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Bid Specification for the AMETEK Drexelbrook Two-wire, Loop Powered USonic™ Continuous Ultrasonic Level System

The continuous level transmitter shall employ an ultrasonic level measuring principle. It shall control an isolated 4-20 mAdc, HART output proportional to level, distance or flow rate into a loop resistance of 600 ohms at 24Vdc. The sensor shall be capable of being mounted in a minimum 2 inch diameter nozzle and be recessed up to 12 inches (0.30 m), which shall permit the system to measure level or distance to the top of the vessel. The ultrasonic sensor shall be integral to the electronic unit. The standard enclosure shall be one of two options:

- 1) A rugged PBT-RF (Valox, UV stabilized) indicating housing with a CPVC sensor.
- 2) Cast Aluminum Explosion Proof non-indicating housing with CPVC sensor housing.

The system shall meet the requirements of NEMA 4X (IP66) for corrosion resistance and wash down service. Additionally, the sensor housing (only) shall be capable of limited submersion. The power input shall be from 12 to 30 VDC.

System configuration shall be accomplished through the standard local integral display with 3-key, environmentally sealed membrane keypad and a 2-line, 7-digit, LCD display for level, distance, flow, totalization, temperature or milliamp indication or remotely on the 2-wire signal leads via PC Software, or HART Communicator. The user may select any (or all) display parameters (level, distance, flow, etc.) and toggle to each or configure to continuously scroll through all display selections. Echo strength will be displayed concurrent with displayed level data. The system shall be capable of displaying level / flow data in the following engineering units: feet, inches, meters, centimeters, millimeters, GPM, M³/Hr, MGD, Milliamp or percent. The configuration menu shall be password protected to prevent unauthorized changes.

System software will support linear level or distance with standard volume conversions for vertical cylinder, horizontal cylinder (flat ends, dished ends and hemispherical ends), and spherical vessel shapes with output volumes in gallons, cubic meters, liters, barrels, Imperial gallons, pounds and kilograms. Open channel flow rates are supported for the following flumes and weirs: Parshall flumes, Rectangular weirs (with and without end contractions, Trapezoidal (Cippoletti) weirs, Trapezoidal flumes, V-Notch weirs, Leopold-Lagco flumes, Palmer-Bowlus flumes, Cutthroat flumes, "H" flumes. A 21-point strapping table is included for user-defined vessels, weirs and flumes. The receiver shall incorporate two (2) totalizers, one (1) nonresettable and one (1) user resettable.

The system shall be capable of AutoProfiling™ - a patented technique of automatically ignoring interfering signal reflections from non-level echoes and internal vessel obstructions, such as ladders, agitator blades and pipes without user intervention. The system shall be capable of being configured with or without level being present in the vessel.

The level measuring system shall have maximum range of at least 30 ft. (9.1 m) on liquid applications with a near zone of 12 inches (305 mm). The accuracy shall be 0.15% or 0.2 inch (5mm) of measurement range, which ever is greater and have a resolution of less than 0.125 inch (3 mm).

The sensor shall be installed via a 2" NPT/BSP CPVC mounting thread. The recommended operating temperature range for the sensor shall be from -40°F to 158°F (-40°C to +70°C) for Intrinsic Safety approvals and -12°F to 158°F (-25°C to +70°C) for Explosion Proof approvals. The electronic unit shall be capable of ambient temperature ranges of -40°F to 158°F (-40°C to +70°C). The electronic unit shall employ a nominal 50KHz operating frequency with a 10° (total) acoustic beam angle. The temperature compensation, for variations in the speed of sound due to temperature changes, shall be automatic and over the entire operating range of the system.

The system shall be capable of displaying diagnostic errors for loss of echo or violation of near zone. The transmitter shall indicate a near zone violation with a current output of 22mA or 3.7mA (user selectable) and an error indication on the local display. The transmitter shall indicate a loss of echo with a current output of 22mA or 3.7mA (user selectable) and an error indication on the local display.

The level measuring system shall be suitable for installations in Class I, Div. 1 or Zone 0, or Zone 1 hazardous areas.

The manufacturer shall have worldwide technical support and installation assistance capabilities.

The continuous ultrasonic level system shall be of the following model: AMETEK Drexelbrook USonic™ Ultrasonic Level System, or an engineer approved equal.