SECTION 15111
ACID NEUTRALIZATION & PROCESS WASTE DRAIN PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes Polypropylene (PP) plastic piping systems for acid, process and chemical drain service with 180°F (82°C) maximum temperature and 100-psig maximum pressure. These systems are as follows:
   1. Acid Waste and Process Waste drain materials and equipment.
   2. Acid Waste Neutralization materials and equipment.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 15, Section 15050, Piping Systems
   2. Division 15, Section 15072, Cleaning
   3. Division 15, Section 15073, Pressure/Leak Testing
   4. Division 15, Section 15074, Identification and Labeling
   5. Division 15, Section 15110, Process Waste Drains Outside Buildings

1.3 REFERENCES

A. Southern Building Code Congress International Inc. (SBCCI).
   1. SPC (1997) Standard Plumbing Code.

B. American Society for Testing and Materials (ASTM)
   1. ASTM D 4101 (1996), Standard Specification for Propylene Plastic Injection and Extrusion Materials.
   2. ASTM F 1412 (1997), Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems.

C. American National Standards Institute (ANSI).

D. The American Society of Mechanical Engineers (ASME).

E. National Fire Protection Association (NFPA).
   1. NFPA 70 (1996) National Electrical Code (NEC)

1.4 DEFINITIONS

A. PP: Polypropylene plastic.

1.5 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure-Piping Pressure Rating: 10-foot (3-m) head of water.

B. Gravity-Flow, Double-Contained-Piping Pressure Rating: 5-psig (34.5-kPa) air test pressure.

C. Secondary-Containment-Piping Pressure Rating: 5-psig (34.5-kPa) air test pressure.

D. Force-Main, Double-Contained-Piping Pressure Rating: At least equal system operating pressure but not less than 50 psig (345 kPa).

1.6 SUBMITTALS

A. Product Data: For chemical-waste piping materials, components, and specialties and for neutralization systems. Indicate dimensions, required clearances, methods of assembly of piping components, and piping accessories.

B. Submit six (6) copies of the following to the Construction Manager:
1. Design Data: Indicate in sufficient detail to verify that products meet or exceed specified performance requirements.
2. Certificates: Certify that products meet or exceed specified performance requirements.
3. Manufacturer's Instructions: Indicate installation and support requirements.
4. Shop drawings: Provide large-scale (Scale of ¼" = 1'-0" minimum) layout drawings, indicating all relevant equipment associated with routing of piping.
Shop drawings shall be "spool" type that includes all piping connection joints, fittings, hangers, supports required and relevant details as required.
5. Coordination Drawings: Include relationship to other services that serve same work areas.
6. Certificates of Shop Inspection and Data Report: As required by ASME Boiler and Pressure Vessel Code.
7. Maintenance Data: For equipment to include in the maintenance manuals as specified in General and Supplementary Conditions.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain pipe, fittings, and joining materials for each piping system through one source from a single manufacturer. Piping materials shall bear label, stamp, or other markings of specified testing agency.
1. Exception: Piping from different manufacturers may be used in same system if indicated and suitable transition fittings matching both piping materials are used.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of chemical-waste specialties and are based on the specific system indicated.

C. Piping materials shall bear label, stamp, or other markings of specified testing laboratory.

D. Electrical Components, Devices, and Accessories: Comply with NFPA 70.
1. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B31.3, "Process Piping."

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver and store piping and specialties with sealing plugs in ends or with end protection.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Neutralization-System Chemicals: Provide ten (10) times the amount of neutralizing chemicals required for filling the tank for each neutralization system.

PART 2 - PRODUCTS

2.1 PROCESS WASTE DRAIN MATERIALS

A. Use materials selected from list below for new systems.

B. Floor Drains and Traps: Shall be of Polypropylene (PP) furnished with fuseal heat fusion joints, sediment bucket, and grate.

C. Floor sink: Shall be polypropylene finish with bucket and strainer. Sink shall be 7 inches square (min.)

D. Cleanout: ANSI A112.36.2M; Provide threaded Polypropylene (PP) cleanout plugs.

E. Sump Pump: Shall be duplex, single contained pump, all plastic Polypropylene (PP) construction, stainless steel fasteners, pump motor-epoxy coated TEFC weather resistant motor with drop shield, and power interrupt pump down reset. See drawing for sump pump schedule.

F. Valves: 4 inches and smaller shall be Class 150 PP construction. Shut-off valves shall be true-union ball valves, check valves shall be swing-type.

