

PART 1 GENERAL

1.1 Section includes

- A. Alkalinity process analyzer for continuous monitoring of alkalinity in water.

1.2 Measurement Procedures

- A. The method of measuring alkalinity will be with a colorimetric titration method to determine concentration.

1.3 Alternates

- A. Other methods of alkalinity measurement, such as probes that use a selective membrane or those that use electrolytes, are not acceptable.

1.4 System Description

A. Performance Requirements

1. Measurement range
 - a. Total alkalinity as calcium carbonate: 1 to 500 mg/L
 - b. Phenolphthalein alkalinity as calcium carbonate: 5 to 250 mg/L
2. Accuracy: ± 5 percent of reading or ± 1.0 mg/L, whichever is greater
3. Repeatability: $\pm 3\%$ of reading or ± 0.6 mg/L, whichever is greater
4. Response time: less than 10 minutes for 90% response to step change at sample inlet (single channel instruments)
5. Cycle time: 8 minutes (average)
6. Detection limit: less than or equal to 0.10 mg/L

1.5 Certifications

A. Safety standards

1. UL 3101-1
2. CSA C22.2 No. 1010.1
3. EN61010-1 (IEC 1010-1)

- B. Class A limits for radio and noise emission as specified by the FCC and EN55011 (CISPR11).

1.6 Environmental Requirements

A. Operational Criteria

1. Operating and sample temperature: 5 to 50 °C (41 to 122 °F)
2. Sample pressure: 0.5 to 30.0 psig (0.03 to 2.04 bar)
3. Sample flow: 100 to 2000 mL/min. maximum
4. Sample inputs: up to two sample streams

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
 - a. Reagents and standards:
 - 1) Replace.
 - 2) Clean reagent compartment and tubing.
 - b. Cleaning solution: fill cleaning solution container (every two weeks in typical municipal wastewater applications).
 - c. Autoburette module:
 - 1) Inspect for seal or fitting leaks.
 - 2) Inspect for particulate build up.
 - 3) Lubricate lead screw and ceramic piston guide.
 - d. Valve module: inspect module and associated tubing for leaks.
 - e. Sample conditioning filter:
 - 1) Inspect filter.
 - 2) Check sample flow.
 - 3) Clean or replace the filter.
 - f. Mixer module: inspect for particulate build up.
 2. Every three months
 - a. Autoburette module: replace piston seals and O-rings.
 - b. Valve module:
 - 1) Replace valve rotor
 - 2) Dry and inspect condition of stator (if scored, replace).
 - 3) Check for leaks. Replace as needed.
 3. Every six months
 - a. Autoburette module:
 - 1) Check for need to replace piston seals.
 - 2) Inspect for signs of leakage.
 - b. Tubing and fittings: inspect for leaks or damage. Replace as needed.
- ### B. Unscheduled maintenance
1. Clean instrument enclosure.
 2. Fuse replacement.

PART 2 PRODUCTS

2.1 Manufacturer

- A. Hach Company, Loveland, CO
 1. APA 6000™ Alkalinity Process Analyzer

2.2 Manufactured Unit

- A. The APA 6000 alkalinity analyzer consists of microprocessor-controlled analyzer designed to continuously monitor alkalinity in a sample stream.

2.3 Equipment

- A. The analyzer uses m-cresol purple and bromcresol green indicators for colorimetric measurement of alkalinity at a wavelength of 600 nm.
- B. The analyzer has a digital display in a numeric or graphical format.
- C. The analyzer is capable of automatic calibration, cleaning, and self-priming.
- D. Samples are continuously purged to assure fresh sample to the analyzer and reduce analysis lag time.
- E. An automatic burette is used to dispense metered volumes of sample, standards, and reagents.
- F. Sample, standard, and reagent flow are directed to the detector module by a rotary valve.
- G. Grab-sample (10 mL) analysis is possible without interrupting continuous sample flow to the analyzer.
- H. The analyzer is equipped with the following communications capabilities.
 - 1. Fourteen user-defined internal recorders, of which four can be used for PID control.
 - 2. Two user-selectable recorder/controller outputs of 4-20 mA, with expansion capability up to 14.
 - 3. Recorder output span is user-adjustable over the entire span of the analyzer.
 - 4. Fourteen user-defined alarms. Alarms may be programmed for sample concentration alarms, analyzer system warning, and analyzer system shutdown.
 - 5. Two unpowered SPDT relays, with expansion capability up to 14, for internal alarms.
 - 6. Two relay contacts rated for 5 A resistive load at 230 Vac.
- I. Analyzer components are assembled to a NEMA-4X(indoor)/IEC 529 (IP66) plastic enclosure.
- J. All standards and reagents are isolated from the analyzer electronics in separate drip-proof plastic containers.
- K. Power requirements are 95 to 240 Vac, 50/60 Hz.

2.4 Components

- A. Standard equipment:
 - 1. AquaTrend Interface
 - 2. One month supply of reagents
 - 3. Basic sample conditioning kit
 - 4. Maintenance kit
 - 5. User manual
- B. Dimensions: 522 x 627 x 526 mm (21 x 25 x 21 inches)
- C. Weight: 25.5 kg (56 pounds)

2.5 Accessories

- A. Cable Termination Kit
- B. Digital Display Module (DDM)
- C. PS2401 Power Supply
- D. Serial Input/Output Module (SIO)
- E. Signal Output Module (SOM)
- F. Installation Kit
- G. Tool Kit
- H. Maintenance Kit

PART 3 EXECUTION

3.1 Preparation

- A. Mounting: bench, wall or panel mount
- B. Sample filter inlet: 3/4-inch NPT male or female

- C. Drain: gravity, air break, or vent recommended
- D. Drain fitting: 3/4-inch NPT barbed hose fitting
- E. Data communications distance:
 - 1. Maximum note-to-node distance: 400 m (1312 feet)
 - 2. Maximum total wire length: 500 m (1640 feet)

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