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## SECTION 22 66 00\_PROCESS WASTE PIPING SYSTEMS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Chemical Waste Piping
  - 2. Chemical Waste Piping Specialties
  - 3. PH Monitoring Systems
- B. The intent of these standards is to provide input to the design team on the University's preference of manufacturers, design, equipment options and quality assurance to maintain the longevity of its assets.

#### 1.2 Related Sections:

- A. Section 22 05 00– Common Work for Plumbing Systems
- B. Section 22 05 01 – Common Requirements for Plumbing Systems
- C. Section 22 13 00 – Sanitary Sewer Piping Systems

#### 1.3 DESIGN REQUIREMENTS

- A. Use this standard to specify waste piping systems for laboratories, process areas (pilot plants) and clean rooms.
- B. Acid neutralization requirements including tank will be decided on case by case basis. Consult the University of Delaware Energy and Engineering Group and Department of Environmental Health and Safety for acid neutralization requirements.
- C. Consult the University Energy and Engineering group when connecting new materials to existing materials at each location. Confirm all new materials are compatible with the existing materials.

1.4 SUBMITTALS

- A. Product Data:
  - 1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
  - 2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
  - 3. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
- B. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data for PH Monitoring System

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.
- B. Do not store chemical waste pipe and fittings in direct sunlight.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underground piping when bedding is wet or frozen.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 WARRANTY

- A. Furnish two year parts and labor manufacturer warranty for chemical waste piping system.

1.10 EXTRA MATERIALS

- A. Furnish five (5) extra kits for manufacturing of pipe joints.
- B. If a kit for manufacturing pipe joints has a shelf life, provide five (5) fresh kits at the end of the warranty period.

## PART 2 PRODUCTS

### 2.1 CHEMICAL WASTE & VENT PIPING

- A. The University of Delaware will entertain either polypropylene (PP) or polyvinlidene fluoride (PVDF) chemical waste piping systems.
- A. All chemical waste piping systems shall be a minimum of schedule 40 wall thickness.
- B. All chemical waste piping shall be made with drainage type fittings only.
- C. All chemical waste piping systems shall be made from either mechanical joint or electro-fusion type joint systems. No-hub chemical waste piping is not allowed on the University of Delaware Newark Campus.
- D. All elements of the chemical waste piping systems (pipe and fittings) shall be of the same material, manufacturer and joint type. Do not mix different materials, manufacturers or joint types to make the chemical waste piping system.
- E. Acceptable Manufacturers:
  - 1. George Fisher Inc., Fuseal
  - 2. Orion Fittings, Rinofuse or Socket Fuse Systems
  - 3. Ipex Inc., Lab Line, Plenum Line and Endfield Systems
- F. Couplings, Adapters and Transition Fittings: Assemblies with combination of clamps, gaskets, sleeves and threaded or flanged parts; compatible with piping and fluids flowing through the system; and made by piping manufacturer for joining piping systems.

### 2.2 PH MONITORING SYSTEM

- A. Acceptable Manufacturers:
  - 1. Pulse Instruments
  - 2. ARC Water Treatment Co.
- B. Description: PH monitoring system for chemical waste system consisting of wiring, conduit, cable, probe, conduit...etc.
  - 1. Control Panel: Wall mounted, NEMA 4X weatherproof enclosure, Accepts direct input from PH electrode and includes ¼ DIN panel motor enclosure. Provide dual point simultaneous control of acid and alkaline. Dual display to indicate current set point and current measurement.

2. Provide with spare contacts to provide alarm/trouble signal to building automation system.
- C. Provide a five (5) year parts only warranty for the PH monitoring system.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify excavations are to required grade, dry, and not over-excavated.

#### **3.2 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

#### **3.3 INSTALLATION - PIPE**

- A. Verify connection to existing piping system, size, location, and invert.
- B. Remove scale and dirt on inside of piping before assembly.
- C. Install pipe on prepared bedding.
- D. Route pipe in straight line.
- E. Establish invert elevations, slopes for drainage per relevant code having authority.
- F. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
- G. Encase exterior cleanouts in concrete flush with grade.

- H. Install floor cleanouts at elevation to accommodate finished floor.
- I. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- J. Install piping to maintain headroom. Do not spread piping, conserve space.
- K. Group piping whenever practical at common elevations.
- L. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- M. Provide clearance in hangers and from structure and other equipment for installation of insulation.
- N. Provide access where valves and fittings are not accessible.
- O. Install piping penetrating roofed areas to maintain integrity of roof assembly.
- P. Sleeve pipes passing through partitions, walls and floors.
- Q. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping
- R. Support piping as per pipe manufacturers recommendations so that there is no sag in the pipe line and no fluids will be trapped in the pipe.
- S. Joints shall be constructed as per manufacturer's instructions. If joining dissimilar materials, adapter shall be compatible with both piping systems materials.
- T. Exhaust vent piping shall be installed in a location to prevent infiltration of exhaust into the building and/or into the building's HVAC system.

### 3.4 FIELD QUALITY CONTROL

- A. All personnel installing the chemical waste piping system shall be factory trained in the performance of each step of the installation of the system. Contractor will provide certification of factory training for all employees used to install the chemical waste piping system.
- B. The mechanical contractor shall supply factory inspection of all chemical waste pipe systems. The manufacturer must certify the chemical waste pipe system installation conforms to its quality requirements. The manufacturer must submit written certification with the close out documents.

- C. Test sanitary piping system in accordance with City of Newark Water Department requirements.

3.5 PH MONITORING SYSTEM START UP

- A. Engage a factory-authorized service representative to perform start up services for the PH monitoring systems.

**END OF SECTION**