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| Version | Date | Description of Revisions |
| 1 | November 1, 2011 | Standard Specification Release |
| 2 | April 16, 2015 | General Formatting |
| 3 | June 13, 2022 | 1.3, 1.4 Tagging requirement revised (BM) |
|  |  |  |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**For each project the Consultant is responsible for the correct application of the specifications and for updating and modifying all highlighted items, as well as updating and modifying those sections that are directly applicable to the project. All updates and modifications to this standard document are to be highlighted to the Region for review and acceptance on each project.**

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# general

## General

### The specifications in this section define additional requirements to those set forth in Section 13105 – Process Control: General Instrumentation Requirements. Where a conflict exists, the more stringent requirement is to be provided.

### The contractor is to clearly identify on the shop drawings any deviation from the specification.

### Contractor required to provide the following O&M documentation: manufacturers’ printed O&M documentation; installation instructions; specifications; operation manuals, including electrical drawings, and plumbing diagrams; sales literature; materials; and training materials as applicable.

### Contractor is to furnish copies of the manufacturer’s warranties.

### Contractor is to provide, through the Instrumentation Supplier, chlorine residual analyzer, complete and operable, in accordance with the Contract Documents.

## Measurement and Payment

### The work outlined in this section shall be included in the lump sum price for Section 13195 – Chlorine Residual Analyzer as indicated in the Bid Form.

## Amperometric Analyzer

### Mounting: Vertical surface mounted.

### Electrolyte Chemicals: 1 year supply.

### Process connection: 12 mm or larger corrosion resistant sampling line.

### Free chlorine residual monitoring: free chlorine residual, pH and temperature analog signals to be provided for integration.

### Free and total chlorine residual monitoring: free chlorine residual, total chlorine residual, pH and temperature analog signals to be provided for integration.

### Equipment tag wired to transmitter in accordance with Section 01080 – Process Equipment Location Tagging

## Colourmetric Analyzer

### Mounting: Vertical surface mounted.

### Reagent Chemicals: 1 year supply

### Process connection: 6 mm or larger corrosion resistant sampling line.

### Free chlorine or total chlorine monitoring.

### Equipment tag wired to transmitter in accordance with Section 01080 – Process Equipment Location Tagging.

# INSTALLATION

## General

### The following installation requirements are in addition to or deviations from the requirements set forth for instrumentation in Section 13105 – Process Control: General Instrumentation Standard.

#### Locate the sample point to minimize unnecessary dead time in the chlorine residual analysis. Take care to ensure the sample is clean, thoroughly mixed, and representative of the process stream.

#### Provide a floor drain next to the analyzer. Provide all required process connections, valves, pressure / flow regulators, filters, tubing and miscellaneous mounting hardware not provided with analyzer. Select type and material for the application.

#### Install pressure reducing valve sample line to maintain constant flow and manufacturer pressure limits.

#### Install a sample withdrawal valve next to the analyzer so samples can be taken for calibration checks.

#### Provide a source of clean water and necessary valves so the sample line and probe can be back flushed.

#### Install a physical (strainer) filter upstream of the analyzer to remove iron and solids.

#### Provide a table nearby with the necessary equipment and chemicals to perform calibration checks.

#### Ensure that the system is on-line 24 hours before start up and calibration for adequate warm up.

#### Provide a one (1) year supply of chemicals, reagents, consumables and spare parts.

#### Mount the transmitter unit 1.8 m off floor in a readily accessible location to facilitate maintenance and calibration.

#### Transmitter/Electronics not mounted/installed indoors must be installed within fiberglass enclosure with viewing window, thermostat and heater. Panel heater to be powered from separate lighting panel circuit than instrument.

# ACCEPTABLE MANUFACTURERS

### Acceptable manufacturers are listed in the following table in order of preference. The design has been completed around the first named supplier. The contractor is responsible for all costs associated with any changes required to the design to accommodate one of the other manufacturers.

### Amperometric:

|  |  |  |
| --- | --- | --- |
| Preference | Manufacturer | Model |
| 1 | Siemens | MFC with Depolox 5Micro/2000 |
| 2 |  |  |
| 3 |  |  |

### Colourmetric:

|  |  |  |
| --- | --- | --- |
| Preference | Manufacturer | Model |
| 1 | Hach | CL-17 |
| 2 |  |  |
| 3 |  |  |

### The Contractor is to select the appropriate options to suit the application and the requirements of the specification.

