

## University of Houston Master Specification

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<Insert U of H Proj #>

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### SECTION 22 1313 - WATER TREATMENT EQUIPMENT

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified **in bold**.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

#### **EDIT TO SUIT PROJECT**

#### **[ADD DEIONIZATION EQUIPMENT, IF REQUIRED]**

##### 1.2 DESCRIPTION OF WORK

- A. Work Included: Provide potable cistern chlorination system, equipment and labor for testing, and dispensing products to control water quality in the cistern (approximately **[one million]** gallons storage capacity) and domestic water supply system as specified. All system components except chemical tank shall be unitized on a structural frame suitable for wall mounting in a corrosive environment. Include chemical feed pumps, piping, 4-inch flow header with flow switch, ejector with check valve, chlorine analyzer, measuring cell, measuring prefilter, wiring, controls, etc. as required for a complete and functioning water treatment system.
- B. Chemicals: Provide, at no change in Contract amount, chemicals required for initial treatment of full cistern volume and testing water treatment systems prior to acceptance by Owner.

##### 1.3 QUALITY ASSURANCE

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- A. Packaging and Labeling: Supply water treatment chemicals in metal drums, fiber drums with plastic liners, or plastic lined "liqui-paks" as best suited to the materials. Paper bags or unlined cardboard cartons will not be accepted. Use only chemicals in domestic water systems, and biocides, regardless of where used, registered with the U.S. Department of Agriculture (USDA) or the U.S. Environmental Protection Agency (EPA) and labeled as required by law.
- B. Electrical Standards: Provide electrical products that have been tested, listed and labeled by Underwriters' Laboratories, Inc. (UL) and that comply with National Electrical Manufacturers' Association (NEMA) standards.
- C. Chemical Standards: Provide chemical products acceptable under state and local pollution control or other governing regulations.
- D. Manufacturer:
  - 1. Evoqua Water Technologies (Xylem)  
15414 International Plaza Dr.  
Houston, TX 77032  
Ph: 281.227.2866
  - 2. No substitutions.

### 1.4 SUBMITTALS

- A. Test Reports: Submit test reports certified by an officer of the firm, on water treatment company letterheads, of samples of treated water drawn from the domestic water pumping unit discharge. Comply with ASTM D596 for reporting. Indicate ASTM test methods used for each test.
- B. Shop Drawings: Submit Shop Drawings for each water treatment system. Show wiring, piping and tubing sizes, fittings, accessories, valves, connections, and manufacturer's product data for all components.
- C. Instructions: Provide operation and maintenance instructions for each water treatment system; include one set in each Owner's Manual and deliver one set to Owner's operating personnel.
- D. Additional information as required in Section 23 0100 "Mechanical General Provisions."

### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver water treatment products in factory-fabricated water-resistant wrapping.
- B. Handle water treatment products carefully to avoid damage to material component, enclosure and finish.
- C. Store water treatment products in a clean, dry space and protect from the weather.

