SECTION 22 13 00
FACILITY SANITARY AND VENT PIPING

PART 1 - GENERAL

1. DESCRIPTION

A. This section pertains to sanitary sewer and vent systems, including piping, fittings and equipment and all necessary accessories as designated in this section.

2. SUBMITTALS

A. Submit in accordance with GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS.

B. Manufacturer's Literature and Data:

1) Piping.
2) Floor Drains.
3) Grease Removal Unit.
4) Cleanouts.
5) All items listed in Part 2 - Products.

3. DELIVERY, STORAGE AND HANDLING

A. Deliver and store all products in accordance with GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS. Protect from damage and contamination, clean as required prior to installation.

PART 2 - PRODUCTS

1. SANITARY WASTE, DRAIN, AND VENT PIPING

A. Cast iron waste, drain, and vent pipe and fittings:

1) Cast iron waste, drain, and vent pipe and fittings shall be used for the following applications:

a) pipe buried in or in contact with earth
b) sanitary pipe extensions to a distance of approximately 5 feet outside of the building.
c) interior waste and vent piping above grade.
d) above ground and below ground grease waste piping

2) Cast iron Pipe shall be bell and spigot or hubless (plain end or no-hub or hubless).

3) The material for all pipe and fittings shall be cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888, or ASTM A-74.

4) Joints for hubless pipe and fittings shall conform to the manufacturer's installation instructions. Couplings for hubless joints shall conform to CISPI 310. Joints for hub and spigot pipe shall be installed with compression gaskets conforming to the requirements of ASTM Standard C-564 or be installed with lead and oakum.

B. Polyvinyl Chloride (PVC):

1) Polyvinyl chloride (PVC) pipe and fittings are permitted.
PVC piping and fittings shall NOT be used for the following applications:

a. Waste collected from steam condensate drains
b. Exposed inside of ceiling return plenums
c. Grease waste piping

2) Pipe and Fittings:

a. Pipe shall be manufactured from virgin rigid PVC (polyvinyl chrloride) vinyl compounds with a cell class of 12454 as identified in ASTM D 1784. PVC Schedule 40 pipe shall be Iron Pipe Size (IPS) conforming to ASTM D 1785 and ASTM D 2665. Injection molded PVC DWV fittings shall conform to ASTM D 2665.Fabricated PVC DWV fittings shall conform to ASTM F 1866. All pipe and fittings shall be manufactured in the United States. Pipe and fittings shall conform to NSF International Standard 14.

b. PVC fittings shall be solvent welded socket type using solvent cement conforming to ASTM D2564.

2. SPECIALTY PIPE FITTINGS

A. Transition pipe couplings shall join piping with small differences in outside diameters or different materials. End connections shall be of the same size and compatible with the pipes being joined. The transition coupling shall be elastomeric, sleeve type reducing or transition pattern and include shear and corrosion resistant metal, tension band and tightening mechanism on each end. The transition coupling sleeve coupling shall be of the following material:

1) For cast iron soil pipes, the sleeve material shall be rubber conforming to ASTM C564.

2) For PVC soil pipes, the sleeve material shall be elastomeric seal or PVC, conforming to ASTM F 477 or ASTM D5926.

3) For dissimilar pipes, the sleeve material shall be PVC conforming to ASTM D5926, or other material compatible with the pipe materials being joined.

3. CLEANOUTS

A. Cleanouts shall be the same size as the pipe, up to 4 inches; and not less than 4 inches for larger pipe. Cleanouts shall be easily accessible and shall be gastight and watertight. Minimum clearance of 24 inches shall be provided for clearing a clogged sanitary line.

B. Floor cleanouts shall be gray iron housing with clamping device and round, secured, scoriated, gray iron cover conforming to ASME A112.36.2M. A gray iron ferrule with hubless, socket, inside calk or spigot connection and counter sunk, taper-thread, brass or bronze closure plug shall be included. The frame and cover material and finish shall be nickel-bronze copper alloy with a square shape. The cleanout shall be vertically adjustable for a minimum of 2 inches. When a waterproof membrane is used in the floor system, clamping collars shall be provided on the cleanouts. Cleanouts shall consist of wye fittings and eighth bends with brass or bronze screw plugs. Two way cleanouts shall be provided where indicated on drawings and at every building exit. The loading classification for cleanouts in sidewalk areas or subject to vehicular traffic shall be heavy duty type.

