



### 1.0 Scope

- 1.1 The system shall collect and store pressure, temperature, and time data.
- 1.2 The sensor shall fit inside 1-inch, schedule 40 and schedule 80 PVC casing or larger.
- 1.3 The system shall be able to network up to 32 sensors, which can be controlled from one location.
- 1.4 The system shall accommodate a combined cable run of up to 2000 feet.
- 1.5 The system shall use MODBUS<sup>®</sup> RTU interface protocol.
- 1.6 The system shall be delivered fully assembled and custom-sized for each well.
- 1.7 The system shall be an **INW PT2X Smart Sensor with Aqua4Plus or Aqua4Plus Lite Host Software**, manufactured by Seametrics.

### 2.0 Sensor/Data Logger Design

- 2.1 The sensor/data logger shall measure and record pressure, temperature and time.
- 2.2 Pressure measurements shall be accurate to  $\pm 0.05\%$  FSO at 20° C, typical/static ( $\pm 0.25\%$  FSO at 20° C for 1 psi version, typical/static).
- 2.3 The sensor/data logger shall have at least four megabytes of non-volatile memory, with the ability to collect at least 520,000 records of pressure, temperature and time.
- 2.4 The sensor/data logger shall be available in absolute or gauge pressure versions.
- 2.5 All pressure readings shall be compensated for variation in fluid temperature.
- 2.6 The sensor/data logger shall be able to use user-replaceable AA batteries and have a battery life of at least 18 months at a 15 minute polling interval.
- 2.7 The sensor shall monitor remaining battery life.
- 2.8 The sensor shall be no larger than 0.75" in diameter (0.84" for 1 psi version).

### 3.0 Software Design

- 3.1 The software shall be capable of communicating with the sensor or sensor network via a USB port at 38.4K Baud.
- 3.2 The software shall display real time readings from the sensor.
- 3.3 The software shall be able to create and save multi-phased, variable-interval test sequences and send these test sequences to the sensor/data logger.
- 3.4 The software shall upload and save test data from the sensor/data logger.
- 3.5 The software shall display uploaded test data.
- 3.6 The software shall export test data to a format easily accessed by common Windows<sup>®</sup> based spreadsheets and databases.
- 3.8 The software shall control up to 32 sensors/data loggers.



### 4.0 Cable Assembly Design

- 4.1 The cable shall be polyurethane, ETFE, or polyethylene jacketed.
- 4.2 The cable shall be vented to atmosphere, with a desiccant assembly at the well-head to prevent buildup of moisture in the vent tube, for gauge version sensors.
- 4.3 The cable shall be continuous with no splices.
- 4.4 The cable connection to the sensor shall be waterproof up to a pressure of at least 325 psi to prevent leakage of fluid inside the sensor housing.
- 4.5 The cable shall have a breaking strength of at least 138 lbs.
- 4.6 All connecting fittings shall be capable of supporting a working tensile load of 50 lbs.

**Acceptable sensors shall be INW PT2X with Aqua4Plus or Aqua4Plus Lite Host Software or approved equal.**