SPECIAL SPECIFICATION

15239S

PROCESS GRAVITY DRAIN PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. This Specification includes process gravity drain. The provided system shall meet all applicable codes indicated herein and those codes required to local building officials.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Requirements of the following Project Specification Sections apply to this section:

1. Section 13085-S - Seismic Protection.
2. Section 15050-S "General Material & Work Requirement-Mechanical".
3. Section 15075-S "Mechanical Identification" for labeling and identifying acid waste piping.
4. Section 15090-S - Polymer Process Piping Systems
5. Section 15401 Plumbing

C. Where a conflict occurs between this specification and any specification referenced herein, this specification shall take precedence.

D. Compliance with the most current version of the following codes is required for the design and provision efforts specified herein:

1. ASME Code B31.3: Process Piping (hazardous wastes)
2. ASME Code B31.9: Building Services Piping Code (non-hazardous wastes)
3. Title 40 of the Federal Code of Regulations
4. Building and Fire Codes: As determined by local fire or hazardous materials authority
5. International Building Code 2001
6.

1.03 DEFINITIONS

A. ASME: The American Society of Mechanical Engineers

B. NFPA: The National Fire Protection Association

C. NPS: Nominal Pipe Size

D. PVC: Polyvinyl Chloride

E. PVDF: Polyvinylidene Fluoride

F. CPVC: Chlorinated Polyvinyl Chloride

G. PP: Polypropylene

H. SS: Stainless Steel

1.04 SYSTEM DESCRIPTION

A. System Description:

1. The process gravity drain system shall collect fire water from one of the chemical storage room and convey the waste to the secondary containment pit in MicroFab below the DI polishing area.

B. Scope of Work

1. General

The Contractor shall provide, install and commission a complete and fully operational process gravity drain meet the design criteria specified herein. The design shall be based upon the codes, regulations, local jurisdictional requirements and attachments indicated herein.
The system shall be provided with appropriate piping connections (floor clean out) to promote efficient system maintenance.

1.05 SUBMITTALS

A. Submit under provisions of section 01300, 01311 and 01700.

B. Product Data.

1. Submit before construction:

Manufacturer's descriptive data, specifications, and/or literature for materials used, including: piping, tubing, fittings, couplings, pipe supports, and other specialty items. Include rated capacities and accessories. Also include installation details..
Installation procedures as recommended by the manufacturer and fabricator, including connection and joint details. Include dimensions, weights, loading, required clearances, method of field assembly, components and location and size of each field connection
Proposed cleaning and testing procedures and schedules.

C. Shop Drawings

1. Submit before construction.

The shop drawing shall include but not be limited to plan view drawings and section drawings, details and details.

D. Closeout Submittals

1. Submit under provisions of Section 01700.

2. In addition to submittals required in Section 01700, submit system and drawings in Micro Station format. Drawings to conform to Owners Micro Station release version, and Owner's format for layering and numbering. The Contractor will supply three hard copies of drawings and two CDs of drawing files. The final issue of drawings will have been updated to project record ("as-built") document status including schematic drawing plan and elevation drawings.
3. The Contractor will supply three hard copies of documents and two CDs of these document files:

   Design calculations
   Specifications in Microsoft Word for Windows, version 6.0
   Operation and maintenance manuals
   Spare parts lists
   Warranty information and documents for equipment
   Maintenance Data for piping, tubing, fittings, couplings, valves, pipe supports, and other specialty items.
4. Welding Certificates for welding procedures and operators. (See Quality Assurance section 1.07.)
5. Field Test Reports of test specified in Part 3 of this Section. Include the following:

   Test procedures used.
   Test results that comply with requirements.
   Failed test results and corrective action taken to achieve requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store piping, tubing, fittings, couplings, valves, pipe supports, and other specialty items separately by type. The materials shall be stored and handled in a clean, sheltered location.

B. Any material damaged during shipping or storage must be replaced and may not be repaired.

1.07 QUALITY ASSURANCE

A. Qualifications. Provide statements of qualification for fabricators. Qualify welding processes and operators according to piping codes listed in 1.02.

B. Regulatory requirements: design and installation to be in accordance with the state and city local plumbing codes.

C. Materials: Provide statements of qualification special materials used in installation. Comply with applicable piping codes listed in 1.02.

D. Labels and/or stamps: Piping, valves, Safety valves, and other specialty items shall bear the appropriate ASME label or stamp of a specified testing agency.

E. Applicable Specifications & Standards. Comply with Applicable Standards and Codes 15050-S General Mechanical & Work Requirements-Mechanical, and Division 1.

F. Cleaning procedures required approval by Owner prior to cleaning activities.

G. In addition to the warranty conditions in Division 1, the Contractor shall repair all leaks on the acid waste system for a period of 6 months following acceptance by the Owner, at no cost to Owner.

H. Professional Certifications: Design documents generated by the Contractor shall be stamped and signed by an engineer registered in the state where work is located.

