

SECTION 15241
POLYPROPYLENE PIPING SYSTEMS

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. This Section specifies the components of and the installation of the following systems;
 - 1. Acid Waste and Vent Piping.
 - 2. Acid waste pump discharge piping.
 - 3. Acid waste lift station.
- B. Related Work Specified in Other Sections:
 - 1. Firestopping of piping penetrations: Section 07840, "Firestopping."
 - 2. Hangers and supports: Section 15060, "Hangers and Supports."
 - 3. Pipe identification: Section 15075, "Mechanical Identification."

1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Installer Qualifications: Installer must have a minimum of 5-years experience in the installation of plastic process waste systems, and high purity water distribution systems.
- B. Acid Waste and Vent Systems: Minimum working pressure rating of 10-foot head of water.
- C. Acid waste pump discharge piping: Minimum working pressure 70 PSIG at 90 Deg.F.

1.04 SUBMITTALS

- A. General: Make submittals in accordance with requirements of Section 01300, "Submittals."
- B. Product data for pipe, fitting, and joining materials.
- C. Test results, and reports specified in "Field Quality Control" and "Cleaning" Articles.

1.05 QUALITY ASSURANCE

- A. Provide listing/approval stamp, label, or other marking of a nationally recognized testing laboratory on equipment made to specified standards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acid Waste Piping System Components: Subject to compliance with requirements, provide products by one of the following:
 1. Zurn Industries, Inc.
 2. Asahi America.
 3. George Fischer, Inc.
 4. IPEX / Enfield Industrial.
 5. Orion Piping Systems.

2.02 PIPES AND TUBES

- A. General: Piping shall meet ASTM 1785 with regards to dimensional tolerances.
- B. Polypropylene Drainage and Vent Pipe: ASTM D 4101 resin, schedule 40.
- C. Polypropylene Drainage and Vent Pipe, Fire Retardant: ASTM D 4101 fire-retardant resin, schedule 40.

2.03 PIPE AND TUBE FITTINGS

- A. General: Fittings shall meet ASTM 1785 with regards to dimensional tolerances, and ASTM D 3311 with regards to drainage pattern.
- B. Polypropylene Drainage and Vent Pipe Fittings: ASTM D 4101 resin, schedule 40, drainage pattern fittings with socket/heat-fusion ends.
- C. Polypropylene Drainage and Vent Pipe Fittings, Fire Retardant: ASTM D 4101 fire-retardant resin, schedule 40, drainage pattern fittings with socket/heat-fusion ends.

2.04 JOINING MATERIALS

- A. General: Install piping system components in strict accord with manufacturer's written instructions. Use joining methods and materials specifically listed for use with the pipe and fittings being joined.
- B. Polypropylene drainage, and vent piping systems, (PP): Fittings shall have integral heat fusion element embedded within the fitting.

2.05 WASTE LIFT STATION

- A. Factory pre-packaged system including, pump, controls, and basin, all of corrosion resistant construction. Unit shall be rated for not less than 5 GPM when pumping against a head of 10 feet.

- B. Construction of tank shall be polyethylene, complete with gas-tight, bolted polyethylene cover. Pump shall be CPVC construction, level control to be CPVC and polypropylene wetted parts, and be provided with a high level alarm contact.
- C. Pump shall be 1/15 HP, 120 volt, single phase, for hard-wired connection. High level alarm contact to be wired under the BMS contract.
- D. Unit shall be Model PES-71, as by Burt Process Equipment, or equal.

PART 3 - EXECUTION

3.01 PIPING AND FITTING APPLICATIONS

- A. General: Use pipe, tube, fittings, and joining methods for piping systems according to the following applications.
- B. Acid Waste and Vent Piping Systems, Above Ground: Fire Retardant Polypropylene pipe and drainage pattern fittings, single wall.

3.02 WASTE PIPING INSTALLATION

- A. General: Install piping systems in strict accord with manufacturers written instructions, as well as applicable ASTM standards.
- B. Make changes in direction for drainage and vent piping using appropriate Y branches, Y branches with 1/8 bends, and long-sweep 1/4, 1/5, 1/6, 1/8, and 1/16 bends. Sanitary tees and short-sweep quarter bends may be used on vertical stacks of drainage lines where change in direction of flow is from horizontal to vertical. Use long-turn double-Y-branch and 1/8-bend fittings where 2 fixtures are installed back to back or side by side and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. Make no change in direction of flow greater than 90 degrees. Where different sizes of drainage pipes and fittings are connected, use proper size standard increasers and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.
- C. Install horizontal runs of drainage and vent piping at the following minimum slopes, except where another slope is indicated:
 - 1. Waste Piping, smaller than 4-inch diameter carrier pipe: 1/4-inch per foot, (2 percent).
 - 2. Waste Piping, 4-inches and larger carrier pipe: 1/8-inch per foot, (1 percent).
 - 3. Vent Piping: 1/8 inch per foot, (1- percent).
- D. Install cleanouts in waste piping systems according to the following:
 - 1. Size same as the carrier piping up to 4-inch size. Use 4-inch size for larger carrier piping.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet for carrier piping 4 inches and smaller and 100 feet for larger carrier piping.
 - 4. Locate at base of each vertical waste stack.
 - 5. Locate at the building wall at drainage exit points from the building.

