

**PLEASE NOTE: The following specification contains areas, highlighted in yellow and with the [ ] symbol. In these areas, the engineer has to make a selection, add specific, project related information and has to delete what is not applicable for the specific project.**

## PART 1 GENERAL

### 1.1 Section includes:

- A. Instrument for continuous, online monitoring of Total Organic Carbon, Total Carbon, Total Inorganic Carbon, Biological Oxygen Demand and/ or Chemical Oxygen Demand via correlation and Volatile Organic Carbon via calculation in water.
- B. The analyzer has internal sensors and utilizes self-diagnostics to monitor analyzer status and produces alerts when maintenance or service are required.

### 1.2 Measurement Procedures

The method of measuring Total Organic Carbon will be by Two Stage Advanced Oxidation which utilizes the Hydroxyl radical and a manganese catalyst.

### 1.3 Alternates

- A. Other instruments that do not use the Two Stage Advanced Oxidation which utilizes the Hydroxyl radical and a manganese catalyst are not acceptable
- B. Other instruments that do not have predictive diagnostic capabilities and don't generate alerts when maintenance or service are required are unacceptable.

### 1.4 System Description

#### A. Performance Requirements

- 1) Measurement ranges:
  - a) 0 – 25mgC/l,
  - b) 0 – 25mgC/l and 0 – 100mgC/l,
- 2) Detection Limit: 0.06mgC/l
- 3) Repeatability:
  - a)  $\pm 3\%$  of reading or  $\pm 0.03\text{mgC/l}$  whichever is greater in 0 – 25mgC/l range,
  - b)  $\pm 5\%$  of reading or  $\pm 0.5\text{mgC/l}$  whichever is greater in 0 – 100mgC/l range,
- 4) Cycle time: from 5.5 min, depending on range and application
- 5) Sample Flow: minimum 100ml per analysis
- 6) Sample Pressure: Ambient
- 7) Sample Temperature: 2 to 60 °C (36 to 140 °F)

### 1.5 Certifications

- A. CE Compliant
- B. KC (Korea Certification)
- C. ACMA (Australia & New Zealand EMC Compliance)
- D. China RoHS

### 1.6 Environmental Requirements

- A. Operational Criteria
  - 1. Operating Temperature: 0 to 45 °C (32 to 113 °F)
  - 2. Relative Humidity: 5 to 85 %, non-condensing

- 1.7 Maintenance Service
  - A. Unscheduled Maintenance
    - 1. Replace chemicals as required
  
- 1.8 Warranty
  - A. Warranted for one year from date of shipment against manufacturer defects.

## PART 2 PRODUCTS

- 2.1 Manufacturer
  - A. Hach Ireland Ltd
  - B. Model Hach BioTector B3500c Online TOC Analyzer
  
- 2.2 Analyzer
  - A. The online TOC analyzer consists of:
    - 1. Housing: Glass Reinforced Polyester
    - 2. Sampling system
    - 3. Oxygen concentrator
    - 4. Ozone generator
    - 5. Oxidation reactor
    - 6. Non-dispersive Infrared (NDIR) analyzer
  
- 2.3 Equipment
  - A. Online TOC analyzer
    - 1. To measure TOC of the sample it utilizes hydroxyl radicals as the oxidizing agent.
    - 2. The TOC analyzer automatically compensates for temperature and pressure utilizing an embedded temperature and pressure sensors.
    - 3. Includes capability to actively monitor internal components and present diagnostics on the overall health of the TOC analyzer and time to next required preventive maintenance.
    - 4. Includes capability to actively monitor reagents usage, displays current reagent volumes and present approximate time to the next reagents replacement.
    - 5. Data transmission is made with a SD card.
  
- 2.4 Components
  - A. Standard equipment:
    - 1. Analyzer
    - 2. Mounting brackets
    - 3. User Manual
    - 4. Reagent dip tubes
  - B. Dimensions: Refer to TOC analyzer drawings
  - C. Weight: typically, 101 lbs (46 kg)

2.5 Instrument Options,

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Must be selected at time of order. Choose one

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- Single channel Online Total Organic Carbon Analyzer, 0 - 25 mg/L C,
- Single channel Online Total Organic Carbon Analyzer, 0 - 25 mg/L C and 0 – 100mg/L C,
- Dual channel Online Total Organic Carbon Analyzer, 0 - 25 mg/L C
- Dual channel Online Total Organic Carbon Analyzer, 0 - 25 mg/L C and 0 – 100mg/L C,
  
- Single channel Online Total Organic Carbon Analyzer, IP54 Purge Ready, 0 - 25 mg/L C,
- Single channel Online Total Organic Carbon Analyzer, IP54 Purge Ready, 0 - 25 mg/L C and 0 – 100mg/L C,
- Dual channel Online Total Organic Carbon Analyzer, IP54 Purge Ready, 0 - 25 mg/L C
- Dual channel Online Total Organic Carbon Analyzer, IP54 Purge Ready, 0 - 25 mg/L C and 0 – 100mg/L C,
  
- Single channel Online Total Organic Carbon Analyzer, ATEX Compliant, EExp Zone 2, 0 - 25 mg/L C,
- Single channel Online Total Organic Carbon Analyzer, ATEX Compliant, EExp Zone 2, 0 - 25 mg/L C and 0 – 100mg/L C,
- Dual channel Online Total Organic Carbon Analyzer, ATEX Compliant, EExp Zone 2, 0 - 25 mg/L C,
- Dual channel Online Total Organic Carbon Analyzer, ATEX Compliant, EExp Zone 2, 0 - 25 mg/L C and 0 – 100mg/L C,
- Single channel Online Total Organic Carbon Analyzer, ETL Certified, EExp Class 1 Div 2, 0 - 25 mg/L C,
- Single channel Online Total Organic Carbon Analyzer, ETL Certified, EExp Class 1 Div 2, 0 - 25 mg/L C and 0 – 100mg/L C,
- Dual channel Online Total Organic Carbon Analyzer, ETL Certified, EExp Class 1 Div 2, 0 - 25 mg/L C
- Dual channel Online Total Organic Carbon Analyzer, ETL Certified, EExp Class 1 Div 2, 0 - 25 mg/L C and 0 – 100mg/L C,

2.6 Instrument Accessories

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Select as many as required

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- VOC mode used for measurement of Volatile Organic Carbon in the sample
- Grab sample/Calibration port
- Remote activation of Manual/Calibration port
- Sample Sensor to detect presence of the sample and evaluate the quantity of air bubbles in the sample
- BioTector compressor
- Filter pack for removal of water, dirt, and oil from compressed air (if using instrument air supply)

Choose one or none

- Profibus
- Modbus RTU
- Modbus TCP/IP

Choose one or none

- BioTector Sample Overflow Chamber
- BioTector Flow Through Sampling Chamber with Sand Trap
- BioTector Sampling Chamber with Sand Trap

PART 3 EXECUTION

3.1 Preparation

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

3.2 Installation

- A. Install TOC analyzer following transmittal drawings and instrument user manual.

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