1.08 COORDINATION

A. Coordinate layout and installation of process gravity drain piping system with other construction.

1. Coordinate piping installation with architectural and structural design.
2. Coordinate pipe sleeve installation for foundation wall penetrations.
3. Coordinate size and location of concrete bases. Cast anchor bolt inserts into bases. Concrete, reinforcement and form-work requirements are specified in Division 3 Sections.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Piping and Fittings
   a. George Fischer PP150 piping with PP75 drain pipefitting.
   b. R.J. Gallegher Company for stainless steel pipe and sanitary fitting.
2. Seal
   a. Link Seal.

2.02 MANUFACTURED PRODUCT

A. Not in use

2.03 MATERIALS OF CONSTRUCTION

A. Pipe:

1. PP Gravity Drain, ASTM D-4101, Pressure Rated to 75 psi, butt fusion.

2. SS Gravity Drain, SS304 pipe Schedule 5

B. Fittings:

1. PP Gravity Drain, ASTM D-4101, Pressure Rated to 75 psi, butt fusion or mechanical joint (flange and clean out).
2. SS Gravity Drain, Pressure Rated to 75 psi, TIG welding or mechanical joint (flange and clean out).

C. Gasket Material: Thickness, material and type suitable for fluid type, pressure and temperature to be handled.

D. Support structures may include fabricated metal structures or ”strut” type modular systems. All support structures shall be of materials that will not corrode in the environment of installation. Epoxy coating, non-corrosive materials (stainless steel, fiberglass) or other methods of corrosion prevention may be used. All metals coatings shall meet the requirements of Division 9.

PART 3 - EXECUTION

3.01 PIPING INSTALLATIONS

A. General. Refer to Division 15 Section “Basic Mechanical Materials and Methods” for basic piping installation requirements. Install piping systems in accordance with manufacturers' instructions and recommendations.

B. Piping Installation

1. Install all piping in accordance with manufacturer’s instructions and recommendations.
2. Install pipe with proper flow characteristics from point of use to distribution/collection main header, and/or final drain destination.

Slope. Install all process gravity drain piping with positive slope to low point in system. Piping inside the building shall maintain a minimum slope of 1/8 inch per foot (gravity flow). Provide clean out at designated location.

3. Branches

Install branch wye connections at main at every branch location.

C. Space Management.

1. Route piping to conform to piping hierarchy.

D. Labels. Label all pipes with service designation, including pipe under the raised floor. Label drain line systems properly, as designated by Owners standards and 15075.

3.02 TESTING.

A. Visually inspect system as much as practical for leaks. Submit proposed testing procedures, including leak testing for connections to existing systems.

B. Prepare process gravity piping according to ASME B31.9 or B31.3 (as appropriate) and as follows:

   1. Leave joints, including welds, un-insulated and exposed for examination during test.
   2. Supply blinds, fabricated clean out, plumbers plugs, gauges and any other materials required for testing.
   3. Flush system with clean water.
   4. Install safety valve, set at a pressure no more than one-third higher than test pressure to protect against damage by expanding liquid or other source of overpressure during test.

C. Perform the tests on process gravity drain piping.

   1. Notify Owner 48 hours in advance of testing. Perform testing and inspection in presence of the Owner.
   2. Test all piping with the requirements in Section 15050-S. Repair any leaks and retest the system. System can be tested in sections during installation only with prior approval by Owner.
   3. Leak test drainage piping system in entirety or in sections by filling the pipe.
   4. Use ambient temperature water as a testing medium unless there is a risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used with approval of the owner. While filling system, use vents installed at high points of system to release trapped air. Use drains at low points for complete draining of liquid.
   5. Entire system test: Close openings in system, except highest opening. Fill with liquid to point of overflow. Upon completion of the system, test the primary system hydrostatically to a pressure of a minimum of 10 feet above the highest projected point.
   6. Section test. Note: system can be tested in sections only with prior approval by owner. Tightly plug each opening except highest opening of section under test, and then fill with water. Test section with at least 10 feet head of water. In testing successive sections, test sections with at least 10-foot head of water, except uppermost ten feet of system. Keep water in system, or in portion under test, for minimum 2 hours before inspection.

D. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed Maximum pressure for any component in system under test.

E. Evaluate the test. Visually inspect entire system for leaks. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints and connections for leakage.

F. Upon completion of the system, test the secondary system pneumatically for a minimum duration of 7 hours. All external joints shall be soaped and visually inspected for leaks. Provide a pressure regulator with gauges to limit pressurization of the system over 10 psig. Provide temporary restraint at all elbows and tees while plastic pipe is under compressed gas pressurization.

G. Repair any leaks and retest the system. Eliminate leaks by tightening, repairing or replacing components and repeat hydrostatic test until there are no leaks.

H. Prepare written report of testing. Submit testing and installation report to Owner and Owner's Representative within 6 days of system completion.

3.03 CLEANING

A. Upon completion of the system, the primary system shall be flushed clean using non-potable water supplied by the Owner. Purge or blow dry with Nitrogen. Owner will furnish nitrogen.

B. Upon completion of the system, purge the secondary containment with Nitrogen for a minimum of 15 minutes, or longer if required to purge the system of all visible moisture.

END OF SECTION 15239-S