

# **GENERAL CONDITIONS FOR Turbidimeters and Accessories MAY 2024**

## **I. CONTRACT PERIOD**

The period of this contract will be for **ninety (90) days** from the date the bid is awarded. This contract may be renewed for up to **three (3) years** from the initial award date upon the agreement of both parties. The bid price will remain firm during the period of the contract. A W-9 and E-verify will be required before the bid is awarded. We request that you submit a completed W-9 and E-verify documentation with your bid packet. If you do not include the W-9 and E-Verify with your bid and your bid is to be awarded, Shelby County Water Services will contact you by the email provided in your bid packet and request the completed W-9 and E-Verify be submitted within 3 business days.

### **Steps to provide your E-Verify**

- a. If you **do not have any physical employees in the State of Alabama**, you may submit a signed statement on letterhead in place of the E-Verify.
- b. If your company hasn't already, enroll in E-Verify at [e-verify.gov](https://e-verify.gov)
- c. If you are newly enrolling, you will have an opportunity at the end to print an MOU (Memorandum of Understanding) or check to see if your company printed and saved their MOU when they established the account. If you don't have the MOU, follow step d.
- d. You can Log into your E-verify account. Go to Company. Select Edit Company Profile. This will show your information. Print this page as proof of enrollment.

## **II. DELIVERY**

**All quoted prices shall include delivery charges.** Deliveries shall be made to the following address:

**Shelby County South Water Treatment Plant  
7935 Highway 61  
Wilsonville, AL 35186**

## **III. BILLING**

Invoice payments shall be based solely on the quantity of items received and the vendor's stated bid price. **The product shall be billed in items received, and all prices shall include shipping.** Shelby County Water Services does require a Purchase Order for every order placed. Shelby County Water Services is tax-exempt.

All invoices shall be billed to:

**Shelby County Water Service  
10927 US Highway 280  
Sterrett, Alabama 35147**

**[ap-water-landfill@shelbyal.com](mailto:ap-water-landfill@shelbyal.com) - preferred delivery method**

#### **IV. ESTIMATED ANNUAL USE**

Products will be ordered on an **AS NEEDED** basis. Estimated quantities for products are on the attached bid documents. Some items in the bid may not be ordered during the contract period.

#### **V. BID QUALIFICATIONS**

**All BIDDERS must submit product information with bids.** Information to be submitted must show the product proposed meets all the specifications listed below and list **ALL EXCEPTIONS** to the specifications in a separate document.

# QUOTATION SHEET (1 of 2)

## Shelby County Water Services

Bid: Turbidimeters and Accessories - April 2024

ALL QUOTES SHOULD INCLUDE DELIVERY

| Item Description   | Quantity | Unit Price | Extended Price |
|--|----------|------------|----------------|
| Maintenance Kit for Laser Turbidimeter, with RFID Sealed Vials.  | 1        | \$         | \$             |
| Stablcal Primary standards Set with RFID (10 NTU, 20 NTU, 600 NTU) for Laser Turbidimeters.                                  | 1        | \$         | \$             |
| Replacement Vial for Online Laser Turbidimeter   | 2        | \$         | \$             |
| Desiccant Cartridge for Laser Turbidimeter   | 2        | \$         | \$             |
| 13 Foot of ¼ Inch Black Polyethylene Tubing for Turbidimeters.   | 7        | \$         | \$             |
| Low Range Laser Turbidimeter with Flow Sensor, Automatic Cleaning, and RFID, EPA Version (Hach TU5 Series TU5300sc or Equal) | 2        | \$         | \$             |
| Fiber Wiper for Automatic Cleaning   | 2        | \$         | \$             |
| Low Range Laser Turbidimeter with Flow Sensor and RFID, EPA Verison (Hach TU5 Series TU5300sc or Equal)                      | 5        | \$         | \$             |
| SC4500 Controller, Prognosys, 5x mA Output, 2 digital Sensors, 100-240 VAC, US plug (or Equal)                               | 2        | \$         | \$             |
| Low Range Laser Turbidimeter, EPA Version (Hach TU5 Series TU5300sc or Equal)  | 1        | \$         | \$             |
| TU5 Series® TU5200 Laboratory Laser Turbidimeter with RFID, EPA Version.   | 1        | \$         | \$             |