C. Cleanouts shall be provided at or near the base of the vertical stacks with the cleanout plug located approximately 24 inches above the floor. The cleanouts shall be extended to the wall access cover. Cleanout shall consist of sanitary tees. Nickel-bronze square frame and stainless steel cover with minimum opening of 6 by 6 inches shall be furnished at each wall cleanout. Where the piping is concealed, a fixture trap or a fixture with integral trap, readily removable without disturbing concealed pipe, shall be accepted as a cleanout equivalent providing the opening to be used as a cleanout opening is the size required.

D. In horizontal runs above grade, cleanouts shall consist of cast brass tapered screw plug in fitting or caulked/hubless cast iron ferrule. Plain end (hubless) piping in interstitial space or above ceiling may use plain end (hubless) blind plug and clamp.

4. FLOOR DRAINS

A. Floor drain shall comply with ANSI A112.6.3 and shall comply with the drawing fixture schedule, furnished and installed with necessary trim for the floor system. A hubless connection shall be provided for connection to cast iron pipe, a solvent joint is permitted for PVC connection

5. TRAPS

A. Traps shall be provided on all sanitary branch waste connections from fixtures or equipment not provided with traps. Exposed pipes shall be polished brass chromium plated with nipple and set screw escutcheons. Concealed traps may be rough cast brass, cast iron, or PVC. Slip joints are not permitted on sewer side of trap. Traps shall correspond to fittings on cast iron soil pipe or steel pipe respectively, and size shall be as required by connected service or fixture.

6. TRAP SEAL PRIMER VALVES AND TRAP SEAL PRIMER SYSTEMS

A. The trap seal primer valve shall be hydraulic, supply type with a pressure rating of 125 psig and conforming to standard ASSE 1018.

1) The inlet and outlet connections shall be NPS ½ inch.
2) The trap seal primer valve shall be fully automatic with an all brass or bronze body.

3) The trap seal primer valve shall be activated by a drop in building water pressure, no adjustment required.
4) The trap seal primer valve shall include a manifold when serving two, three, or four traps.
5) The manifold shall be omitted when serving only one trap.

7. WATERPROOFING

A. A sleeve flashing device shall be provided at points where pipes pass through membrane waterproofed floors or walls. The sleeve flashing device shall be manufactured, cast iron fitting with clamping device that forms a sleeve for the pipe floor penetration of the floor membrane. A galvanized steel pipe extension shall be included in the top of the fitting that will extend 2 inches above finished floor and galvanized steel pipe extension in the bottom of the fitting that will extend through the floor slab. Link-Seal shall be provided for all pipe penetrations 3” and over. A waterproof caulked joint shall be provided at the top hub.

PART 3 - EXECUTION

1. PIPE INSTALLATION

A. The pipe installation shall comply with the requirements of the International Plumbing Code (IPC) and these specifications.

B. Branch piping shall be installed for waste from the respective piping systems and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those not furnished by the plumbing contractor.

C. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe shall be reamed to full size after cutting.

D. All pipe runs shall be laid out to avoid interference with other work.

E. The piping shall be installed above accessible ceilings where possible.

F. The piping shall be installed to permit valve servicing or operation.

G. Unless specifically indicated on the drawings, the minimum slope shall be 2% slope.

H. The piping shall be installed free of sags and bends.

I. Seismic restraint shall be installed where required by code.

J. Changes in direction for soil and waste drainage and vent piping shall be made using appropriate branches, bends and long sweep bends. Sanitary tees and short sweep quarter bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Long turn double wye branch and eighth bend fittings shall be used if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Proper size of standard increaser and reducers shall be used if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Buried soil and waste drainage and vent piping shall be laid beginning at the low point of each system. Piping shall be installed true to grades and alignment indicated with unbroken continuity of invert. Hub ends shall be placed upstream. Required gaskets shall be installed according to manufacturer's written instruction for use of lubricants, cements, and other installation requirements.

L. Cast iron piping shall be installed according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings".

M. Aboveground PVC piping shall be installed according to ASTM D2665. Underground PVC piping shall be installed according to ASTM D2321.

2. JOINT CONSTRUCTION

A. Hub and spigot, cast iron piping with gasket joints shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub and spigot, cast iron piping with calked joints shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

C. Hubless or No-hub, cast iron piping shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless piping coupling joints.

