# ROSEMOUNT® SPECIFICATIONS

## Model 8800C Vortex Flowmeter

00815-0100-4003
English
Rev CA

### 1. EQUIPMENT DESCRIPTION

- Two-wire piezoelectric-based vortex shedding flowmeter
  - Fully cast, all-welded meter body
  - Non-clogging sensor design
  - Adaptive Digital Signal Processing filtering
  - HART® and FOUNDATION™ fieldbus communication capabilities

### 2. ENVIRONMENTAL CONDITIONS

- The instrument selected shall be suitable for the following conditions:
  - Humidity: 0–95% relative humidity under noncondensing conditions
  - Ambient temperature limits
    - HART: –58 to 185 °F (–50 to 85 °C)
    - FOUNDATION fieldbus: –40 to 185 °F (–40 to 85 °C)
- Flowmeter shall have a dual-compartment housing with a moisture barrier totally isolating the electronic circuitry from the field wiring and communication terminals

### 3. PROCESS CONDITIONS

- Suitable for liquid, gas, and steam in homogeneous, single-phase state
- Process temperature limits:
  - Standard range sensor: –40 to 450 °F (–40 to 232 °C)
  - Extended range temperature sensor: –330 to 800 °F (–200 to 427 °C)

### 4. ELECTRICAL

- Flowmeter shall be certified for use in hazardous areas by a recognized authority, such as Factory Mutual
- Electrical connections shall include a choice of: ½–14 NPT, M20 × 1.5 or PG 13.5

### 5. POWER SUPPLY

- HART communication: flowmeter shall operate on 10.8 to 42 V dc with no load
- FOUNDATION fieldbus communication: flowmeter shall operate on 9 to 32 V dc, 17.8 mA nominal, 19 mA maximum

### 6. LINE SIZES

- Flowmeter shall be available in the following line sizes:
  - Wafer, flanged, and dual-sensor style: ½-,1-,1½-, 2-, 3-, 4-, 6-, and 8-inch
- Flanged-style flowmeters shall be available with ANSI Class 150, 300, or 600 or DIN PN 10, 16, 25, 40, 64, or 100 or JIS 10K, 20K, or 40K flanges in each of the above sizes

### 7. OUTPUTS

- Outputs shall be a 4–20 mA analog signal with a superimposed HART digital signal
- Analog output shall be adjustable remotely with a field communicator or a control system
- A simultaneous, independently scalable pulse/frequency output (0 to 10,000 Hz) also available with HART
- FOUNDATION fieldbus output also available

## 8. SOFTWARE FUNCTIONALITY

- Flowmeter shall be capable of simultaneous communication over the 4–20 mA output signal enabling process variable information to be available digitally
- Flowmeter shall perform continuous diagnostics, be capable of self-test functions and be able to give specific diagnostic information
- Accessible test points shall be available for ISO electronics verification
- Transmitter shall be able to calculate density ratio for standard and normal flow units
- Transmitter shall have flow simulation capabilities by an internal flow generator
- The shedding frequency at the Upper Range Value shall be available

## 9. PERFORMANCE

- The flowmeter shall meet the following performance criteria as a minimum:
  - Accuracy:

    *Liquids (for Reynolds numbers over 20,000)*

    – Digital and Pulse output: ±0.65% of rate

    – Analog output: same as pulse plus an additional 0.025% of span

    *Gas & Steam (for Reynolds numbers over 15,000)*

    – Digital and Pulse output: ±1.35% of rate

    – Analog output: same as pulse plus an additional 0.025% of span

    *Accuracy Limitations:*

    – ½- and 1-in. (DN 15 and DN 25): max velocity of 220 ft/s (67.06 m/s)

    – Dual-style meters (all sizes): max velocity of 100 ft/s (30.5 m/s)
  - Stability: ±0.1% of rate over one year
  - Ambient temperature effect:

    Digital and pulse outputs: no effect

    Analog output: ±0.1% of span from -40 to 185 °F (-40 to 85 °C)
  - Process temperature effect:

    Flowmeter shall have an automatic K-factor correction with user-entered process temperature
  - Mating pipe I.D. effect:

    Flowmeter shall have an automatic K-factor correction with user-entered mating pipe I.D.