**Shelby County Water Services**  
**QUOTATION SHEET (2 of 2)**

**BID: Turbidimeters and Accessories**  
**May 2024**

**THE UNDERSIGNED OFFERS THESE PRICES, TERMS, AND DELIVERY AS PER THE BID  
GENERAL CONDITIONS AND SPECIFICATIONS:**

**NAME OF COMPANY:** \_\_\_\_\_

**BY: (Please Print):** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**COMPANY ADDRESS:** \_\_\_\_\_

\_\_\_\_\_

**PHONE:** \_\_\_\_\_

**E-MAIL:** \_\_\_\_\_

**BIDS SUBMITTED ARE FIRM, AND NO CLAIMS FOR ERRORS WILL BE MADE AFTER BIDS  
ARE OPENED AND SUBSEQUENT THEREOF.**

**DON'T FORGET** to enclose the Bid Specifications documentation with your bid.

**Sworn to and subscribed before me this**

**the** \_\_\_\_\_ **day of** \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_, **Notary Public My Commission Expires:** \_\_\_\_\_

\_\_\_\_\_

# **BID SPECIFICATIONS FOR**

## **Turbidimeters and Accessories**

### **SECTION 1 - TURBIDITY ANALYZERS**

#### **PART 1 GENERAL**

- 1.1.1 Section includes:
  - A. Instrument for continuous, online monitoring of turbidity in water that includes predictive diagnostics capability to monitor instrument status using USEPA Approved Hach Method 10258
- 1.1.2 Measurement Procedures
  - A. The sensor is used with an SC controller to measure low range turbidity in water. These sensors collect scattered light at an angle of 90° in a 360° radius around the axis of the incident lightbeam.
- 1.1.3 Alternates
  - A. Methods of turbidity measurements that do not include a laser light source and a 360° x 90° detection system are not acceptable.
  - B. Instruments that do not have predictive diagnostic capabilities are not acceptable
- 1.1.4 System Description
  - A. Performance Requirements
    - a. Measuring Range
      - 1) 0 to 700 NTU / FNU / TE/F / FTU
      - 2) 0 to 175 EBC
  - B. Other Specifications
    - a. Detection Limit
      - 1) 0.002 NTU / NTU / FNU / TE/F / FTU
    - b. Accuracy
      - 1) ±2% of reading ±0.01 NTU from 0 to 40 NTU based on formazin primary standard at 25°C
      - 2) ±10% of reading from 40 to 1000 NTU based on formazin primary standard at 25°C
    - c. Repeatability
      - 1) ±1% of reading or 0.002 NTU, whichever is greater based on formazin primary standard at 25°C
    - d. Resolution
      - 1) 0.0001 NTU / FNU / TE/F / FTU / EBC
    - e. Response Time
      - 1) T90 <45s at 100 mL/min
    - f. Sample Flow
      - 1) 100 to 1000 mL/min; optimal flow rate 200 to 500mL/min
    - g. Sample Pressure
      - 1) Max. 6 bar (87 psi) compared to air at sample temperature range of 0 to 40 °C (32 to 104°F)
      - 2) Max. 3 bar (43 psi) compared to air at temperature range of 40 °C to 60°C (104 °F to 140°F)

- h. Sample Temperature
  - 1) 2 to 60 °C (36 to 140 °F)

#### 1.1.5 Certifications

- A. CE Compliant
- B. US FDA accession number: 1420493-001 EPA version, 1420492-001 ISO version. Complies with IEC/EN 60825-1 and to 21 CFR 1040.10 in accordance with Laser Notice No. 50)
- C. Australian RCM Marking

#### 1.1.6 Environmental Requirements

- A. Operational Criteria
  - 1. Storage Temperature: -40 to 60 °C (-40 to 140 °F)
  - 2. Operating Temperature: 0 to 50 °C (32 to 122 °F)
  - 3. Relative Humidity: 5 to 95 %, non-condensing

#### 1.1.7 Enclosure Rating

- A. Electronic compartment IP55; all other functional units IP65 with process head/ACM attached

#### 1.1.8 Maintenance Service

- A. Unscheduled Maintenance
  - 1. Clean the measurement vial, depending on cleanliness of the sample
  - 2. Replacement of desiccant cartridge (depending on ambient temperature, ambient humidity, and sample temperature)
  - 3. Replacement of measurement vial, depending on cleanliness of the sample

## PART 2 PRODUCTS

#### 1.2.1 Manufacturer

- A. TU5300sc Low Range Laser Turbidimeter
- B. Hach

#### 1.2.2 Sensor

- A. The low range online laser turbidimeter consists of a Class 1 650nm (EPA) or 850 nm (ISO) laser light source and 360° x 90° detection system with predictive diagnostics designed to continuously monitor turbidity in a sample stream. Automatic cleaning and flow measurement options are available.