- E. Install flashing flange and clamping device with each stack and cleanout passing through floors having waterproof membrane.
- F. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to the manufacturer's written instruction.

3.03 WASTE PUMP INSTALLATION

- A. Install pump on a firm and level base, and located directly under sink unit location. Provide a flanged connection on the discharge line, within 6 inches of the unit outlet, to facilitate removal and replacement of the unit, at the time of future casework installation.
- B. Coordinate pipe routing and configuration with the owner, prior to installation, to facilitate the casework installation.

3.03 HANGERS AND SUPPORTS INSTALLATION

- A. Hanger and support devices are specified in Division 15 Section "Hangers and Supports."
- B. Install hangers for horizontal piping with following maximum spacing and minimum rod sizes:

Nom. Pipe Size (Inches)	Plastic Drainage & Vent Pipe Max. Span (Feet)	Plastic Pressure Pipe Max. Span (Feet)	Min. Rod Diameter (Inches)
1/2	-	2	3/8
3/4	-	2.5	3/8
1	-	2.5	3/8
1-1/4	-	3	3/8
1-1/2	4	3.5	3/8
2	5	4	3/8
3	6	-	3/8
4	6	-	3/8

- C. Support vertical runs of piping at each floor

3.04 CONNECTIONS

- A. Connect waste and vent piping systems to existing systems, as shown.

3.05 FIELD QUALITY CONTROL

- A. Inspect acid waste and vent systems piping as follows:
 1. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the authority having jurisdiction.
 2. During progress of installation, notify the plumbing official having jurisdiction at least 24 hours prior to time of inspection. Perform tests specified below in presence of the plumbing official.

- a. Roughing-in Inspection: Arrange for inspection of piping system after system roughing-in, before concealing, and prior to setting fixtures and equipment.
 - b. Final Inspection: Arrange for final inspection by plumbing official to observe tests specified below and to ensure compliance with requirements of plumbing code.
 3. Reinspections: Make required corrections and arrange for reinspection by plumbing official when piping system fails to pass test or inspection.
 4. Reports: Prepare inspection reports signed by the plumbing official.
- B. Acid Waste and Vent Piping System Tests, (Carrier Piping): Test systems according to procedures of authority having jurisdiction, or in absence of published procedure, as follows:
1. Test for leaks and defects new piping systems and parts of existing systems that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of the system tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced piping until it has been tested and approved. Expose for testing all such work that has been covered or concealed before it has been tested and approved.
 3. Rough Plumbing Test Procedure: Test piping systems at completion of roughing-in piping installation. Tightly close all openings in piping system, and fill with water to point of overflow, but not less than 10 feet head of water. Water level shall not drop from 15 minutes before inspection starts through completion of inspection. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures and equipment have been set and their traps filled with water, test connections and prove gastight and watertight. Plug stack openings on roof and building drain where it leaves the building, and introduce air into the system equal to pressure of 1-inch water column. Use a U tube or manometer inserted in the trap of a fixture to measure this pressure. Air pressure shall remain constant without introduction of additional air throughout period of inspection. Inspect fixture connections for gas and water leaks.
 5. Repair leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.
- C. Acid Waste Containment Piping Tests: Test containment piping as follows:
1. Test for leaks and defects new piping systems and parts of existing systems which have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of the system tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced piping until it has been tested and approved. Expose for testing all such work that has been covered or concealed before it has been tested and approved.
 3. Test Procedure: Tightly close all openings in piping system, and fill space between carrier and containment piping with 5 psig compressed air, (5 psig is the maximum allowable air pressure, as well as the test pressure). Inspect joints for leaks. Air pressure shall remain constant without introduction of additional air throughout 15- minute period of inspection.
 4. Repair leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
 5. Prepare reports for tests and required corrective action.

3.06 CLEANING

- A. Acid Waste: Clean acid waste piping by thoroughly flushing with potable or protected water. Clean piping systems and dispose of the water (flushing and cleaning water) into the sanitary drainage system, without passing through the acid waste treatment system.

3.07 SYSTEMS START-UP

- A. Before Starting Checks: Perform the following final checks before startup:
 - 1. Verify specified tests of piping systems are complete.

END OF SECTION 15241