

Rosemount 285 Annubar Primary Element

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 a calculation for approval prior to manufacturing is required

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 6 on page 14, the "Fluid Data Sheet (FDS)" on page 15 must be completed.

For Rosemount Use Only

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

285/15-49007-902, 15-49007-903

Rosemount 285 Annubar Primary Element

* = 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: 2¹/₂ D & 8D Taps

Discharge coefficient: _____

- Calibrating Nozzle

Discharge coefficient: _____

- Calibrating Venturi

Discharge coefficient: _____

- Area Averaging Meter

Discharge coefficient: _____

- V-Cone®

Discharge coefficient: _____

Diameter (d) _____

Orifice

- 3051SFP, 3095MFP, 1195
- 405C, 405P, 3051SFC, 3095MFC
- 1595 Conditioning Orifice
- 2¹/₂D & 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

inch★

millimeters

at _____

°F

°C

68 °F★

ODF _____

ODT _____

Special Annubar dimension (required if customer supplies mounting hardware).

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

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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 6. 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-Octanol
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	Sulfur 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 an Emerson Process Management 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

<input type="checkbox"/> Custom Liquid– Complete Table	<input type="checkbox"/> Liquid
<input type="checkbox"/> Custom Gas– Complete Table	<input type="checkbox"/> Gas
<input type="checkbox"/> Custom Natural Gas– Complete Table	<input type="checkbox"/> Natural Gas

For Rosemount Use Only

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

Rosemount 285 Annubar Primary Element

TABLE 7. Custom Liquid Worksheet

* = Required Item

★ = Default

Mass Liquid Density and Viscosity Information

1. Fill in the following operating temperatures

- a) _____ min
- b) _____ [$^{1/3}(\text{max} - \text{min})$] + min
- c) _____ [$^{2/3}(\text{max} - \text{min})$] + 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

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

Viscosity

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

Temperature

- a) _____ min
- b) _____ [$^{1/3}(\text{max} - \text{min})$] + min
- c) _____ [$^{2/3}(\text{max} - \text{min})$] + min
- d) _____ max

Temperature

- a) _____ min.
- b) _____ [$^{1/3}(\text{max} - \text{min})$] + min
- c) _____ [$^{2/3}(\text{max} - \text{min})$] + min
- d) _____ max

Base density: _____
(at base reference conditions specified)

Volumetric Liquid Density and Viscosity Information

* Density at Flow: _____ Units: lb/ft³ Kg/m³ Other:

OR

Specific Gravity at Flow: _____

* Viscosity at Flow: _____ Units: Centipoise Other:

TABLE 8. Custom Gas Worksheet

* = Required Item

★ = Default

Mass Gas Compressibility and Viscosity Information

1. Fill in the following operating pressures and operating temperatures

Operating Pressures

- 1) _____ min
- 2) _____ [$^{1/3}$ (max - min))] + min
- 3) _____ [$^{2/3}$ (max - min))] + min
- 4) _____ max

Operating Temperatures

- 5) _____ min
- 6) _____ [$^{1/2}$ (max - min))] + min
- 7) _____ 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

Pressure Temperature

- | | |
|----------|----------|
| 1) _____ | 5) _____ |
| 2) _____ | 5) _____ |
| 3) _____ | 5) _____ |
| 4) _____ | 5) _____ |
| 1) _____ | 6) _____ |
| 2) _____ | 6) _____ |
| 3) _____ | 6) _____ |
| 4) _____ | 6) _____ |
| 1) _____ | 7) _____ |
| 2) _____ | 7) _____ |
| 3) _____ | 7) _____ |
| 4) _____ | 7) _____ |

Viscosity

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

- 5) _____
- 8) _____
- 9) _____
- 7) _____

Molecular Weight: _____

Isentropic Exponent: _____ 1.4 ★

Standard density/compressibility: _____

Volumetric Gas Compressibility and Viscosity Information

* Density at Flow: _____ Units: lb/ft³ Kg/m³ 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 ★

Rosemount 285 Annubar Primary Element

TABLE 9. Natural Gas Worksheet

NOTE

The minimum requirement for the Volumetric options is highlighted gray on page 18.

Compressibility Factor Information

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

<input type="checkbox"/> 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 ₂ H ₆	Ethane mole percent _____	%	0 – 100 percent
C ₃ H ₈	Propane mole percent _____	%	0 – 12 percent
H ₂ O	Water mole percent _____	%	0 – Dew point
H ₂ S	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 ₄ H ₁₀	i-Butane mole percent _____	%	0 – 6 percent ⁽¹⁾
C ₄ H ₁₀	n-Butane mole percent _____	%	0 – 6 percent ⁽¹⁾
C ₅ H ₁₂	i-Pentane mole percent _____	%	0 – 4 percent ⁽²⁾
C ₅ H ₁₂	n-Pentane mole percent _____	%	0 – 4 percent
C ₆ H ₁₄	n-Hexane mole percent _____	%	0 – Dew Point
C ₇ H ₁₈	n-Heptane mole percent _____	%	0 – Dew Point
C ₈ H ₁₈	n-Octane mole percent _____	%	0 – Dew Point
C ₉ H ₂₀	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

<input type="checkbox"/> 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

<input type="checkbox"/> 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.