### Where second and third named manufacturers are provided, they are to meet the performance specifications of the first named manufacturer.

## Chlorine Residual Analyzer

Amperometric Chlorine Residual Analyzer:

|  |  |  |
| --- | --- | --- |
| **Service:** | Free Chlorine Residual Analyzer | Total Chlorine Residual Analyzer  (Non-Ammoniated Water) |
| **Process:** |  |  |
| Tag name: | xxx-xxx | xxx-xxx |
| Installation DWG: | 13195x | 13195x |
| Fluid: | Potable Water | Potable Water |
| Sample Temp min/max: | 5 to 40 C | 5 to 40 C |
| Sample Press min/max: | 7 to 34 kPa | 7 to 34 kPa |
| Sample Flow min/max: | 200 mL/min to 500 mL/min | 200 mL/min to 500 mL/min |
| Sample Pressure: | 241kPa (35 psi) | 241kPa (35 psi) |
| **Sensor/Measurement Module Device Data:** |  |  |
| Measuring System: | Membrane-Covered Potentiostatic 3 Electrode System | Membrane-Covered Potentiostatic 3 Electrode System |
| Electrolyte: | Diluted Potassium Chloride Solution | Diluted Potassium Iodine |
| Cleaning: | Continuous Hydro-Mechanical Cleaning of Sensor | Continuous Hydro-Mechanical Cleaning of Sensor |
| Measuring Ranges: | 0-20 mg/L (ppm) Free Chlorine | 0-20 mg/L (ppm) Total Chlorine |
| Compensation: | Temperature, pH | Temperature, pH |
| Maximum Pressure: | Non-Pressurized | Non-Pressurized |
| Flow: | 6-35 L/h, As Constant as Possible | 6-35 L/h, As Constant as Possible |
| Manufacturer: | Siemens | Siemens |
| Part Number: | Depolox 5 with Free Chlorine Membrane Sensor | Depolox 5 with Total Chlorine Membrane Sensor |
| **Transmitter Device Data:** |  |  |
| Measurement Inputs:: | 1 x PT 1000 Temperature Input,  5 x Measured Value Isolated Inputs | 1 x PT 1000 Temperature Input,  5 x Measured Value Isolated Inputs |
| Analog Outputs: | 4-20mA, Isolated, Plug-In | 4-20mA, Isolated, Plug-In |
| Relay Outputs: | 8 x 5A, 250VAC | 8 x 5A, 250VAC |
| Operating Conditions: | 0°C – 50°C, Non Condensing | 0°C – 50°C, Non Condensing |
| Production Category: | NEMA 4X/IP66 Wall Mount | NEMA 4X/IP66 Wall Mount |
| Power Supply: | 120 VAC, 50-60 Hz | 120 VAC, 50-60 Hz |
| Manufacturer: | Siemens | Siemens |
| Part Number: | MFC | MFC |
| Accessories: | Pressure Regulating Valve | Pressure Regulating Valve |

Amperometric Chlorine Residual Analyzer:

|  |  |
| --- | --- |
| **Service:** | Total Chlorine Residual Analyzer (Ammoniated Water) |
| **Process:** |  |
| Tag name: | xxx-xxx |
| Installation DWG: | 13195x |
| Fluid: | Potable Water |
| Sample Temp min/max: | 5 to 40 C |
| Sample Press min/max: | 7 to 34 kPa |
| Sample Flow min/max: | 200 mL/min to 500 mL/min |
| Sample Pressure: | 241kPa (35 psi) |
| **Sensor & Flow Cell Device Data:** |  |
| Measuring System: | Three Bare Electrode Cell System |
| Accuracy: | 0.001 mg/L or 1% of Full Scale, whichever is greater |
| Sensitivity: | 0.001 mg/L or 1% of Full Scale, whichever is greater |
| Measuring Ranges: | 0-200 mg/L (ppm) Total Chlorine |
| Compensation: | Temperature, pH |
| Maximum Pressure: | 34 kPa |
| Flow: | 4-19 L/m, As Constant as Possible |
| Mounting: | Wall Mount |
| Manufacturer: | Siemens |
| Part Number: | Micro/2000 |
| Reagents: | Total Chlorine Measurement – pH 4 and Granular Potassium Iodide |
| **Transmitter Device Data:** |  |
| Measurement Inputs: | 1 x PT 1000 Temperature Input,  Bare Electrode for Total Chlorine |
| Analog Outputs: | 4-20mA, Isolated, Plug-In |
| Relay Outputs: | 8 x 5A, 250VAC |
| Operating Conditions: | 0°C – 50°C, Non Condensing |
| Production Category: | NEMA 4X/IP66 Wall Mount |
| Power Supply: | 120 VAC, 50-60 Hz |
| Manufacturer: | Siemens |
| Part Number: | MFC |
| Accessories: | Pressure Regulating Valve |