#### 1.2.3 Equipment

- A. Online turbidimeter
  - 1. Utilizes a laser-based 360° x 90° optical system that measures turbidity from multiple different angles.
  - 2. Continuous particle removal using a vortex created by the fluid path.
  - 3. Utilizes an identical laser-based optical system that matches the laboratory turbidimeter described in 2.3.C. for direct comparison between laboratory and online measurements.
  - 4. If chosen, includes capability to communicate measurements and calibration information via RFID to the laboratory turbidimeter described in 2.3.C.

5. Includes capability to actively monitor all internal components and present diagnostics on the overall health of the turbidimeter and time to next required maintenance.
  6. When connected to a predictive diagnostics capable controller the overall status of instrument performance is displayed as a percentage value via a measurement indicator
  7. When connected to a predictive diagnostics capable controller the overall time remaining until maintenance tasks are due is displayed in days
  8. Built in-help screens included.
  - B. Controller
    1. Provide an SC controller for turbidimeter operation.
  - C. Laboratory Turbidimeter
    1. Furnish laboratory turbidimeter with the same 360° x 90° detection system as the online turbidimeter, for validation of readings from the online turbidimeter.
  - D. Calibration Standards
    1. Frequency of use of calibration standards determined by recommendation of local regulator.
    2. Manufacturer must make available certified calibration standards that can be used in online and bench top instruments for highest calibration accuracy
    3. Calibration standards must be capable of being used to calibrate laboratory turbidimeters with similar optics systems.
    4. Calibration standards must be capable of functioning with the instrument's optional RFID module.
- 1.2.4 Components
- A. Analytical instrument
 

To deliver:

    1. Turbidimeter as selected in section 1.1.A.
    2. Mounting bracket
    3. Desiccant cartridge
    4. User Manual
  - B. Dimensions: Refer to turbidimeter drawings
  - C. Weight: 5 lbs (2.3 kg)
- 1.2.5 Instrument Options
- A. RFID Module
- 1.2.6 RFID Module Instrument Accessories
- A. Flow sensor
  - B. Automatic Cleaning Module (quantity 2)
  - C. Turbidimeter maintenance kit

## **PART 3 EXECUTION**

- 1.3.1 Preparation
1. Mounting
    - a. As shown on the drawings
  2. Inlet and outlet connection sizes
    - a. As shown on the drawings

### 1.3.2 Installation

- A. Install turbidimeter following transmittal drawings and instrument user manual.

### 1.3.3 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



## SECTION 2 - MEASUREMENT AND CONTROL INSTRUMENTATION

### PART 1 GENERAL

#### 2.1.1 Section includes:

- A. Laboratory instrument for monitoring turbidity in water accordance/compliance with DIN EN ISO 7027 and USEPA method 10258.

#### 2.1.2 Measurement Procedures

- A. The TU5200 turbidimeter measures low range turbidity primarily in water purification applications and in seawater with high salt concentrations. This sensor collects scattered light at an angle of 90° in a 360° radius around the axis of the incident light beam.

#### 2.1.3 Alternates

- A. Other methods of turbidity measurements including those with incandescent light sources, LED light sources, or turbidimeters without a 360° x 90° detection system are not acceptable.