## PART 2 - PRODUCTS

### 2.1 POTABLE CISTERN WATER SYSTEM

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- A. General: Provide a complete factory-fabricated, automatic potable cistern water treatment system designed to monitor, record and control residual chlorine content. Provide a three (3) year warranty for the system.
- B. Chemical Feed Pumps: Provide two each piston diaphragm metering pumps (one online and one stand-by) as manufactured by Alldos or approved substitution suitable for 120 volt operation. The pump shall have a maximum feed rate as required and a maximum back pressure rating of 145 psi. The pump shall include a double diaphragm for extra protection against damage and an audible alarm to sound when the pump is not working. The pump output shall be adjustable manually and have a set point between 0% and 100% for stroke control. The pumps shall have PVC heads, an ejector with check valve, foot valve, and all necessary connections to the chemical storage tank. The pump shall be designed to handle up to a 30% solution of sodium hypochlorite.
- C. Chemical Storage Tank: Provide a polyethylene storage tank with a bolt-down gasketed gastight cover equipped with gastight inlet and outlet vent connections. Include graduated gallon markings on the side of the tank. Provide a low-level switch and alarm connected to the chemical feed pumps.
- D. Chlorine Analyzer: Provide an Alldos analyzer and indicator. The analyzer shall measure the chlorine level between zero and 2 PPM and come with a two-point controller for minimum and maximum feed. Connect control cables for the analyzer to the chemical feed pump(s) to turn the pump(s) on and off as required to maintain the set chlorine level within the cistern. Provide 120 volt, 1-phase, 60 Hz to operate the analyzer.
- E. Measuring Cell: Provide an Alldos chlorine measuring cell in a glass bowl. Connect the measuring cell to the chlorine analyzer using a 4-20MA power supply. The water from the recirculating line shall pass by the measuring cell at a constant flow of 5 to 6 gallons per hour. The cell shall measure the chlorine level and send a 4-20MA signal to the analyzer. When the chlorine drops below the set point, the analyzer shall signal the chemical feed pumps to come on, and when the set point is reached the pumps shall turn off.
- F. Measuring Prefilter: Provide a prefilter 10 inches in length installed in a clear polypropylene housing. The housing shall contain a 30 micron, 10-inch nominal polypropylene filter cartridge for sediment removal when the chlorine measuring cell requires calibration. An activated carbon filter shall be installed to remove the chlorine from the incoming water in order to calibrate the cell.
- G. Piping, fittings, and valves shall be Schedule 80 PVC or polypropylene.
- H. Install ejector, flow switch, and sampling water connection in the 4-inch PVC flow header.
- I. Mount all components on the unitized frame such that only the following connections are required:
  - 1. 120-volt single phase power supply.
  - 2. 4-inch flow header inlet.
  - 3. 4-inchflow header outlet.
  - 4. Flexible suction tube with foot valve inserted into tank.
  - 5. Discharge to drain.
- J. Controller enclosure shall be NEMA 4X and all interconnecting wiring shall be installed in PVC conduit as required. Control cabinet shall include analyzer, recorder, amplifier, operating lamps, alarm,

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safeties, controls, auxiliary contacts, etc., all as required for specified system operation. Chemical injection pumps shall be prevented from operating whenever the flow header mounted flow switch indicates a no-flow condition.

### PART 3 - EXECUTION

#### 3.1 POTABLE CISTERN WATER TREATMENT SYSTEM

- A. General: Install potable cistern water treatment system where shown on the Drawings in accordance with the manufacturer's written instructions.
- B. Testing Equipment and Reagents: Furnish suitable water treatment testing equipment for each system, complete with apparatus and reagents necessary for operation until acceptance by Owner.
- C. Initially treat full volume of cistern then verify system operation to maintain desired chlorine residual content of circulated water. The minimum residual shall be no lower than 0.2 mg/l of free chlorine.

#### 3.2 TESTING

- A. Reports: Submit certified test report for each required water performance characteristic. Comply with following ASTM standards, where applicable:
  - 1. ASTM D859 - Tests for Silica in Water and Waste Water.
  - 2. ASTM D1067 - Tests for Acidity or Alkalinity of Water.
  - 3. ASTM D1068 - Tests for Iron in Water and Waste Water.
  - 4. ASTM D1126 - Tests for Hardness in Water.
  - 5. ASTM D1128 - Identification of Types of Microorganisms and Microscopic Matter in Water and Waste Water.
  - 6. ASTM D3370 - Sampling Water. The technician taking the samples shall be a licensed Class III Water Treatment Specialist with TCEQ.

#### 3.3 PERSONNEL TRAINING

- A. Operator Training: Train Owner's personnel in use and operation of heating water, chilled water and condenser water treating systems, including preparation of chemical solutions, if applicable, and charging of the chemical solution reservoir.
  - 1. Furnish a Program Administration Manual encompassing all systems covered in this Section of the Specifications.

#### 3.4 SERVICE REPRESENTATIVE

- A. Furnish the services of a qualified service representative to instruct Owner's operating personnel in proper operation and maintenance of water treatment equipment, systems, and tests required. Service representative shall return to the site bi-monthly during the three-year warranty period. At such times, service representative shall check and adjust water treatment system operation, check efficiency and assay of chemicals and chemical applications, and instruct and advise operating personnel.

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**3.5 IDENTIFICATION**

- A. Refer to Section 23 0300 "Basic Materials and Methods" for applicable painting, nameplates and labeling requirements.

**END OF SECTION 22 1313**

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