

SECTION 15065CHEMICAL FEED & SAMPLE SYSTEMS PIPING & FITTINGSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, install, support and test all tubing and tube fittings associated with the chemical feed and sample systems of the type(s) and size(s) and in the location(s) shown on the Drawings and specified herein. This includes:
1. Connector Piping between pumps and hard piping within sodium hypochlorite building.
 2. Connector Piping between pumps and hard piping within sodium bisulfite building.
 3. Tubing on or within chlorine contact tanks inside pipe conduit.
 4. Tubing between buildings and chlorine contact tanks within pipe conduit.
 5. Tubing between sodium hypochlorite building and Activated Sludge Pump Gallery within pipe conduit.
- B. Related Work Specified Elsewhere:
1. Heat trace and pipe insulation are specified in the appropriate Sections in Division 15.
 2. Section 15052 - Polyvinyl Chloride Pressure Pipe.
 3. Section 11235 - Chemical Feed Pumping System.
 4. Section 11236 - Chemical Storage Tanks.
- C. Other Trades: Cooperate with all other trades whose work is to be coordinated with piping work.
- D. Description of Systems:
1. Disinfection System:
The disinfection system consists of eight chemical feed pumps that withdraw liquid sodium hypochlorite from four bulk storage tanks and discharge to the secondary and bypass chlorine contact tanks and to the Return Activated Sludge system located within the Activated Sludge Pump Gallery.
 - a. Delivery of sodium hypochlorite to the chlorine contact tanks shall be accomplished through the use of new tubing within pipe conduit to existing submersible induction mechanical mixers.
 - b. Delivery of sodium hypochlorite to the Return Activated Sludge system shall be accomplished through the use of new tubing within pipe conduit to existing injection nozzles.
 2. Sample System:
The sample system consists of four chlorine analyzers that analyze effluent samples withdrawn from the secondary and bypass chlorine contact tanks via four sample pumps. Each sample pump shall discharge through new tubing within pipe conduit.

1.2 QUALITY ASSURANCE

A. Standards:

1. Schedule 40 and 80 Pipe: ASTM D-1785 and PS 21-70.
2. Materials: ASTM 1784
 - a. PVC Normal Impact: Type I, Grade I, PVC 1120.
 - b. PVC Normal Impact: Type I, Grade II, PVC 1220.
 - c. CPVC (high temperature): Type IV, Grade I, PVC 4120.

B. Manufacturers:

1. Certain-Teed.
2. J-M Manufacturing.
3. Harvel.
4. Cabot.
5. Or approved equal.

1.3 SUBMITTALS TO THE ENGINEER

- A. Submit shop drawings in accordance with Section 01340 and the General Conditions of the Construction Contract.
- B. Submit manufacturer's "Certification of Conformance" that pipe and fittings and other piping appurtenances meet or exceed the requirements of these Specifications.
- C. Submit other documents as specified in the appropriate Sections of this Division.

1.4 GUARANTEE

- A. The Contractor shall obtain a warranty by the manufacturer, in the name of the Owner, in strict accordance with Section 11000 and the General Conditions.

PART 2 - PRODUCTS

2.1 PIPING SYSTEMS

A. General:

1. The chemical feed and sample systems include both standard single wall piping for chemical transmission, and secondary containment, or double wall, piping. Double wall containment shall be provided on all chemical feed tubing within the sodium hypochlorite and sodium bisulfite buildings.
2. Double wall containment consists of a carrier pipe and an outer containment pipe. The containment pipe completely encases the carrier pipe to prevent any leaks in the carrier pipe from contaminating its surroundings. Carrier pipe is defined as all tubing in direct contact with the fluids.
6. Piping shall be installed to prevent short or long-term fatigue damage to the system by the expansion and contraction of the piping. Provide offsets in the piping for allowing deflection in the piping and vertical support without restricting movement in the planes of expansion. Piping is shown schematically on Drawings to show general intent and system function. Contractor shall layout piping system to provide the intended function and be accessible for