#### 2.1.4 System Description

##### A. Performance Requirements

##### 1. TU5200 in accordance with DIN EN ISO7027

##### a. Measuring Range

- 1) 0 to 1000 NTU / FNU / TE/F / FTU
- 2) 0 to 250 EBC
- 3) 0 to 100 mg/L

##### b. Accuracy

- 1)  $\pm 2\%$  of reading  $\pm 0.01$  NTU from 0 to 40 NTU based on formazin primary standard at 25°C
- 2)  $\pm 10\%$  of reading from 40 to 1000 NTU based on formazin primary standard at 25°C

##### c. Repeatability

- 1) 1% or  $\pm 0.002$  NTU, whichever is greater, from 0 to 40 NTU based on formazin primary standard at 25°C
- 2) 3.5% at turbidity levels greater than 40 NTU, based on formazin primary standard at 25°C

##### d. Resolution

- 1) 0.0001 NTU / FNU / TE/F / FTU / EBC / mg/L

##### 2. TU5200 in accordance with USEPA method 10258

##### a. Measuring Range

- 1) 0 to 700 NTU / FNU / TE/F / FTU
- 2) 0 to 175 EBC
- 3) 0 to 100 mg/L

##### b. Accuracy

- 1)  $\pm 2\%$  of reading  $\pm 0.01$  NTU from 0 to 40 NTU based on formazin primary standard at 25°C
- 2)  $\pm 10\%$  of reading from 40 to 700 NTU based on formazin primary standard at 25°C

##### c. Repeatability

- 1) 1% or  $\pm 0.002$  NTU, whichever is greater, from 0 to 40 NTU based on formazin primary standard at 25°C
- 2) 3.5% at turbidity levels greater than 40 NTU, based on formazin primary standard at 25°C

d. Resolution

- 1) 0.0001 NTU / FNU / TE/F / FTU / EBC / mg/L

2.1.5 Certifications

- A. CE Compliant
- B. US FDA accession number: 1420493-000 EPA version, 1420492-000 ISO version.  
Complies with IEC/EN 60825-1 and to 21 CFR 1040.10 in accordance with Laser Notice No. 50)
- C. Australian RCM Marking

2.1.6 Environmental Requirements

- A. Operational Criteria
  - 1. Storage Temperature: -30 to 60 °C (-22 to 140 °F)
  - 2. Operating Temperature: 10 to 40 °C (50 to 104 °F)
  - 3. Relative Humidity: 5 to 95 %, non-condensing

2.1.7 Warranty

- A. Warranted from manufacturer defects for two years (Europe) or one year (all other geographies) from date of shipment.

2.1.8 Maintenance Service

- A. Unscheduled Maintenance
  - 1. Clean the measurement vial (depends on cleanliness of sample)
  - 2. Clean the instrument (depends on cleanliness of instrument exterior)
  - 3. Clean the vial compartment

## PART 2 PRODUCTS

2.2.1 Manufacturer

- A. Hach-Lange GmbH, Berlin, Germany
  - 1. TU5200 Low Range Laser Turbidimeter

2.2.2 Manufactured Unit

- A. The TU520 Low Range Laser Turbidimeter consists of a Class 1 650nm (EPA) or 850 nm (ISO) laser light source and 360° x 90° detection system.

2.2.3 Equipment

- A. Turbidimeter
  - 1. The analyzer shall utilize a 360° x 90° optical system that allows for measurement of turbidity from multiple different angles.
  - 2. The analyzer's optical system should be identical to current market online turbidimeters to provide proper and direct comparison between online and laboratory measurements.
  - 3. The analyzer's optical system shall be class 1 laser 650nm (EPA) or 850 nm (ISO).
  - 4. The analyzer shall have a 7" TFT WVGA, colored touch screen with menu-guided, graphical user interface.
  - 5. The analyzer shall have the ability to be operated in at least 25 different languages.
  - 6. The analyzer shall not require the use of silicone oil or sample cell indexing.
  - 7. The analyzer shall have Link2sc capability to communicate measurements and provide calibration information between the analyzer and identical optical system online turbidimeters.
  - 8. The analyzer shall provide the user with built in help screens that include assistance with issues matching laboratory and online turbidity measurements.

