SECTION 23 00 00

BATTERY SDI SERIES
Battery Powered, Insert-style Impeller Flow Sensor, Liquid, Single-Channel

PART 1 - GENERAL

* 1. SCOPE
1. This section describes the requirements for a flow meter.
2. Under this item, the contractor shall furnish and install flow measurement equipment and accessories as indicated on the plans and as herein specified.
	1. SUBMITTALS
3. The following information shall be included in the submittal for this section:
4. Customer connection and power wiring diagrams
5. Data sheets and catalog literature for microprocessor-based flow measurement system
6. Installation and operations manual
7. List of spare parts
8. Complete technical product description including a complete list of options provided
9. Any portions of this specification not met must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification
	1. SYSTEM DESCRIPTION
10. Battery powered SDI Series impeller flow measurement system offers liquid flow measurement in closed pipe systems. Responds to changes in flow rate and is also suitable for flow control and batch type applications. Four-bladed impeller design is non-fouling and does not require custom calibration. Complete flow measuring system provides a programmable display of rate, total or both. Optional scaled pulse output available. Powered by a “C” sized lithium battery. Sensor type shall be either direct insert or hot tap.
	1. DEFINITIONS
11. Direct Insert – This is a type of flow sensor which is meant for direct installation in a pipeline that has been shut down.
12. Flow Monitor – Peripheral device which remotely displays various flow conditions (e.g. total volume, flow rate) using a potential variety of inputs.
13. Hot Tap – This is a type of flow sensor which is meant for installation into a pipeline which is in service or under pressure. A ball valve is featured on the sensor stem to isolate the sensor during the installation process.
14. Impeller – The rotating element exposed to the moving fluid in the conduit. The rotations of the impeller are detected by a sensing mechanism and correlated to flow rate.
15. LCD – (Liquid Crystal Display) An electronic visual display that uses the light-modulating properties of liquid crystals. LCD screens have low electrical power consumption which makes them preferable for battery-powered electronic equipment.
16. NEMA – (National Electrical Manufacturers Association) Association of companies which provides a forum for the development of technical standards that are in the best interests of the industry and users, advocacy of industry policies on legislative and regulatory matters, and collection, analysis, and dissemination of industry data.
17. Neoprene® - (Polychloroprene) A family of synthetic rubbers that are produced by polymerization of chloroprene. Neoprene exhibits good chemical stability, and maintains flexibility over a wide temperature range.
18. NPT – (National Pipe Thread) A U.S. standard for tapered threads used on threaded pipes and fittings.  In contrast to straight threads that are found on a bolt, a taper thread will pull tight and therefore make a fluid-tight seal.
19. STN – (Super Twisted Nematic) A type of monochrome, passive-matrix liquid crystal display. STN LCDs have the advantage of a more pronounced electro-optical threshold allowing for passive-matrix addressing with many more lines and columns.
20. Viton® – A brand of synthetic rubber and fluoropolymer elastomer commonly used in O-rings and other molded or extruded goods. The name is a registered trademark of DuPont Performance Elastomers L.L.C.

PART 2 – PRODUCTS

* 1. APPROVED MANUFACTURERS
		+ - 1. Basis-of-Design Product: Subject to compliance with specifications, provide flow measurement technology by one of the following:

Data Industrial by Badger Meter

* 1. OPERATING CONDITIONS
1. System Components
2. Insert Style Flow Sensor
3. Measures flows regardless of conductivity or turbidity of liquid and delivers flow measurement data to monitor/data logger.
4. Mounting Hardware
5. Hardware required for the mechanical installation of the flow meter. This may include a weld-on fitting or pipe-saddle.
6. (Optional) Remote Display
7. Displays and records flow measurement data.
8. Operational Requirements
9. Impeller Flow Meter

NOTE TO SPECIFIER: Select the appropriate sensor type: Hot Tap or Direct Insert respectively.

1. Hot tap impeller flow meter features isolation valves and mounting hardware to install or remove the sensor from a pipeline that would be difficult to shut down or drain.
2. Direct insert impeller flow meter shall be installed in piping configurations that are not in service or under pressure.
3. Flow Sensor
4. Primary Sensor: Four-bladed, stainless steel impeller design.

NOTE TO SPECIFIER: Select the appropriate applicable size range.

