1. GENERAL
   1. DESCRIPTION
      1. Section Includes
         1. Analyzers, cables, and associated equipment for measuring Ammonium in water and wastewater treatment systems. Controllers and modules required for a complete monitoring system are specified elsewhere.
      2. Scope
         1. Furnish, install, calibrate, test, adjust, and place into satisfactory operation analyzers as shown on the Drawings and specified herein.
         2. The Drawings and Specifications illustrate and specify functional and general construction requirements of analyzers and do not necessarily show or specify all components, wiring, piping, and accessories required to make a completely integrated system. Provide all components, piping, wiring, accessories, and labor required for a complete and integrated system.
      3. Coordination: Coordinate with other suppliers for installation of all items specified herein and required to ensure the complete and proper interfacing of all the components and systems.
   2. PERFORMANCE REQUIREMENTS
      1. Design Requirements
         1. Design Ammonium measurement system for continuous monitoring of samples at discrete intervals *ex situ*.
         2. Ammonium measurement system shall be a component of a process monitoring system capable of monitoring up to 20 parameters simultaneously on each controller. Measurement locations shall be networked together in a linear, star, or branched topology with a single 2-wire cable that distributes 12 V power and communications.
         3. Ammonium measurement system is available as a single channel or dual channel system.
      2. Performance Requirements
         1. Operating range:
            1. Ambient Temperature: -4°F to 104°F (-20°C to 40°C).
            2. Sample Temperature: 39°F to 113°F (4°C to 45°C).
            3. pH: 5.0 S.U. to 9.0 S.U.
            4. Maximum solids content: 6,000 mg/L
         2. Measuring range: Instrument dependent, select measuring range:
            1. Alyza NH4-111 and Alyza NH4-112

Ammonium as N:

0.02 mg NH4-N / l to 5 mg NH4-N / l

* + - * 1. Alyza NH4-111 and Alyza NH4-112

Ammonium as N:

0.10 mg NH4-N / l to 20 mg NH4-N / l

* + - 1. Measuring accuracy, instrument dependent:
         1. Alyza NH4-111 and Alyza NH4-112: ± 2% or ±0.02 mg NH4-N / l. whichever is greater
         2. Alyza NH4-111 and Alyza NH4-112: ± 3% or ± 0.10 mg NH4-N / l. whichever is greater
      2. Resolution, instrument dependent:
         1. Alyza NH4-111 and Alyza NH4-112: 0.01 mg NH4-N / l
         2. Alyza NH4-111 and Alyza NH4-112: 0.01 mg NH4-N / l
      3. Measuring interval: User-selectable measuring interval
         1. Alyza NH4-111: 10 minutes to 12 hours (adjustable)
         2. Alyza NH4-112: 20 minutes to 12 hours (adjustable)
      4. Measurement Channels
         1. Alyza NH4-111: single channel
         2. Alyza NH4-112: two channels
      5. Automatic calibration: one or two point calibration (user-selectable)
      6. Automatic calibration interval: 6 to 96 hours (user-selectable)
      7. Chemical consumption
         1. Reagent MB1(10 minute measuring interval)

every 90 days

* + - * 1. Reagent MB2 (20 minute measuring interval)

every 45 days

* + - * 1. Standard solution: every 180 days (daily calibration)
        2. Cleaning solution: every 180 days (daily cleaning)
      1. Power consumption: 1,600 W max
  1. QUALITY ASSURANCE
     1. Acceptable Manufacturers:
        1. Furnish phosphate analyzer by the named manufacturers.
        2. The named manufacturers have been specified to establish the standard of quality and performance of the equipment to be supplied.
        3. Manufacturer shall be ISO 9001 certified.
  2. PRODUCT DELIVERY, STORAGE, AND HANDLING
     1. Ammonium measurement system shall not be delivered to the site until all product information and system shop drawings for the system have been approved.
     2. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
     3. Storage and Handling Requirements:
        1. Store and handle materials in accordance with manufacturer’s instructions.
        2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
        3. Store materials in clean, dry area indoors.
        4. Protect materials during storage, handling, and installation to prevent damage.
        5. Temperature range for storage: -4°F to 122°F (-20°C to 50°C)
  3. SUBMITTALS
     1. Product data
        1. Analyzer operating manual.
        2. Mounting bracket installation instructions.
     2. Manufacturer’s Certifications: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
     3. Warranty documentation: Submit manufacturer’s standard warranties.