9. The analyzer shall be capable of data storage of at least 2000 data points and shall have the capability to export these measurements through USB data stick download or via LAN connection.
  10. The analyzer shall have the option of an integrated RFID module that allows for measurement tracking between online and laboratory instrumentation.
- B. Calibration Standards
1. Calibration standards shall be able to be used at a frequency determined by recommendation of local regulator.
  2. Manufacturer shall make available certified calibration standards that can be used in online and bench top instruments for highest calibration accuracy
  3. Calibration standards shall be capable of being used to calibrate online turbidimeters with similar optics systems.
  4. Calibration standards shall be capable of functioning with the instrument's optional RFID module.
- 2.2.4 Components
- A. Standard Equipment
1. TU5200 Low Range Turbidimeter
  2. Power adapter with multiple power plug options
  3. Sample Cells
  4. Sealed Vial StablCal® standards
  5. Vial Stand
  6. Instrument Dust Cover
  7. User Manual
- B. Dimensions: 409 x 278 x 195mm (16.1 x 10.9 x 7.7 in)
- C. Weight: 2.4 kg (5.2 lb)
- 2.2.5 Complimentary Instruments
- A. TU5300sc Low Range Laser Turbidimeter
- B. TU5400sc Ultra-Low Range Laser Turbidimeter
- 2.2.6 Instrument Options, must added to instrument at time of order
- A. RFID Module
- 2.2.7 Instrument Accessories
- A. Glass calibration/verification rod
- B. StablCal® Sealed Vial Calibration Standards
- C. Peristaltic Pump automatic sampler

## **PART 3 EXECUTION**

### **2.3.1 Preparation**

1. Mounting
  - a. Laboratory Bench

- 2. Sample Temperature
  - a. 4 to 70 °C (39 to 158 °F)

### 2.3.2 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. Controls Technician

### 2.3.3 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

## SECTION 3 - MULTI-PARAMETER ANALYZER SYSTEMS

### PART 1 GENERAL

#### 3.1.1 Section includes:

- A. A dual channel water quality sensor transmitter with a local user interface AND the ability to access sensor data remotely through a browser enabled device.
- B. Scope
  - 1. Provide labor, material, equipment, related services, and supervision to install and operate the controller to drawings and manufacturer's specifications.
- C. Alternates
  - 1. Parameter-specific controllers that do not allow changing parameter configurations in the field are unacceptable.
  - 2. Controllers or transmitters without the possibility to access data through an internet browser enabled device and cannot present real-time instrument diagnostics are not acceptable.

#### 3.1.2 System Descriptions

- A. Design requirements
  - 1. Includes capability to actively monitor all internal components and present diagnostics on the overall health of connected sensors and time to next required maintenance, reducing user risk.
    - a. Ability to see and be notified of upcoming and past due maintenance.
  - 2. Includes capability to provide real-time alerts when sensor issues occur with built in workflows with step-by-step guidance to perform calibration and maintenance tasks, reducing user risk.
  - 3. Includes ability for a cellular network coverage OR Wi-Fi connection OR a LAN connection.
  - 4. Supports advanced communication protocols, including Profibus DPV1, Modbus TCP/IP, Profinet IO, and Ethernet IP.
  - 5. Provides capability to view all connected plant measurements, alerts, calibration, and maintenance status in real time on any internet browser capable device.
    - a. Connects with overall data system for real time graphic of both online and laboratory data for a full picture of functional plant operational capability.
  - 6. Controller designed to be used in indoor or outdoor locations.
- B. Performance Requirements
  - 1. The controller accepts digital sensors in any combination to measure the following water quality parameters:
    - a. pH/ORP
    - b. Conductivity/Dissolved Oxygen
    - c. UV Organics
    - d. Sludge level
    - e. Ammonium
    - f. Ammonia
    - g. Nitrate
    - h. Combination Ammonium and Nitrate
    - i. Total suspended solids
    - j. Orthophosphate
    - k. Turbidity
    - l. Free/total Chlorine
    - m. Combination Chlorine HOCl /Chlorine+Acid / Total free chlorine
    - n. Ozone in water

- o. Chlorine Dioxide
- p. Oil in Water
- q. Nitrite

#### C. Environmental Requirements

##### 1. Operational Criteria

- a. Operating Temperature:
  - 1) Ethernet version: –20 to 45 °C (–4 to 113 °F)  
Cellular version including Controller and external Cellular USB BOX: -20 to 60 °C (-4 to 140 °F)
  - 2) Wi-Fi version including Controller and external Wi-Fi USB BOX: -20 to 60 °C (-4 to 140 °F)
- b. Storage temperature: –20 to 70 °C (–4 to 158 °F)
- c. Relative humidity: 0 to 95%, non-condensing
- d. Altitude ≤3000m (6,562 ft.)