1. The system shall operate with pipe size ranges 1 ½ to 10'' [3.81to 25.4 cm].
2. The system shall operate with pipe size ranges 12 to 36'' [30.48 to 91.44 cm].
3. The system shall operate with pipe size ranges from 36'' [30.48 cm], up to 40'' [101 cm] for special orders.
4. Tap size shall be 1'' NPT.
5. Housing shall be constructed from 316 stainless steel or Brass, B16, UNS C36000 (not available for hot tap versions).
6. Sensor shall have a continuous operating temperature of 70° to 300°F [21° to 149°C].
7. Pressure drop shall be 0.5 psi or less at 10ft/s for pipe diameters of 1.5'' [3.81cm] and larger. Maximum pressure ratings vary by temperature.
8. Indication

NOTE TO SPECIFIER: Select the appropriate type of display; Remote or Local respectively.

1. Display type shall be remote.
	1. Meets NEMA 4X specifications.
	2. Enclosure shall be Polycarbonate w/ Neoprene® sealed cover.
	3. May be connected 50' [15 m] maximum
2. Display type shall be local LCD.
	1. Operating temperature shall be 14° to 68° F [20° to 65° C].
	2. Enclosure shall be Polypropylene with Viton® - sealed acrylic cover.
	3. Display shall be an 8 character, 3/8'' STN (Super twisted Nematic) LCD.
	4. Annunciators for rate, total, totalizer multipliers, low battery.
3. Electronics
4. Enclosure for battery-powered models shall be NEMA 6P [IP 65] local and NEMA 4X [IP 65] remote.
5. Power shall be supplied by a C-sized lithium battery (life expectancy up to 10 years, depending upon use). A low battery annunciator turns on at 3 years based on elapsed time.
6. Operating temperature shall be 14° to 150° F [-10° to 65° C] for electronics.
7. Outputs:

NOTE TO SPECIFIER: Select the appropriate output option; None or Scaled Pulse respectively.

* 1. None; readings appear on local display.
1. Scaled Pulse. Signal can travel up to 2000' [610 m] between flow sensor and connected device depending on cable.
2. Control and Programming
	1. All programmable models utilize Windows® based SDI Series software program.
	2. Connection to PC through A-303 Communications port. RJ11 plug on A-303 cable links to the RJ11 socket on the Battery Powered SDI. DB9 connector of A-303 cable links to PC comm port of PC with SDI programming software installed.

NOTE TO SPECIFIER: Select the following if specifying model with Scaled Pulse output.

* 1. Scaled Pulse Output programmed to produce a transistor closure scaled to any number of engineering units of measure. Sensors may be pre-programmed at the factory or field programmed using a A-303 connection cable and a Windows® based software program.
	2. All information is stored in non-volatile memory in the flow sensor.
1. Sensor Performance
2. Measuring range shall be 1 to 20 FPS [.30 to 6.1 MPS].
3. Accuracy shall be ±1% of full scale.
4. Repeatability shall be ±0.5%.
5. Integrations
6. ASDIB-20 Programming Kit
7. A1027 Hot Tap Adapter Nipple
8. 07101 5' Extension Cable
9. 07108 10' Extension Cable
10. 07102 20' Extension Cable
11. 07109 50' Extension Cable

PART 3 - EXECUTION

* 1. INSTALLATION
1. Follow manufacturer’s recommendation for installation and conform to the guidelines provided by the Installation & Operation Manual.
2. Hot tap versions may be installed into piping configurations which are in service or under pressure.
3. Straight pipe requirement shall be 10 diameters upstream and 5 downstream. Pipe bends, valves, other fittings, pipe enlargements and reductions should not be present in this length of pipe.
4. Tee sensor shall be vertically upright in horizontal installations, best performance if not more than 45° from top dead center; any circumferential orientation in vertical installations is acceptable.
5. All SDI insert sensors are mounted on the pipe using a 1'' tap. Insert sensor: pipe saddle or weld-on fitting is preferred over a service tee because it causes fewer disturbances to the flow.
6. Insertion depth must conform to the recommended position for accurate measurement.
	1. MANUFACTURER’S WARRANTY
7. Terms
8. The manufacturer of the above specified equipment shall guarantee for twelve (12) months from date of installation; or one (1) year and six (6) months after the data of shipment that the equipment shall be free from defects in design, workmanship or materials.

END OF SECTION