Colourmetric Chlorine Residual Analyzer:

|  |  |  |
| --- | --- | --- |
| **Service:** | Total Chlorine Residual Analyzer | Free Chlorine Residual Analyzer |
| **Process:** |  |  |
| Tag name: | xxx-xxx | xxx-xxx |
| Installation DWG: | 13195x | 13195x |
| Fluid: | Potable Water | Potable Water |
| Sample Temp min/max: | 5° to 40° C | 5° to 40° C |
| Sample Press min/max: | 7 to 34 kPa | 7 to 34 kPa |
| Sample Flow min/max: | 200 mL/min to 500 mL/min | 200 mL/min to 500 mL/min |
| **Device Data:** |  |  |
| Operating Range: | 0 – 5 mg/L Total Chlorine Residual | 0 – 5 mg/L Free Chlorine Residual |
| Accuracy: | ±5% or ±0.035 mg/L as Cl2, whichever greater | ±5% or ±0.035 mg/L as Cl2, whichever greater |
| Precision: | ±5% or ±0.005 mg/L as Cl2, whichever greater | ±5% or ±0.005 mg/L as Cl2, whichever greater |
| Minimum Detection Limit: | 0.035 mg/L | 0.035 mg/L |
| Cycle Time: | 2.5 Minutes | 2.5 Minutes |
| Sample Flow: | 200 – 500 mL per minute Minimum Required | 200 – 500 mL per minute Minimum Required |
| Analog Output: | 4 - 20 mA DC isolated (500 W) | 4 - 20 mA DC isolated (500 W) |
| Alarm Relay Outputs: | Two SPDT Programmable | Two SPDT Programmable |
| Sample Inlet Connection: | ¼” OD Polyethylene Tube, Quick Disconnect Fitting | ¼” OD Polyethylene Tube, Quick Disconnect Fitting |
| Drain Connection: | ½” ID Flexible Hose, Hose Barb | ½” ID Flexible Hose, Hose Barb |
| Enclosure: | ABS Plastic, Two Clear Polycarbonate Windows | ABS Plastic, Two Clear Polycarbonate Windows |
| Mounting: | Wall Mount | Wall Mount |
| Display: | LCD, 3-Digit Measurement Readout,  6-Characheter Alphanumeric Scrolling Text Line | LCD, 3-Digit Measurement Readout,  6-Characheter Alphanumeric Scrolling Text Line |
| Light Source: | Class 1 LED, Peak Wavelength 520nm, 50,000 hrs Estimated Minimum Life | Class 1 LED, Peak Wavelength 520nm, 50,000 hrs Estimated Minimum Life |
| Certification: | CE Approval  ETL Listed to UL 1262  ETL Listed to CSA 22.2 No. 142 | CE Approval  ETL Listed to UL 1262  ETL Listed to CSA 22.2 No. 142 |
| Manufacturer: | HACH | HACH |
| Part Number: | 5440002 | 5440001 |
| **Accessories:** |  |  |
| Power Cord, 115V, 10A, 1.83m, North American Plug: | 5448800 | 5448800 |
| Installation Kit: | 5516400 | 5516400 |
| Reagent Set: | 2557000 | 2556900 |
| Maintenance Kit: | 5444301 | 5444301 |

**END OF SECTION**