

PART 1 GENERAL

1.1 Section includes

- A. Potentiostatic chlorine analyzer for continuous measurement free chlorine in aqueous solutions.

1.2 Measurement Procedures

- A. The method of measuring free chlorine will be with a three-electrode potentiostatic sensor immersed into an electrolytic medium with a gold electrodes, selective to free chlorine, separating it from the sample.
- B. pH and Temperature correction
 - 1. pH compensation by included 0-14 pH measurement
 - 2. Temperature compensation by Pt-100 temperature measurement

1.3 Alternates

- A. Other methods of chlorine measurement, such as a two-electrode amperometric and amperometric requiring a flexible replaceable membrane plus electrolyte are not acceptable.

1.4 System Description

- A. Performance Requirements
 - 1. Measurement range selectable: 0-1000 ppb, 0-5 ppm, 0-10 ppm, and 0-20 ppm chlorine for free chlorine.
 - 2. Free Chlorine
 - a. Low Limit of Detection (LOD): 40 ppb (0.04 ppm) or better
 - b. Response time: ~21s for 90% change (T_{90}) (At a stable T and pH)
 - c. Interference: Chlorine Dioxide, and Ozone
 - 3. Drift: <10% with regular calibration (calibration will be weekly to quarterly depending on the application, given stable sample temperature and pH of water sample)
 - 4. Specificity/Selectivity: free chlorine
 - 5. Calibration method: A one point
 - 6. Verification procedure: One-point process calibration (slope) against a standard reference method.

1.5 Certifications (when connected to a Kuntze Krypton Multi system):

- A. CE-Symbol: The product meets the requirements of the Harmonized European standards and complies with the legal requirements of the EC directives
- B. EMC: EN 61000 6-1 (3) EN 61000 6-2 (4) EN 61326-1
- C. Rating: Front IP54; IP65

1.6 Environmental Requirements

A. Operational Criteria

1. Operating temperature: -5 to 50 °C (23 to 122 °F)
2. Relative humidity: 0-95%, non condensing

B. Sample Requirements

1. Maximum back pressure the chlorine sensor can manage without failure:
 - a. 6.0 bar (87 psi)
2. Temperature: 0 to 50 °C (32 to 122 °F)
3. Temperature compensation range: 0 to 50 °C (32 to 122 °F)
4. Flow: 35 – 400 L/hr (Instrument Controlled at 30 L/hr)
5. Pressure: 6.0 bar (87 psi)

C. Storage Requirements

1. Chlorine sensors: 0 to 30°C (32 to 86°F)

1.7 Warranty

- A. The product includes a one-year warranty from the date of shipment.

1.8 Maintenance Service

A. Scheduled maintenance:

1. Calibration by comparison with lab method: every 1 month or as necessary
2. Automated cleaning can be programmed via ASR

B. Unscheduled maintenance

1. Cleaning as needed based on environmental conditions.
2. Working electrode tip scrubbing with wet paper towel and granular cleaning detergent.

PART 2 PRODUCTS

2.1 Manufacturer

A. Kuntze Instruments, Meerbusch, Germany

1. Model Krypton Multi Reagentless Free Chlorine Analyzer

2.2 Manufactured Unit

A. The Kuntze Krypton Multi analyzer consists of:

1. Three Electrode Potentiostatic sensor that employs a two gold measuring electrodes.
2. Argon® StabiFlow Assembly that incorporates an inlet and outlet with stop cocks, sampling point, holder for FCL sensor, flow control, filter, check valve multisensor for flow monitoring and temperature

3. Neon Multi controller with five 4-20mA outputs, four control relays, four alarm relays.
4. Pre-assembled PVC panel mount

2.3 Equipment

- A. The Zirkon® DIS FCL sensor work with Kuntze Neon controllers. (Specific controller specifications can be found in the associated sensor CSI specifications)
- B. The potentiostatic cell of the sensor consists of:
 1. Two gold electrodes
 2. Silver/silver chloride/Tepox-Gel reference electrode
- C. Wetted materials as follows:
 1. Chlorine Measuring Cell: Acrylic
 2. Chlorine Sensor Body: Glass
 3. Chlorine Sensor Flow Cell: Acrylic
 4. Optional pH Sensor Flow Cell: Acrylic
- D. The chlorine sensor automatically compensates for temperature utilizing an external temperature sensor.
- E. The panel assembly includes a flow control and monitoring.

2.4 Components

- A. Standard equipment:
 1. PVC Mounting Panel
 2. Chlorine Sensor with gold electrodes
 3. Stabiflow Assembly with temperature sensor/flow monitor
 4. User Manual
- B. Dimensions
 1. Sensor
 - a. Length: 5.94 in. (151mm)
 - b. Diameter: 0.47 in. (12 mm)
 2. Panel
 - a. Length: 19.7 in. (500 mm)
 - b. Width: 15.8 in. (400 mm)
 - c. Depth: 6.3 in. (160 mm)
- C. Weight
 1. Complete panel: approximately 14 lbs. (6.4 kg)

PART 3 EXECUTION

3.1 Preparation

- A. Clearances
 - 1. The pre-assembled analyzer panel must be mounted to allow clearance for sensor removal and routine maintenance.
- B. Mounting
 - 1. Wall or panel mounted
- C. Sample Inlet (Metric Fittings)
 - 1. Metric Fittings
 - a. Tube Connector DN 6/8 1/4"
- D. Sample Outlet Metric (Fittings)
 - 1. Metric Fittings
 - a. Tube Connector DR 6/8 1/4"

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. Kuntze 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.

END OF SECTION