

SECTION 22 13 13

WATER TREATMENT EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The Conditions of the Contract and applicable requirements of Division 1, "General Requirements", and Section 23 01 00, "Mechanical General Provisions", govern this Section.

[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" flow header with flow switch, ejector with check valve, chlorine analyzer, measuring cell, measuring prefilter, wiring, controls, etc. All 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 the Owner.

1.3 QUALITY ASSURANCE:

- 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 acceptable. Use only chemicals in domestic water systems, and biocides, regardless of where used, shall be 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 which have been tested, listed, and labeled by Underwriters' Laboratories, Inc. (UL) and 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. Manufacturers:
 - 1. Bob Johnson & Associates, Inc.
21606 Spring Bridge Road
Houston, Texas 77073
Telephone: (713) 443-2225
Fax: (713) 443-6831.

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 Show 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 01 00.
- 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:

- A. General: Provide a complete factory-fabricated automatic potable cistern water treatment system designed to monitor, record, and control residual chlorine content.
- B. Chemical Feed Pumps: Provide two each piston diaphragm metering pumps (one online and one stand-by) as manufactured by Alldos or approved equal 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 come with a double diaphragm for extra protection against damage and an audible alarm to sound when the pump is not working. The pump output will be adjusted 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: The tank shall be a polyethylene storage tank with a bolt-down gasketed gastight cover. The cover will be equipped with gastight inlet and outlet vent connections. The tank shall come with graduated gallon markings on the side. A low level switch and alarm shall be provided and 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. Control cables for the analyzer shall be connected 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. The power supply available is 120 volt, 1-phase, 60 Hz to operate the analyzer.
- E. Measuring Cell: Provide an Alldos chlorine measuring cell in a glass bowl. The cell will be connected to the chlorine analyzer and operate on a 4-20MA power supply. The water from the recirculating line will 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: A prefilter 10" in length shall be provided ahead and be installed in a clear polypropylene housing. The housing shall contain a 30 micron, 10" 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 made from Schedule 80 PVC or polypropylene.
- H. Install ejector, flow switch, and sampling water connection in the 4" 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" flow header inlet.
 3. 4" flow 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, 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 manufacturers 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 the Owner.
- C. Initially treat full volume of cistern then verify system operation to maintain desired chlorine residual content of circulated water.

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.

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 solution, if applicable, and charging of the chemical solution reservoir. A Program Administration Manual shall be furnished 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 bimonthly during the guarantee period. At such times, service representative shall check and adjust water treatment system operation, check efficiency of chemicals and chemical applications, and instruct and advise operating personnel.

3.5 IDENTIFICATION:

- A. Refer to Section 23 03 00 for applicable painting, nameplates, and labeling requirements.

END OF SECTION 22 13 13