F-4600 Inline Ultrasonic Flow Meter - Master Specification

1. Ultrasonic Flowmeters:
2. Basis of Design: ONICON Model F-4600 Series Inline Ultrasonic Flowmeter. Manufacturers approved to bid, subject to compliance with requirements include:
	1. Insert additional MFG’s pre-approved to bid.
3. Description: Provide an inline flowmeter complete with direct beam wetted ultrasonic transducers, temperature sensor, mounting hardware and calibration certificate.
4. Application Range: This contractor shall be responsible for selecting the flowmeter options submitted based on the application. Flowmeter shall be selected for the intended application in terms of pipe size, pipe material, installation requirements, expected flow rate, ambient conditions and fluid characteristics which include but are not limited to pressure, temperature, and viscosity.
5. Design - Sensing Technology: Ultrasonic flow sensing element shall utilize matched direct path, wetted ultrasonic transducers and 1000 OHM Platinum RTD.
6. Construction: Flowmeter shall consist of a drop forged corrosion resistant metal flow body with process connections, integral transducers and a processor / transmitter. All wetted materials shall be ANSI/NSF 61 & 372 compliant.
7. Maximum Pressure Rating: 400psi
8. Maximum Temperature Rating: 250F
9. Mounting Connections: For NPS  ½” – 2”, piping connections shall be male NPT threads; for NPS 2 ½” provide ANSI class flange, rated for maximum system temperature and pressure.
10. Flow Range: Flow-measuring element and transmitter shall cover operating range of equipment or system served.
11. Accuracy: Flowmeter shall provide calibrated outputs directly from the transmitter, throughout the operating range with the accuracy stated as follows:
12. Plus or minus 1.0% of flow rate over a 25:1 turndown
13. Plus or minus 2.0% of flow rate over a 100:1 turndown
14. Overall turndown of 500:1
15. Transmitter: Transmitter shall provide instantaneous flow rate information over a 4-20mA scale and a pulse output for totalized flow information.
16. Optional Transmitter with Integral Display and Operator Interface: Provide an operator interface consisting of three push-buttons. Display shall visually indicate total fluid volume, instantaneous flow rate and fluid temperature. Output signals shall be either serial network protocol, pulse output, analog output or combination. Pulse output for totalization of flow, Gallons typical. Optional serial communications output shall be native to the BTU meter, BACnet meters shall be BTL certified, secondary communication gateways shall not be permitted. Information provided via the serial communication network shall include: Flow rate, flow total, fluid temperature and a trend including peak values. Meters with serial communications shall be able to provide up to three additional auxiliary pulses configured as inputs or outputs.
17. Operating and Installation Instructions: Installation and operating instructions shall be provided for each flowmeter.
18. Warranty: Flowmeter shall be covered by the manufacturer’s three-year warranty.

**EXECUTION**

1. INSTALLATION
	1. Install flowmeters in accessible locations in piping systems based on manufacturer’s recommendations regarding orientation and straight run requirements.
	2. Install flowmeter elements with at least the minimum straight lengths of pipe, upstream and downstream from meter, required to produce the published flowmeter accuracy according to manufacturer's written instructions.
2. CONNECTIONS
	1. This contractor shall be responsible for connecting flowmeter transmitters to flow metering elements as required.
3. COMMISSIONING
	1. After installation, commission all meters according to manufacturer's written instructions.
	2. Adjust faces of meters and gages to proper angle for best visibility. Refer to manufacturers written instructions.
4. FLOWMETER SCHEDULE BY APPLICATION
	1. Flowmeter selection, including flow sensing technology and materials of construction shall be based on accuracy requirements, installation requirements, fluid characteristics and ambient conditions. Flowmeters shall be selected and installed in accordance with manufacturers recommendations.  Refer to drawings for additional information regarding flow metering applications.