1. PRODUCTS
   1. GENERAL
      1. Measurement principle shall be colorimetry by means of the Berthelot method (Indophenol Blue Method).
      2. Ammonium measurement system shall be intended for use as a stand-alone instrument or as part of a multiparameter monitoring network by connecting Ammonium analyzer to expansion modules specified in Section 2.3.G. and network cable specified in Section 2.3.F.
      3. Ammonium measurement system components shall be designed to be part of an analytical process control system with enhanced protection from overvoltage due to lightning and power supply fluctuations according to EN 61326 when installed using manufacturer’s recommended components per manufacturer’s instructions.
   2. MANUFACTURER
      1. Provide products from the following manufacturer:
         1. YSI Incorporated, 1700/1725 Brannum Lane, Yellow Springs, OH 45387. 1-800-765-4974.
   3. MANUFACTURED UNIT
      1. Enclosure:
         1. Twin-cabin (internal, external)
         2. Model:
            1. Alyza NH4-111: Single channel, measuring range one or two
            2. Alyza NH4-112: Dual channel, measuring range one or two
      2. Power supply: 120 VAC / 240 VAC, 50 / 60 Hz
      3. Photometer Unit:
         1. Power supply: 24V DC
         2. Controller
         3. Status LED
         4. Optics
            1. 660 nm LED
            2. Photo diodes
         5. Power supply / communication interface
         6. Overflow vessel
         7. MulitPort mixing valve block with inlet and outlet tubing
         8. Pump: syringe pump
      4. Filtration Pump:
         1. Control panel with pump frequency indicator
         2. Return line, heat-traced tubing
         3. Manometer
      5. Filter membrane module
         1. Chain
         2. Guiderail
         3. Adjustable slide
         4. Suction line, heat-traced tubing
         5. Sleeve tube
         6. Filter membrane insert
      6. SNCIQ-x,x [SNCIQ-x,x SW] network connection cable.
         1. Capable of transmitting digital communications and low voltage (24V) power.
         2. Integrated shield.

Note to specifier: Network cable is suitable to connect all components of the multiparameter measuring system. Specify appropriate total length of cable required for project in meters.

* + 1. Network modules
       1. Allows networking of different IQ SensorNet sensors and analyzers within a multiparameter water quality monitoring network.
  1. MATERIALS
     1. Enclosure:
        1. Structure: Powder-coated aluminum
        2. Door seals: NBR
        3. Screws: stainless steel
        4. Protection rating: IP54
     2. Photometer Unit
        1. Overflow vessel: PMMA
        2. Pump
           1. 1.6 mm ID Teflon tubing
     3. Filter membrane module
        1. Frame: PVC
        2. Filter media: PVDF with chlorinated polyethylene
           1. PVDF with 0.45 micron pore openings
           2. Polyester fleece on both sides
           3. Surface area: 1,000 cm2 (155 in.2)
        3. Suction tubing: polyethylene
        4. Sleeve tube: PVC-reinforced PCV tube
     4. Network connection cable
        1. Conductors: Tin-coated stranded copper wire.
        2. Cable sheath: PUR
        3. Protective cap: PVC
        4. Protection rating: IP68 (waterproof)
        5. Warranty: 12 months
  2. ACCESSORIES

Note to specifier: Specify analyzer mounting assembly and other accessories as required.

* + 1. Handrail mounting assemblies:
       1. YSI model 821988Y rail mount

Note to specifier: A handrail mount is the most appropriate option for most installations. Wall Mount and Stand Mount options are available. Consult YSI for more information.

1. EXECUTION
   1. INSTALLATION
      1. Enclosure space requirements
         1. Below: 500 mm minimum clear space
         2. Above: 200 mm minimum clear space
         3. Door hinge side: 675 mm minimum clear space to allow 180° range for door.
      2. Filter membrane module
         1. Mount vertically
         2. Mount filter module to be completely immersed at all times.
      3. Network cable
         1. Bend radius
            1. Permanent bend: not less than 3.2 in. (80 mm).
            2. One-time bend: not less than 2 in. (50 mm).
   2. START-UP
      1. Install analyzers in strict accordance with the manufacturer’s instructions and recommendations.
      2. 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 representatives of the following be present during the start-up:
            1. General contractor
            2. Electrical contractor
            3. YSI factory-trained representative
            4. Owner’s personnel
            5. Engineer

END OF SECTION