G. Process Waste Drainage Piping:
   1. Above ground: Pressure piping and fittings above ground shall be Schedule 40 Polypropylene (PP), conforming to ASTM D4101, SDR11, rated for 150 psig operating pressure.
      a. PP threaded fittings: Mechanical Joints or fusion joints. Mechanical joints shall be utilized at all Laboratory sinks and Tailpieces.
   2. Below ground: Drainage piping and drainage-pattern fittings below ground of 2” and larger shall be Schedule 40 Polypropylene (PP) with fusion joints, conforming to ASTM F 1412.
      a. Below-grade drainage piping for the Target Building however shall be increased to Schedule 80 Polypropylene (PP) piping. Waste drain system shall be assembled similarly with fusion joints as above, but Schedule 40 weight drainage-pattern fittings are adequate.

2.2 Ph NEUTRALIZATION SYSTEM MATERIALS

A. The system shall be complete in all respects with products matched and assembled into a complete system by a single manufacturer who will assume responsibility for the entire system. All components required to produce a completely functional system, whether indicated or not, shall be provided. System shall be as manufactured by Harrington Plastics, or equal.

B. Drainage Pipe: Schedule 40, Polypropylene (PP) pipe and fittings, with heat fused joints. Provide all required adapters for connection to sanitary sewer.

C. Neutralization Tanks: Neutralization tanks shall be constructed of high-density Polypropylene (PP), designed to withstand heat of neutralization and corrosive attacks of acids and alkaloids. Capacity 350 Gallons. Tanks shall be provided with triple welded tank fittings, heavy-gauge bolt down cover, neoprene gasket, stainless steel nuts, bolts and washers. Inlet fitting shall be provided with a pipe extension to within 4-inches of the tank bottom. Provide openings in tank cover to suite Ph probe, tank mixer, and neutralization agent tubing.

D. Tank Mixer: Heavy-duty type, with tank mounting clamp, constructed with 316 Stainless Steel shaft and propeller. Provide with ½ HP motor for connection to 115-volt convenience receptacle. Mixer shall be provided with a single 3-blade propeller. Shaft length shall be such that propeller is within 6 inches of the tank bottom.

E. Neutralizing Agent: Provide two 55-gallon drums of 30% caustic neutralizing agent.

F. PH Controller and Accessories: The Ph Controller shall be microprocessor controlled. The unit shall contain a Liquid Crystal Display (LCD) providing the operator with selected readouts of Ph and temperature. Unit shall permit easy calibration and standardization. Unit shall have adjustable high and low set points for alarm activation. Unit shall produce a variable output signal (through a pulse relay module) to drive a variable speed metering pump. Provide unit in weatherproof panel and furnish built-in battery back up to maintain memory during power outage. Provide compatible Ph probe for installation in neutralizer tank. Provide probe support pipe with tank mounting flange. Controller shall be suitable for connection to a standard 115-volt convenience receptacle. Provide all required signal cable for controller connection to Ph probe and metering pump. Controller shall also provide output to a Ph strip chart recorder. The recorder shall contain a 2-inch wide strip capable of providing a 30-day record of Ph.

G. Metering Pump: Electronic type, variable speed in response to signal from Ph controller. Unit shall be of double ball valve construction (suction and discharge) including a bleed valve for simple, reliable priming characteristics. Pump housing and head shall be constructed of Polypropylene and all wetted components shall be highly corrosive resistant. Unit shall be provided with stroke length control and stroke frequency control adjustment (manual and from Ph controller). Unit shall be equipped with thermal protector and built-in fuse. Unit shall be suitable for connection to a standard 115-volt convenience receptacle. Provide with suction tubing and discharge tubing suitable to the application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install piping system per Standard Plumbing Code.

B. Slope lines to have a minimum pitch of 1/4 in./ft., unless otherwise noted.

C. Support vertical lines at maximum intervals of 10 ft. Maximum horizontal intervals for Polypropylene (PP) pipe is 3 ft. 6 in.

D. Install cleanouts flush with floor with long sweep 1/4-ends or 1/8-bends extended to floor level in location shown on drawings. Caulk cleanout plug assembly with countersunk cleanout plug into hub of fitting with plug face flush with floor.

E. In other cases, form cleanouts by using tee or "Y" pattern branch fittings with screw plugs of the same size as the pipe up to and including 4 in.

F. Install cleanout plugs at foot of new vent stacks.

G. Identification/Labeling: Section 15074.

3.2 FIELD QUALITY CONTROL

A. Pressure/Leak Test: Section 15073, Class C.

3.3 CLEANING

A. Clean piping systems per project specifications, Section 15072, Cleaning.

END OF SECTION 15111