#### 3.1.3 Certifications

- A. EMC: CE approved (with all sensor types). Listed for use in general locations to UL and CSA safety standards by ETL (with all sensor types).
- B. Safety: General Purpose UL/CSA 61010-1 with cETLus safety mark
- C. Possibility for Hazardous Locations Use: Class 1 Div 2

#### 3.1.4 Warranty

- A. Warranted for 1 year from date of shipment from manufacturer defects.

#### 3.1.5 Unscheduled Maintenance

- A. Clean controller face
- B. Calibrate mA output signals

## PART 2 PRODUCTS

#### 3.2.1 Manufacturer

- A. Hach Company, Loveland, Colorado and Hach Lange GmbH, Berlin, Germany
  - 1. SC4500 Controller

#### 3.2.2 Manufactured Unit

- A. Microprocessor-based sensor controller.
- B. Change digital sensors connected to the controller by unplugging and plugging in sensors as necessary. Modules for connection of Analogue sensors for pH, ORP or Conductivity
- C. The controller is available with the following power requirements: AC powered: 100–240 VAC ±10%, 50/60 Hz; 1 A (28 W sensor load) DC powered: 24 VDC +15% –20%; 2.5 A (20 W sensor load)
- D. The controller uses a menu-driven operation system.
- E. The controller is equipped with a real-time clock.
- F. The controller is equipped with two security levels.
- G. The controller shall have worded operation menus in 24 languages.
- H. The controller is equipped with an USB reader for data download and controller software upload.
- I. High voltage:
  - Two relays (SPDT);
  - Wire gauge: 0.75 to 1.5 mm<sup>2</sup> (18 to 16 AWG)

**AC controller**

Maximum switching voltage: 100–240 VAC

Maximum switching current: 5 A Resistive/1 A Pilot Duty Maximum

switching power: 1200 VA Resistive/360 VA Pilot Duty

**DC controller**

Maximum switching voltage: 30 VAC or 42 VDC Maximum

switching current: 4 A Resistive/1 A Pilot Duty

Maximum switching power: 125 W Resistive/28 W Pilot Duty

- J. Five analogs 0/4-20 mA outputs are provided with a maximum impedance of 500ohms.
  - 1. The controller can be equipped with five 4-20 mA outputs with a maximum impedance of 500 ohms.
  - 2. The following can be programmed:
    - a. Alarms:
      - 1) High and Low alarm point
      - 2) High and Low alarm point deadband
      - 3) On and Off delay
    - b. Controls
      - 1) Linear
      - 2) PID
- K. The controller can be equipped with the following forms of communication:
  - 1. Profibus DP
  - 2. Modbus TCP/IP
  - 3. Profinet (ODVA certified)
  - 4. Ethernet IP (ODVA certified)
- L. The controller can host one of the compatible RTC modules
- M. All user settings of the controller are retained for 10 years in flash memory.
- N. The controller is equipped with a system check for:
  - 1. Motherboard temperature
  - 2. Field auto-test

**3.2.3 Equipment****A. Materials**

- 1. Housing: polycarbonate, aluminum (powder coated), and stainless steel Metal enclosure with a corrosion-resistant finish
  - 2. Rating: UL50E type 4X, IEC/EN 60529–IP 66, NEMA 250 type 4X
- B. Conduit openings: 0.5 in. NPT**

**3.2.4 Components****A. To deliver:**

- 1. Controller as described in section 1.1.A
  - 2. Mounting hardware for wall, pipe, and panel mounting
  - 3. User manual and installation documentation
- B. Dimensions: Refer to controller drawings**
- C. Weight: 1.7 kg (3.7 lbs.)**

**3.2.5 Instrument Options & Accessories**

- A. Maintenance Kit
- B. Stablcal primary standard Kit
- C. Replacement Vials
- D. Dessicant Cartridges
- E. Tubing for Installation
- F. Fiber Wiper for Automatic cleaning module
- G. Automatic Cleaning Module

## **PART 3 EXECUTION**

### **3.3.1 Preparation**

#### **A. Mounting**

1. Mount the controller as shown on the drawings

### **3.3.2 Installation**

- A. Install controller following transmittal drawings and instrument user manual.

### **3.3.3 Manufacturer's Service and Start-Up**

- A. Contractor will include manufacturer's services to perform commissioning of the system to include device provisioning to communicate via local protocols and initiate initial product configuration
- B. 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.
- C. 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.
- D. 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.
- E. Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION