SECTION 15156 - MAGNETIC FLOW METERS

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing magnetic flow meters designed and fabricated for continuous operation with minimum error due to pipe deposits.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 15150 Meters, General

1.3 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1. MIL STD 456662A Calibration System Requirements

PART 2 -- PRODUCTS

2.1 GENERAL

A. All devices indicated herein shall conform to the requirements of Section 13300.

B. **Schedule:** The following magnetic flow measuring systems shall be provided:

Tag Number	Size	Range	Liner Material	Electrode Material	NEMA Rating (Body/Transmitter)
[ ]	[ ]	[ ]	[ ]	[ ]	[/]
[ ]	[ ]	[ ]	[ ]	[ ]	[/]

2.1 MAGNETIC FLOW MEASURING SYSTEMS

A. **Magnetic Flowmeter Systems:** Magnetic flowmeter systems shall be of the low frequency electromagnetic induction type and produce a DC pulsed signal directly proportional to and linear with the liquid flow rate. Complete zero stability shall be an inherent characteristic of the flowmeter system. Each magnetic flow metering system shall include a metering tube, signal cable, transmitter and flowmeter grounding rings.

B. **Metering Tube:** The metering tube shall have the following attributes:

1. Be constructed of ASTM A 316 stainless steel with flanged connections

2. Utilize a minimum of 2 bullet-nosed, self-cleaning electrodes

3. Include a liner in conformance with the manufacturer's recommendation for the intended service

4. Have electrodes constructed of materials which are in conformance with the manufacturer's recommendation for the intended service

5. Have housing rated for NEMA 6 submergence conditions and be coated with epoxy paint

C. **Ground Rings:** Magnetic flow meters shall have 2 grounding rings which are in conformance with the manufacturer's bore and material recommendation for the intended service. Grounding rings shall be designed to protect and shield from process abrasion the liner edge interface at the metering tube end.

D. **Transmitter:** The microprocessor-based signal converter/transmitter shall have the following attributes:

1. Utilize DC pulse technique to drive flux-producing coils

2. Convert DC pulse signal from the tube to a standardized 4-20 mA signal into a minimum 700 ohms

3. Include a 6 digit LCD display for flowrate, percent of span, and totalizer

4. Include an operator interface consisting of keypads which respond to English text entry

5. Feature an integral zero return to provide a consistent zero output signal in response to an external dry contact closure

6. Be capable of measuring flow in both directions

7. Integral low flow cutoff and zero return

8. Automatic range change

9. Programmable parameters including meter size, full scale Q. magnetic field frequency, primary constant, time constant

10. Data retention for a minimum of 5 years without line or battery power

11. Self diagnostics and automatic data checking

12. Protected terminals and fuses in a separate compartment which isolates field connection from electronics

13. [Utilize "Smart" technology which employs a hand-held configuration terminal and outputs a digital flow signal superimposed on 4-20 mA signal that complies with the HART protocol.]

14. [Produce a scaleable frequency output, O to 100 Hz, transistor switch closure up to 5.75 W externally powered, 5 to 24 V DC]

15. Can tolerate ambient temperature operating limits of -20 to 140 degrees Fahrenheit (-29 to 60 degrees C)

E. **Signal Cable**: Signal cable shall be the manufacturer's standard cable for the intended application.

F. **Performance**: The flow metering system shall conform to the following technical specifications: Time constant= 0.5 to 1000 seconds; galvanic or optic isolation: Accuracy: 0.25% of flow rate from 10 to 100% full scale for velocities over 3 fps: Repeatability: 0.25% full Scale: Power consumption: 30 watts or less: Power Requirements: 120 VAC, ± 10%:

2.3 CALIBRATION

A. Each flow metering system shall be hydraulically calibrated at a facility which is traceable to the National Institute of Standards and Technologies. The calibration procedure shall conform to the requirements of MIL-STD-45662A. A real-time computer generated printout of the actual calibration data indicating apparent and actual flows at 20 percent, 40 percent, 60 percent, 80 percent, and 100 percent of the calibrated range shall be submitted to the CONSTRUCTION MANAGER at least thirty (30) days prior to shipment of the meters to the project site.

2.4 MANUFACTURERS

A. Meters shall be manufactured by one of the following (or equal):

1. Fischer & Porter

2. Foxboro

3. Johnson Yokagawa

4. Krohne

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Magnetic flow meters shall be installed in accordance with the manufacturer's installation instructions and Section 15150.

B. Meters shall be properly grounded to the adjacent pipe where indicated to ensure full pipe grounding.

** END OF SECTION **