- operation and maintenance. All piping layout shall be reviewed with the Engineer prior to installation.
7. Flexible polyethylene tubing or reinforced PVC hose shall be of the size and location shown on the Drawings or as appropriate for the pump size. Tubing shall be rated for -80° to +150° F with a minimum burst pressure of 280 psi at 73°F. Tubing minimum wall thickness shall be 0.062 inches. All tubing connections to rigid pipe or equipment shall be by compression type tubing connections. Tubing shall be natural translucent color, equivalent to Series E, PE tubing by Parker Fluid Connections, Trenton, NJ.
 8. A pipe to pump PVC hose transition connection shall be provided at the pump suction and discharge for easy removal of the pump. The PVC hose connection assembly shall be supplied with chemical feed pumps. The assembly shall have ¾" size female cam and groove quick disconnect coupling at each end with a male cam and groove connector with ¾-inch NPT male threads for installation in the piping by the installing contractor.
 9. The system shall be provided with all necessary appurtenances for a complete and operable system.
- B. Double Containment/Dual Wall Piping Systems: Shall be designed and provided by Spears Manufacturing Co, Slymar, California, or equivalent (Local Distributor: Portland Plastic Pipe).
1. Provide containment pipe system encasing the fluid carrier pipe for all chemical feed piping within the sodium hypochlorite and sodium bisulfite buildings.
 2. The system shall utilize standard PVC fittings and pipe with extensions and nipples as needed to facilitate interior piping connections.
 3. The system shall also utilize specialty fittings to fully support the interior carrier pipe and allow for differential thermal expansion and contraction. The interior carrier pipe shall be centered in the containment pipe by polypropylene centralizer spacers. The spacers shall be constructed to allow drainage of any leakage from the carrier pipe to a low point. Sensor centralizers shall not restrict thermal expansion or contractions. Centralizer spacing shall be one at each end of a fitting. Refer to the Double Containment Pipe Schedule, below.
 4. The double containment system shall include sealed terminal fittings to end of the double wall piping allowing the carrier pipe to continue through.
 5. The double containment system piping shall be installed to slope to low point leak detection sensors as indicated on the Contract Drawings.
 6. The double containment system shall have adequate thrust blocking to restrain interior carrier piping from water hammer, pulsation and other fluid forces.
 7. The double containment system containment piping shall not be pressurized above 10 psi.
 8. One low point sensor sump shall be provided for each of the sodium hypochlorite discharge piping (for a total of three) and for each of the sodium bisulfite discharge piping (for a total of two). Low point sensor sumps shall be provided by a tee connection in the containment pipe at the low points in the piping as indicated on the Drawings. The sensor sumps shall consist of PVC

elbows, tees, reducers, clear PVC pipe, and drain ball valve as indicated on the Drawings. Sensors (float switches) shall be provided under Specification Section 13440, Instrumentation.

9. The containment pipes shall be constructed of Schedule 80 PVC and Schedule 40 PVC, respectively, with dark gray color. Containment Pipe shall include a 4-foot long clear/translucent section every 20-feet of piping. The double containment system piping sizes and centralizer maximum spacing shall be as follows:

Item	Carrier Pipe Size	Containment Pipe Size	Centralizer Maximum Spacing @ 120°F
Sodium Hypochlorite Discharge	¾ & 5/8	3"	3 ft
Sodium Bisulfite Discharge	½"	3"	3 ft

10. All solvent welding shall be as specified for carrier piping in paragraph 2.1, A above.
11. Fittings and pipe assemblies that can be prefabricated at the factory shall be fabricated and shipped to the site in as many complete assemblies as possible.
12. Double containment pipe installers shall be trained and certified by the double-walled piping system manufacturer used.
13. Carrier piping and containment pipe shall be tested prior to use. Carrier system shall be hydrostatically tested as specified in PVC pressure pipe specification. The containment piping tested to a maximum of 8 psig.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. In accordance with Sections 01800, 11000 and manufacturers recommendations.
- B. Jointing:
 1. Clear each pipe length, coupling and fitting of all debris and dirt before installing.
 2. Provide and use coupling pullers for jointing the pipe when required.
 3. Shove home each length of pipe against the pipe previously laid and hold securely in position.
 4. Do not pull or cramp joints.
- C. Fabrication:
 1. Cutting:
 - a. Use a hand saw or pipe cutter with blades (not rollers).
 - b. Examine all cut ends for possible cracks caused by cutting.
 2. Connecting:
 - a. Solvent weld connections as recommended by the manufacturer.

- b. Connect pipe and fittings only when temperature is above the minimum recommended by the manufacturer.
- c. Threaded adapters shall be connected only with plastic male into metal female.

END OF SECTION