SECTION 223119 – CHEMICAL FEED SYSTEMS FOR DOMESTIC WATER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sodium Hypochlorite Injection Skid (CI-1).

1.2 COORDINATION

A. Coordinate size and location of concrete bases with actual equipment provided.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Provide one pump and two rebuild kits for each pump size and type.
   2. Provide one valve or rebuild kit for each size and type of valve.
   3. Provide one controller, sensor, and actuator, for each type of controller, sensor, and actuator.

PART 2 - PRODUCTS

2.1 SODIUM HYPOCHLORITE INJECTION SKID (TAG: CI-1)

A. SKID – Single, dual, or multiple pump systems shall be constructed of ½ (or ¾") thick marine grade high density polyethylene sheet material and have a tensile strength greater than 4100 psi. The polyethylene sheet material shall be 100% UV inhibited. Molded skids shall not be accepted.
   1. There shall be two side walls, a pump mounting base, and one rear back plate with top support structure.
   2. Two 316 stainless steel pump mounting brackets with four mounting slots shall be provided per pump. Pump mounting brackets shall be secured to the skid structure with 316 stainless steel hardware.
   3. All piping shall be securely mounted to the polyethylene skid with secure plastic mounts and 316 stainless-steel fasteners. Ball valves shall be mounted with polyethylene mounting plates and four 316 stainless steel fasteners.
   4. Chemical containment shall be built into the chemical feed skid.
   5. Piping shall be ½" diameter schedule 80 CPVC.
   6. True union ball valves shall be CPVC with PTFE shaft bearings and seals. Seals and O-rings shall be selected by the skid fabricator to be compatible with the chemical being used. All ball valves shall be George Fisher model 546 or Asahi type 21.
   7. Unions shall be scheduled for 80 CPVC.
   8. Seals may be specified as Viton, or EPDM with Viton seals as the default selection.
   9. One or two chemical inlet ports shall be provided as required.
   10. One or two chemical outlet ports shall be provided as required.

11. One drain shall be provided on the chemical suction side of the metering pumps.
12. A calibration column fill line / discharge valve shall be included to assist in filling the calibration column and reliving pressure on the discharge side of the pumps. This line shall be vented back to the storage tank.
13. All socket weld joints shall be chemically welded with gray CPVC 724 industrial pipe cement with the use of P-70 industrial primer for chemical applications. All joints shall be squared, beveled and 100% seated. All socket welded joints shall have a full five-year field replacement warranty by the manufacture.
14. System shall have a five-year manufacturer's warranty on all chemically welded joints. Any leaks shall be repaired, on site, at the manufacturer's expense.
15. All skid components shall carry the manufacturer's standard warranty, not less than two years.
16. To prevent leaks, no threaded joints shall be permitted on the skid assembly.

B. A flow indicator shall be located in the discharge side of the piping system to provide a visual indication of fluid movement through the system.
   1. The flow indicator body shall be machined from clear cast acrylic with a ceramic ball indicator and polypropylene ball stop.
   2. The flow indicator shall be secured to the piping system with CPVC socket weld connectors and half unions.

C. Diaphragm check valves shall be located at the discharge side of each peristaltic pump to prevent the back flow of fluid through the pump.
   1. The diaphragm check valve shall be CPVC with a 1.0 – 1.5 PSI cracking pressure.
   2. The maximum inlet working pressure shall be 150 PSI.
   3. Seals may be specified as either Viton or EPDM with Viton seals as the default selection.
   4. Ball check valves shall not be permitted for this application.

D. Pressure relief valves (PRV) shall be located on the discharge side of each pump to prevent excessive pressure in the system. Fluid shall be returned to the inlet side of the system if the pre-set maximum system pressure is exceeded.
   1. The PRV shall be CPVC with a PTFE diaphragm seal.
   2. The PRV shall have infinite adjustment increments from 15 to 150 psi.
   3. The PRV shall have a 3-year manufacturer's warranty.

E. A back pressure valve (BPV) shall be located on the discharge side of the skid system to maintain constant back pressure on the discharge side of the diaphragm metering pumps. BPV shall NOT be used with peristaltic pumps.
   1. The BPV shall be CPVC with a PTFE diaphragm seal.
   2. The BPV shall have infinite adjustment increments from 15 to 150 psi.
   3. The BPV shall have a 3-year manufacturer's warranty.

F. Inlet Y-strainer shall be located in the suction side of the piping system ONLY when used with Diaphragm Metering Pumps.
   1. The Y-strainer shall be CPVC with removable screen.
   2. Seals may be specified as either Viton or EPDM with Viton seals as the default selection.

G. Calibration cylinders shall be located in the inlet side of the system to permit metering pump output volume calibration.

1. Valves shall permit the cylinder to be filled by gravity if possible. If gravity fill is not available, a bypass line shall be provided to allow the metering pump to be used to fill the calibration cylinder.
2. The cylinder shall be clear CPVC with CPVC socket weld end caps.
3. Calibration Cylinder shall have a 3-year manufacturer's warranty.

H. Pulsation dampener shall be located in the discharge side of the system to reduce pulsation.
1. A ball valve shall be provided to permit the dampener to be removed for service.
2. The dampener shall be CPVC with 10 cubic inches of volume for peristaltic pumps. Size shall be calculated for diaphragm pumps based on capacity and operating pressure.
3. Seals may be specified as either Viton or EPDM with Viton seals as the default selection.
4. Pulsation Dampener shall have a 2-year manufacturer's warranty.

I. Pressure gauge and guard shall be located in the discharge side of the system to indicate system pressure.
1. The liquid filled gauge shall be stainless steel and include a blow-out plug.
2. The gauge shall be bottom mounted to the guard with ¼" NPT stainless steel threads.
3. The temperature compensated oil filled gauge guard shall be CPVC with ½" socket weld bottom connection.
4. Pressure gauge shall have 2.5" dial, stainless steel case and 316 stainless steel Internals with 1.6% accuracy.

J. Diaphragm check valves shall be located at the discharge side of each peristaltic pump to prevent the back flow of fluid through the pump.
1. All manufacturers must modify their standard equipment to meet the specifications. Any field modifications required to correct deficiencies shall be at the contractor's expense.
2. The system manufacturer shall have a minimum of 10 years of experience manufacturing the specific type of skids specified.
3. The manufacturer shall have a minimum of ten local references for similar skids provided over the last five years.

PART 3 - EXECUTION

3.1 EQUIPMENT MOUNTING

A. Equipment Mounting: Install on concrete bases. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete."
1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

4. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.2 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service, Including Testing: Engage a factory-authorized service representative to support field tests and inspections.

C. Tests and Inspections:
   1. Leak Test: After installation, charge system, and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain.

END OF SECTION