



TECHNICAL SPECIFICATIONS

Portable Doppler Flow Meter

SCOPE: This specification covers a portable, ultrasonic Doppler-type flow meter as manufactured by Greyline Instruments, Largo, Florida / Long Sault, Ontario. This instrument shall provide for non-intrusive flow measurement, indication, totalizing, transmitting and data logging of the flow rate in a full pipe.

1. GENERAL

- 1.1 Measure forward and reverse flow ± 0.1 to 40 ft/sec (± 0.03 to 12.2 m/sec).
- 1.2 Have an accuracy of $\pm 2\%$ of full scale on most wastewater applications. Have linearity of $\pm 0.5\%$ and repeatability of $\pm 0.25\%$.
- 1.3 Operate on liquids with entrained particles or gases of 100 microns or larger and minimum concentrations of 75 ppm.
- 1.4 Operate from the outside of common pipe materials including: carbon steel, stainless steel, ductile iron, copper, PVC, FRP, ABS and other selected engineering materials.
- 1.5 Operate on AC/DC power.

2. TRANSDUCERS (SENSORS)

- 2.1 Have a single-head, clamp-on transducer with twin piezoelectric ceramic transmit and receive crystals encapsulated in epoxy resin and a stainless steel housing.
- 2.2 The transducer shall be solid state and transformer isolated, and operate at 640KHz.
- 2.3 The transducer shall be waterproof and operate at temperatures from -40°F to 300°F (-40°C to 150°C), and withstand accidental submersion to 10 psi.
- 2.4 The transducer shall be designed to install on pipes with inside diameter ranging from 1/2" to 180" (12.5 mm to 4.5 m).
- 2.5 Have a 12 ft (3.6 m) long flexible, shielded coaxial pair cable extending from the transducer to the electronics.
- 2.6 Shall include Manufacturer's recommended sensor coupling compound and adjustable stainless steel sensor mounting clamp.

3. ELECTRONICS

- 3.1 Have a portable ABS electronics enclosure with a padded, watertight IP67 carrying case. Total weight shall be less than 14 lbs (6.5 kg).
- 3.2 Electronics shall be designed for continuous operation at temperatures from -10° to 140°F (-23° to 60°C).
- 3.3 Have a built-in 5-key calibration keypad with operator selection of parameters through visual prompts from a

menu calibration system. Systems requiring calibration by Parameter codes or external calibrators shall not be accepted.

- 3.4 Have user-selectable menu languages including English, French and Spanish.
- 3.5 Have a white, backlit matrix display indicating flow in user-selected engineering units, totalized flow, units of calibration, and signal strength.
- 3.6 Have display backlight brightness adjustment for reduced power consumption.
- 3.7 Have flow proportional 4-20mA output rated to maximum resistive load of 500 ohms.
- 3.8 Have a built-in 300,000 point data logger, USB output and connecting cables. Data logger shall support time and date-stamped logging and generate formatted flow reports including total, average, minimum, maximum and times of occurrence.
- 3.9 Include Windows software for data log retrieval, graphing and export.
- 3.10 Have automatic signal strength and signal confidence monitoring.
- 3.11 Have keypad adjustable signal cutoff to reduce interference.
- 3.12 Shall include an external charger with 100-240VAC 50/60Hz input.
- 3.13 Shall include an internal NiMH rechargeable battery with minimum capacity for 18 hours continuous battery operation.
- 3.14 Have a battery status indicator with automatic low battery shut off and battery overcharge protection.
- 3.15 Have user-selectable "sleep mode" synchronized to data logger sample rate for reduced battery power consumption.

4. OPTIONAL FEATURES FOR INSERTION IN SPECIFICATION AS REQUIRED:

- 4.1 Include additional 150 g. manufacturer's recommended ultrasonic sensor coupling compound.
- 4.2 Include 50 ft (15 m) length Sensor Cable extension complete with connecting plugs.

5. MANUFACTURER

The instrument shall be a Model PDFM 5.1 Portable Doppler Flow Meter as manufactured by Greyline Instruments Inc., and warranted against defects in materials and workmanship for one year.