# SECTION 409115 MAGNETIC FLOWMETERS

## PART 1 - GENERAL

A. Description

This section describes requirements for magnetic flowmeters.

B. Related Work Specified Elsewhere

1. Painting and Coating: 099000.

2. Pressure Testing of Piping: 400515.

C. Submittals

1. Submit shop drawings in accordance with the General Conditions and Section 013300.

2. Submit manufacturer's catalog data and detail drawings showing dimensions, pressure rating, coatings, and meter parts and describe by material of construction specifications (such as AISI, ASTM, SAE, or CDA) and grade or type.

3. Furnish manufacturer’s application performance guarantee with submittals.

4. Show meter laying lengths.

## PART 2 - MATERIALS

A. Manufacturers

1. The meter flow tube and transmitter shall be by the same manufacturer.

2. The magnetic flowmeter and transmitter shall be manufactured by ABB Instrumentation, Rochester, New York:

   Magnetic Flowmeter with Transmitter and insitu software: Model WaterMaster series with VeriMaster verification software.

3. The manufacturer shall have a minimum of five years' experience in the manufacture of bipolar d-c magnetic flowmeters.

B. Meter Design

1. The magnetic flowmeter shall be an obstructionless pipeline-mounted instrument to magnetically measure the flow of the process media. The output signal shall not be affected by changes in fluid viscosity or density and shall have zero point stability and auto zeroing functions. Provide the magnetic flowmeter with the following features:

   a. Drip- and splash-proof sensor, capable of withstanding temporary submersion of up to 30 feet of water for 48 hours.

   b. Integral terminal box with watertight cable seals.

   c. Interconnecting cables.

2. Provide stainless steel grounding rings and grounding straps per manufacturer's requirements.

C. Materials of Construction--Flanged Meters

1. The flow tube shall be Type 304 stainless steel with carbon steel flanges per ANSI B16.5 Class 150.

2. Liner and electrodes shall be as indicated in the subsection on "Service Conditions."

D. Indicator/Totalizer

The indicator/totalizer shall accept the process flow signal from the magnetic flowmeter and convert its electrical output signals directly proportional to the instantaneous metered flow rate. The housing shall be suitable for field mounting.

E. Transmitter

1. The transmitter shall be microprocessor based with flow rate indicator in engineering units, forward, reversed, and net flow totalizer, all in user-selectable engineering units. The display shall also be capable of indicating alarm status and velocity of fluid. The transmitter shall be mounted as indicated in the instrument list.

2. The preamplifier input impedance shall be a minimum of 10E+11 ohms.

3. Power Requirements: 117-volt ac, ±10%, 60 hertz.

4. Totalized flow and programmed configuration shall be maintained in memory for up to 10 years.

F. Interconnecting Cable

Interconnecting cables shall be furnished by the magnetic flowmeter manufacturer. Provide signal cable with minimum 30-ft length.

G. Performance

The overall system's performance shall be as follows:

1. Accuracy: 0.2% of flow rate with minimum fluid velocity of 1 fps.

2. Repeatability: ±0.05% of flow rate.

3. Calibration shall be per compliance with OIML R49 Type P standards.

4. Adjustable full-scale range.

5. Outputs: Bidirectional, isolated 4- to 20-mA d-c and either 24-volt d-c scaled pulse, or 0- to 10-KHz frequency.

6. Minimum Conductivity: 5 micromho/centimeter.

7. Power Consumption: 20 watts maximum.

8. Temperature Limits, Ambient: -20°F to +140°F.

9. Temperature Limits, Process: Elastomers +160°F, Teflons +300°F, ceramic 350°F.

10. Field Selectable Low Flow Cutoff: 0% to 10%.

11. The flowmeter shall have a positive zero return (PZR) input controlled by an external dry contact.

12. Environmental Rating: NEMA 4X, for both sensor and electronics whether remote or sensor mounted.

13. The meter shall have empty pipe detection.

14. A common alarm discrete output (a dry contact or a transistor switch) shall be provided for remote indication of fault conditions.

PART 3 - EXECUTION

A. Service Conditions

MAGNETIC FLOWMETER AND INDICATOR/TOTALIZER

| GENERAL | | |
|---|---|---|
| 1. | P&ID No. | N-102 |
| 2. | Service | water |

| MAGNETIC FLOWMETER | | |
|---|---|---|
| 3. | Tag No. | FE-101 |
| 4. | Metering Tube | |
| | Size Flg. | 16 inch |
| | Rating (psi) | 150 |
| 5. | Metering Tube Material | Stainless Steel |
| 6. | Liner Material | Elastomer |
| 7. | Electrode Material | 316 SST |
| 8. | Elec. Class. | NEMA 4X |

| INDICATOR/TOTALIZER TRANSMITTER | | |
|---|---|---|
| 9. | Tag No. | FIT-101 |
| 10. | Flow Rate Ind. Scale | 0 – 2500 gpm |
| 11. | Flow Totalizer Multiplier | gpm X 1000 |
| 12. | Aux. Output Signal | 4 – 20 mA |
| 13. | Aux. Output Signal To | See drawings |
| 14. | Elec. Class. | NEMA 4X |
| 15. | Mounting | Wall Mount |

| SERVICE CONDITIONS | | |
|---|---|---|
| 16. | Process Media | Water |
| 17. | Spec. Gravity | 1.0 |
| 18. | Conductivity (Mhos) (min/max) | 450 / 1600 |
| 19. | TDS (ppm) (min/max) | 290 / 1,000 |
| 20. | Flow (gpm) (min/max) | 0 / 2,500 |
| 21. | Velocity (fps) (min/max) | 0 / 4.0 |
| 22. | Press. (psig) (min/max) | 30 / 150 |
| 23. | Temp. (°F) (min/max) | 45 / 110 |

B. Replacement Spool

Furnish a flanged ductile-iron spool in accordance with Specification Section 402040 with gaskets for the magnetic flowmeter. The spool shall be the same length as the meter.

C. Painting and Coating

Coat exposed carbon steel components of meter tube and sensor in accordance with Section 099000, System No. 21 at the place of manufacture. Finish coat shall match the color of the adjacent piping.

END OF SECTION