## 10. MEASURABLE FLOW RATES

Flowmeter shall be capable of processing signals from flow applications which meet the following sizing requirements stated in Table 1,Table 2, and Table 3. Process conditions must be within both the Reynolds number and velocity limitations for the desired size.

TABLE 1.Minimum Measurable Reynolds Number

| Line Sizes | Reynolds Number Limitations |
|---|---|
| 1/2 through 4/15 through 100 | 10,000 minimum |
| 6 through 8/150 through 200 | 20,000 minimum |

TABLE 2.Minimum Measurable Velocities
(use the larger of the two values)

| | Feet per second | Meters per second |
|---|---|---|
| **Liquids** | $\sqrt{36/\rho}$ or 0.7 | $\sqrt{54/\rho}$ or 0.22 |
| **Gases** | $\sqrt{36/\rho}$ or 6.5 | $\sqrt{54/\rho}$ or 2.0 |

TABLE 3.Minimum Measurable Velocities
(use the smaller of the two values)

| | Feet per second | Meters per second |
|---|---|---|
| **Liquids** | $\sqrt{(90,000)/\rho}$ or 25 | $\sqrt{(134,000)/\rho}$ or 7.6 |
| **Gases** | $\sqrt{(90,000)/\rho}$ or 250 | $\sqrt{(134,000)/\rho}$ or 76 |

## 11. OPTIONS

- The following options shall be available:
  - Indicating LCD meter (totalized flow display available with HART)
  - Remote electronics cable (up to 75 feet maximum) and mounting hardware
  - Terminal block with integral transient protection (HART only)

## 12. MODEL 8800C VORTEX FLOWMETER TYPICAL SPECIFICATION

The Model 8800C Vortex Flowmeter shall operate on the principal of vortex shedding, which is produced by an all-welded shedder bar in the flow stream that causes vortices to form. These vortices create pulses that represent the specific volume of fluid (liquid, gas, or steam), which is generated at a rate linearly proportional to the process flow rate. Vortex flowmeters with moving parts or cavities that retain process fluid are not acceptable.

The flowmeter body and shedder bar should be welded or cast in place and require no process seals. The flowmeter body, shedder bar, and flanges shall be made of stainless steel or Hastelloy-C® material. The fluid shall generate pressure pulses that will be converted to electronic pulses by a piezoelectric sensor that is external (non-wetted) of the process.

The electronics shall be intelligent, microprocessor-based, and can be integrally mounted or remotely mounted up to a distance of 75 feet (23 meters). The electronics will convert the signal into a digital, 4-20 mA and pulse output with internal totalizer, and be capable of being replaced without shutting-down the flow. The electronics will be optionally available with FOUNDATION fieldbus output. The electronics shall be capable of disconnecting the sensor and producing a simulation of the flow to verify the electronics remotely via HART communications protocol. The electronics shall use Adaptive Digital Signal Processing for the filters for optimal performance and perform continuous self-diagnostic routines that immediately identify electronics problems. The electronics housing shall be suitable for hazardous locations (Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust Ignition-Proof for Class II/III, Division 1, Groups E, F, and G. Factory sealed.)

Flowmeter accuracy shall be 0.65% of rate for liquids having flowrates corresponding to Reynolds numbers greater than 20,000 and 1.35% of rate in gas and steam applications having flowrates corresponding to Reynolds numbers greater than 15,000. The flowmeters will have a process capability of –330 to 800 °F (-200 to 427 °C).

The Vortex Flowmeter shall be Rosemount Model 8800 or customer pre-approved equal.

Refer to Rosemount Product Specifications for more detailed information.

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