D. For threaded joints, thread pipe with tapered pipe threads according to ASME B1.20.1. The threads shall be cut full and clean using sharp disc cutters. Threaded pipe ends shall be reamed to remove burrs and restored to full pipe inside diameter. Pipe fittings and valves shall be joined as follows:

1) Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is required by the pipe service.

2) Pipe sections with damaged threads shall be replaced with new sections of pipe.

3) For PVC piping, solvent cement joints shall be used for joints. All surfaces shall be cleaned and dry prior to applying the primer and solvent cement. Installation practices shall comply with ASTM F402. The joint shall conform to ASTM D2855 and ASTM D2665 appendixes.

3. SPECIALTY PIPE FITTINGS

A. Transition coupling shall be installed at pipe joints with small differences in pipe outside diameters.

B. Dielectric fittings shall be installed at connections of dissimilar metal piping and tubing.

4. PIPE HANGERS, SUPPORTS AND ACCESSORIES

A. All piping shall be supported according to the most restrictive requirements of the International Plumbing Code (IPC) and COMMON WORK RESULTS FOR PLUMBING, and these specifications.

B. Hangers, supports, rods, inserts and accessories used for pipe supports shall be shop coated with zinc chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.

C. Horizontal piping and tubing shall be supported within 12 inches of each fitting or coupling.

D. Horizontal cast iron piping shall be supported with the following maximum horizontal spacing and minimum hanger rod diameters:

1) NPS 1-1/2 inch to NPS 2 inch: 60 inches with 3/8 inch rod.
2) NPS 3 inch: 60 inches with ½ inch rod.
3) NPS 4 to NPS 5: 60 inches with 5/8 inch rod.
4) NPS 6 inch to NPS 8 inch: 60 inches with ¾ inch rod.
5) NPS 10 inch to NPS 12 inch: 60 inches with 7/8 inch rod.

E. The maximum spacing for plastic pipe shall be 4 feet.

F. Vertical piping and tubing shall be supported at the base, at each floor, and at intervals no greater than 15 feet.

G. In addition to the requirements in COMMON WORK RESULTS FOR PLUMBING, floor, wall and ceiling plates, supports, hangers shall have the following characteristics:

1) Solid or split unplated cast iron.
2) All plates shall be provided with set screws.
3) Height adjustable clevis type pipe hangers.
4) Adjustable floor rests and base flanges shall be steel.
5) Hanger rods shall be low carbon steel, fully threaded or threaded at each end with two removable nuts at each end for positioning rod and hanger and locking each in place.
6) Riser clamps shall be malleable iron or steel.
7) Rollers shall be cast iron.

H. Miscellaneous materials shall be provided as specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories. If the vertical distance exceeds 20 feet for cast iron pipe additional support shall be provided in the center of that span. All necessary auxiliary steel shall be provided to provide that support.

I. Cast escutcheon with set screw shall be provided at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.

J. Penetrations:

1) Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, a fire stop shall be installed that provides an effective barrier against the

spread of fire, smoke and gases as required. Clearances between raceways and openings shall be completely filled and sealed with the fire stopping materials.

2) Water proofing: At floor penetrations, clearances shall be completely sealed around the pipe and make watertight with sealant.

K. Piping shall conform to the following:

1) Waste and Vent Drain to main stacks:

Pipe Size	Minimum Pitch
2 1/2 inches and smaller	2%
3 inches and larger	1%

L. Exhaust vents shall be extended separately through roof. Sanitary vents shall not connect to exhaust vents.

5. TESTS

A. Sanitary waste and drain systems shall be tested either in its entirety or in sections.

B. Waste System tests shall be conducted before trenches are backfilled or fixtures are connected. A water test or air test shall be conducted, as directed.

1) If entire system is tested for a water test, tightly close all openings in pipes except highest opening, and fill system with water to point of overflow. If the waste system is tested in sections, tightly plug each opening except highest opening of section under test, fill each section with water and test with at least a 10 foot head of water. In testing successive sections, test so that each joint or pipe has been submitted to a test of at least a 10 foot head of water. Water shall be kept in the system, or in portion under test, for at least 15 minutes before inspection starts. System shall then be tight at all joints.

2) For an air test, an air pressure of 5 psig gage shall be maintained for at least 15 minutes without leakage. A force pump and mercury column gage shall be used for the air test.

3) After installing all fixtures and equipment, open water supply so that all p-traps can be observed. For 15 minutes of operation, all p-traps shall be inspected for leaks and any leaks found shall be corrected.

- END OF SECTION -