C_4H_{10}	n-Butane mole percent	_____	%	0 – 6 percent(1)
C_5H_{12}	i-Pentane mole percent	_____	%	0 – 4 percent(2)
C_5H_{12}	n-Pentane mole percent	_____	%	0 – 4 percent
C_6H_{14}	n-Hexane mole percent	_____	%	0 – Dew Point
C_7H_{18}	n-Heptane mole percent	_____	%	0 – Dew Point
C_8H_{18}	n-Octane mole percent	_____	%	0 – Dew Point
C_9H_{2O}	n-Nonane mole percent	_____	%	0 – Dew Point
$C_{10}H_{22}$	n-Decane mole percent	_____	%	0 – Dew Point
He	Helium mole percent	_____	%	0 – 3.0percent
Ar	Argon mole percent	_____	%	0 – 1.0 percent

❑ Gross Characterization Method, Option Code 1 (AGA8 Gr-Hv-CO_2)			Mole	Valid Range
	Specific Gravity at 14.73 psia and 60 °F	_____		0.554 – 0.87
	Volumetric gross heating value at base conditions	_____	BTU/SCF	477 – 1150 BTU/SCF
	Carbon Dioxide mole percent	_____	%	0 – 30 percent
	Hydrogen mole percent	_____	%	0 – 10 percent
	Carbon Monoxide mole percent	_____	%	0 – 3.0 percent

❑ Gross Characterization Method, Option Code 2 (AGA8 Gr-CO_2-N_2)			Mole	Valid Range
	Specific Gravity at 14.73 psia and 60 °F	_____	%	0.554 – 0.87
	Carbon Dioxide mole percent	_____	%	0 – 30 percent
	Nitrogen mole percent	_____	%	0 – 50 percent
	Hydrogen mole percent	_____	%	0 – 10 percent
	Carbon Monoxide mole percent	_____	%	0 – 3.0 percent

(1) The summaries of i-Butane and n-Butane cannot exceed 6 percent.

(2) The summaries of i-Pentane and n-Pentane cannot exceed 4 percent.

Notes

Notes

Rosemount 1595

Emerson Process Management

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