



## Engineering Specifications: Level-Velocity Logger Greyline Stingray

### LEVEL-VELOCITY LOGGER SPECIFICATIONS

SCOPE: This specification covers a portable Level-Velocity Logger as manufactured by Greyline Instruments, Massena, New York / Long Sault, Ontario. The instrument shall provide for measurement and data logging of level, velocity and temperature readings from flow in open channels and partially filled or surcharged pipes.

#### A. GENERAL

- Level-Velocity Logger to consist of a submersible ultrasonic sensor, connecting cable, and a remote enclosure with electronics and display. System shall have no moving parts.
- Level measurement accuracy shall be  $\pm 0.25\%$  of Level. Velocity measurement accuracy shall be  $\pm 2\%$  of reading.

#### B. SENSING ELEMENT

- Ultrasonic sensor shall be designed for continuous submersion in liquids.
- Using the ultrasonic Doppler principle, the sensor shall measure fluid velocities from 0.1 to 10 ft/sec (0.03 to 3.05 m/sec).
- Using ultrasonic echo-ranging principle, the submerged sensor shall measure liquid level from 1" to 15 ft. (25.4 mm to 4.57 m) above the bottom of the pipe or channel. Minimum detectable level shall not be greater than 1" (25.4 mm). Level sensing circuitry shall include a temperature sensor for automatic temperature compensation.
- Sensor shall be constructed of PVC, polyurethane and epoxy.
- Sensor operating temperature shall be from 5°F to 150°F (-15°C to 65°C).

#### C. SENSOR CONNECTING CABLE

- Provide minimum length 25 ft (7.6 m) tri-coaxial cable with potted bond to the Sensor head. Sensor cable shall be waterproof and electrically shielded. Exposed material shall be polyurethane only.
- Sensor shall include a watertight plug for connection to the instrument electronics.

#### D. LOGGER ELECTRONICS

- No calibration shall be required. The Level-Velocity Logger shall measure liquid level from the bottom of the pipe or channel, and flow velocity.

- Logger electronics operating temperature shall be from –5° to 140°F (–20° to 60°C).
- Shall have an isolated RS232 output operating at 28,800 Baud to transfer log files to a Windows™ computer or laptop.
- Provide an LCD bar graph display to indicate level, velocity and temperature readings, plus remaining battery and logger storage capacity.
- Shall be housed in a watertight IP67 enclosure with hinged, latching cover and watertight sensor cable entry.
- Logger capacity shall be 130,000 data points. Each data point includes level, velocity and temperature reading.
- Logger sample rate shall be user-selectable from 10 or 30 seconds, 1, 2, 5, 10, 30 or 60 minutes.
- Shall be powered by 4 D-cell Alkaline batteries. Battery life shall be matched to Logger storage capacity: 15 days at 10 second sample rate up to 4 years at 30 minute sample rate.

#### **E. SOFTWARE**

- Shall include Windows™ software to retrieve, display, save and export log files from the Level-Velocity Logger. Shall support Windows versions including 98, 2000, Me, XP, Vista and 7.
- Shall convert level-velocity readings to flow for channel shapes including round pipes, rectangular, trapezoid and egg-shaped channels. Shall convert level readings to flow for flumes and weirs.
- Shall provide 'real-time' communication with the level-velocity logger to display readings with a refresh rate of 10 seconds or less.
- Shall permit the operator to set logging rate of the level-velocity instrument from 10 or 30 seconds, 1, 2, 5, 10, 30 or 60 minutes.
- Shall display battery life remaining and logger capacity remaining.
- Shall display, save, output to a printer and export level-velocity log files in graph and tabular format. Export log files shall be delimited for import to spreadsheet or database programs.
- Shall permit conversion of linear and volume units.
- Shall support RS232 connection through COM ports and USB to RS232 converters.

#### **F. OPTIONAL FEATURES FOR INSERTION AS REQUIRED**

- Shall include 50 ft / 15 m length sensor cable extension with watertight connector plugs to permit sensor installation total distance of 75 ft / 23 m from the electronics enclosure. Cable extension shall be shielded, submersible with a durable polyurethane coating.

#### **G. MANUFACTURER**

- Level-Velocity Logger shall be Stingray model by Greyline Instruments and warranted against defects in materials and workmanship for one year.
- Software shall be 'Greyline Logger' by Greyline Instruments.