PART 1 GENERAL

1.1 Section includes

A. Process analyzer for continuous monitoring of fluoride in water.

1.2 Measurement Procedures

A. The method of measuring fluoride will be with ion-selective electrode (ISE) method using total ionic strength adjustment buffer (TISAB) reagent and two fluoride standards.
   1. The ISE will be enhanced by patented design (US patent number 5,393,402) where the replaceable lanthanum crystal at the tip of the probe is molded into a one-piece monolithic tip that is threaded for easy removal.

1.3 Alternates

A. Other methods of fluoride measurement, such as colorimetric methods, are not acceptable.
B. Other ISEs that do not have a replaceable lanthanum crystal moded into the tip are not acceptable.

1.4 System Description

A. Performance Requirements
   1. Measurement range: 0.1 to 10 mg/L fluoride
   2. Accuracy: ±10% or ±0.10 ppm whichever is greater
   3. Precision: ±7% or ±0.07 ppm whichever is greater
   4. Minimum detection limit: 0.10 mg/L
   5. Cycle time: 4.2 minutes

1.5 Certifications

A. CE approved
B. ETL listed to UL 1262,
C. ETL certified to CSA 22.2 No. 142

1.6 Environmental Requirements

A. Operational Criteria
   1. Operating temperature: 5 to 40°C (41 to 104°F)
   2. Operating humidity: 90% at 40°C (90% at 104°F) maximum
   3. Sample temperature: 5 to 40°C (41 to 104°F)
   4. Sample flow rate: 200 to 500 mL/minute (200 mL/min minimum required)
   5. Sample inlet pressure: 1 to 10 psig (use sample restriction device to reduce higher pressure samples)
   6. Sample size: 0.3 mL

1.7 Warranty

A. The analyzer includes a one-year warranty from the date of shipment.

1.8 Maintenance Service

A. Scheduled maintenance:
   1. Monthly: replenish reagents
   2. Quarterly
      a. Refill electrode inner fill solution
      b. Replace pump tubing
      c. Clean sample screen
   3. Semi-yearly
      a. Replace pump tubing
      b. Replace lanthanum crystal tip
   4. Yearly
      a. Replace analyzer tubing
      b. Replace working and reference electrode
B. Unscheduled maintenance
   1. Fuse replacement
   2. Clean enclosure
   3. Replace sample screen
   4. Clean reagent spill

PART 2 PRODUCTS

2.1 Manufacturer

A. Hach Company, Loveland, CO
   1. CA610 Fluoride Analyzer
      a. Housing: ABS, IP62 rated plastic enclosure with two clear polycarbonate windows for viewing the measurement readout and reagent levels.

2.2 Manufactured Unit

A. The CA610 fluoride analyzer consists of microprocessor-controlled analyzer designed to continuously monitor fluoride in a sample stream.

2.3 Equipment

A. The CA610 fluoride analyzer can operate unattended for 30 days and use less than 500 mL of reagent per month and less than 500 mL each of two standard solutions every two months when the calibration interval is set for 24 hours.
B. Fluride results are displayed by a three digit menu driven LCD readout.
C. TISAB ise used to adjust the ionic strength of the sample to allow measurement of concentration instead of activity. TISAB also adjusts the pH so fluoride is present in its ionic state and chelates some potential interferences for accurate and reproducible measurements.
D. The analyzer uses automatic two-point log/linear calibration based on 0.5mg/L and 5.0 mg/L fluoride standards at a user-specified interval (hourly to monthly).
E. The anayzer is equipped with the following communications capabilities.
   1. One optically isolated analog output selectable over 4-20 mA. The output span is field-programmable over any portion of the analyzer range allowing the readings to be available for a recorder, PLC, or SCADA.

2. Four internal alarms including two concentration set point alarms, analyzer system warning and analyzer system shut down alarm. Each alarm is user-selectable for:
    a. Sample concentration alarms (fully adjustable through the entire range)
    b. System warnings (activate for minor variations in analyzer performance)
    c. System alarms (activate for major variations in analyzer performance and will shut down the analyzer until corrective action is taken)
3. Two SPDT normally open/normally closed dry contact relays rated at 5 A resistive load at 230 Vac.
4. Optional AquaTrend network card integration into an AquaTrend network.

F. Power requirement is 100-115/230 Vac, switch selectable, 50/60 Hz, 90 VA maximum, with 2.5 A fuse.

2.4 Components

A. Standard equipment:
    1. One-month supply of reagents
    2. Maintenance kit
    3. Installation kit
    4. Two fluoride electrode tips
    5. Spare pump tubing
    6. Manual
B. Dimensions: 34.3 x 41.9 x 19.1 cm (13.5 x 16.5 x 7.5 inches)
C. Weight: 11.3 kg (25 pounds)

2.5 Accessories

A. Power cord
B. Flow meter with 1/4-inch OD tubing
C. Oil-tight seal

PART 3 EXECUTION

3.1 Preparation

A. Mounting: wall mount
B. Sample inlet: 1/4-inch quick-disconnect fitting
C. Drain: 1/2-inch I.D. flexible hose.

3.2 Installation

A. Contractor will install the analyzer in strict accordance with the manufacturer’s instructions and recommendation.
B. Manufacturer’s representative will include a half-day of start-up service by a factory-trained technician, if requested.
    1. Contractor will schedule a date and time for start-up.
    2. Contractor will require the following people to be present during the start-up procedure.
        a. General contractor
        b. Electrical contractor
        c. Hach Company factory trained representative
        d. Owner’s personnel
        e. Engineer

3.3 Manufacturer's Service and Start-Up

A. Contractor will include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
B. Contractor will include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
C. Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
D. Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION