

SECTION 15420

DRAINAGE AND VENT SYSTEMS

PART 1 – DESIGN DIRECTIVES

1.1 DESIGN CRITERIA

- A. All cleanouts above finished (accessible and non-accessible) ceilings shall be extended to the floor above.
- B. Install floor drains where emergency showers are located. Do not slope the floor to the drain. All emergency eyewashes shall be connected to sanitary drain.
- C. Install floor drains in all restrooms. Do not slope floors to the drain where there is a threshold or other device that effectively isolates the bathroom to the adjoining room.
- D. The designer shall include a riser diagram or isometric of all drainage and vent systems.
- E. PVC may be used for underground sanitary in buildings that do not have steam. Buildings with steam shall have hub type cast iron.
- F. The use of trap primers are discouraged; use deep seal traps. Consult with FO&M the proposed use of trap primers.
- G. Discharge from elevator sumps shall go to storm drain, not sanitary.

PART 2 – PRODUCTS

2.1 ABOVE GROUND DRAINAGE AND VENT PIPE AND FITTINGS

- A. Hubless cast iron pipe and fittings, service weight or heavier, (ASTM A-888) conforming with CISPI 301, using neoprene sealing sleeves (ASTM C-564) and stainless steel bands (type 304) conforming with CISPI 310.. All connectors, regardless of pipe size, shall be heavy duty connectors having four bands for pipe sizes 4” and less, six bands for sizes greater than 4” (Mission Heavyweight Couplings or equal).

2.2 UNDERGROUND BUILDING DRAIN PIPE AND FITTINGS

- A. Hub and spicot cast iron pipe and fittings, service weight or heavier, (ASTM A-74) using neoprene sealing sleeves (meeting specifications of ASTM C-564).
- B. PVC pipe and fittings, DWV, schedule 40, (ASTM# D-1784 & D-2665, latest edition). PVC DWV solvent cement fittings shall conform to ASTM D-2665. Solvent cement joints shall be made in a two step process with primer manufactured for thermoplastic piping systems and solvent cement conforming to ASTM D-2564.

2.3 SUBSTITUTIONS

- A. The following specialties list Zurn Industries as the sole manufacturer. Equivalent products manufactured by Jay R. Smith Mfg. Co. are an acceptable substitute.

**2.4 DRAINAGE PIPING SPECIALTIES**

- A. Backwater valve assembly shall be bronze fitted cast-iron, in-line style, with screwed cover. Flapper shall provide a maximum 1/4" clearance between swing check flapper and seat for air circulation. Valve ends shall suit piping material. Zurn Industries, Inc. #Z-1090 series
- B. Floor cleanouts shall be cast iron body and frame, with cast iron cleanout plug and adjustable round top. Provide nickel bronze top for areas with exposed concrete finishes; in all other areas provide tops suitable for the finishes intended for the area. Outlet type shall be Neo-Loc for on grade applications (connections to hub & spicot pipe), no-hub or Neo-Loc for above grade applications (connections to no-hub pipe). Zurn Industries, Inc. #Z-1400
- C. Wall cleanouts shall be cast iron body clean out tee adaptable to pipe with cast bronze or brass cleanout plug with tapping to accept wall cover. Round stainless steel cover including screws. Zurn Industries, Inc. #Z-1446

**2.5 FLOOR DRAINS**

- A. Provide floor drains with deep trap seals to minimize the need for trap primers. Provide trap assemblies with trap primer connections for floor drains where indicated on the drawings. Outlet type shall be Neo-Loc for on grade applications (connections to hub & spicot pipe), no-hub or Neo-Loc for above grade applications (connections to no-hub pipe)
- B. Floor drains in public areas shall be cast iron body and flashing collar with closure plug, nickel bronze adjustable strainer head with secured round hole grate. Zurn Industries, Inc. #Z-415 series with "B" strainer.
- C. Floor drains in non-public areas shall be heavy duty, cast iron body and 12±" cast iron grate, flashing flange and collar. Zurn Industries, Inc. #Z-541

**2.6 ROOF DRAINS**

- A. Provide a complete roof drain assembly including all appurtenances required for a complete installation.
- B. Roof drain shall be a cast iron body and combined flashing collar and gravel stop, 16±" low profile cast iron dome, underdeck clamp, sump receiver; bottom outlet, and extensions as required for roof thickness. Zurn Industries, Inc. #ZC-100-EA.

**PART 3 – EXECUTION**

**3.1 EXAMINATION**

- A. Verify existing grades, inverts, utilities, obstacles, and topographical conditions prior to installations.
- B. Examine rough-in requirements for plumbing fixtures and other equipment having drain connections to verify actual locations of piping connections prior to installation.
- C. Examine walls, floors, roof, and plumbing chases for suitable conditions where piping and specialties are to be installed.
- D. Do not proceed until unsatisfactory conditions have been corrected.

**3.2 PREPARATION FOUNDATION FOR UNDERGROUND BUILDING DRAINS**

- A. Grade trench bottoms to provide a smooth, firm, and stable foundation, free from rock, throughout the length of the trench.
- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or pea gravel to indicated invert elevation.
- C. Shape bottom of trench to fit bottom of pipe for 90° (bottom 1/4 of the circumference). Fill unevenness with tamped sand backfill.

**3.3 PIPE APPLICATIONS**

- A. Install no-hub, service weight or heavier, cast iron soil piping systems for above ground, within building, for all piping services.
- B. Install PVC soil piping systems for below ground, within building, for all piping services of buildings that do not have steam or devices that may discharge water in excess of 140°F, such as commercial kitchens. The transition from cast iron to PVC must occur within 12" of the floor slab.
- C. Install hub & spicot cast iron piping systems below ground, within building, where PVC is not suitable as defined previously.

**3.4 PIPE AND TUBE JOINT CONSTRUCTION**

- A. Cast Iron Soil Pipe: Make all joints in accordance with the recommendations in the CISPI Cast Iron Soil Pipe and Fittings Handbook, latest edition. Specifically, conform to the requirements of bracing horizontal pipe 5" and larger.
- B. PVC Pipe: Make connections in accordance with the recommendations in ASTM D-2885. Prime the pipe and fittings prior to applying solvent.

**3.5 INSTALLATION**

- A. Use fittings for all changes in direction and all branch connections.
- B. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted, unless expressly indicated.
- C. Install piping free of sags or bends and with ample space between piping to permit proper insulation applications.
- D. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.
- E. Install piping tight to slabs, beams, joists, columns, walls, and other permanent elements of the building. Allow sufficient space above removable ceiling panels to allow for panel removal.
- F. Install underground building drains to conform with the plumbing code. Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert.

**3.6 INSTALLATION OF PIPING SPECIALTIES**

- A. Install backwater valves in sanitary building drain piping as indicated, as required by the plumbing code and for all floor drains in pits.
- B. Install cleanouts in above ground piping and building drain piping as required by plumbing code. Where there is a floor above, cleanouts should be brought to the floor level in order to minimize cleanouts in ceiling cavities.
- C. Install floor and wall cleanout covers for concealed piping, types as required. The contractor shall provide pipe extensions as required to be flush with the finish surface. The contractor shall also coordinate with all other trades to determine the appropriate floor finish and provide a floor cleanout cover compatible with the finish floor material.

**3.7 INSTALLATION OF FLOOR DRAINS**

- A. Install floor drains in accordance with manufacturer's written instructions and in locations indicated.
- B. Install floor drains at low points of surface areas to be drained. Set tops of drains flush with finished floor. Do not slope floors of rest rooms where the water closet will not be level.
- C. Set drain elevation depressed below finished slab elevation as listed below to provide proper slope to drain.
- D. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.

**3.8 INSTALLATION OF ROOF DRAINS**

- A. Install roof drains at low points of roof areas, in accordance with the roof membrane manufacturer's installation instructions.
- B. Install drain flashing collar or flange so that no leakage occurs between roof drain and adjoining roofing. Maintain integrity of waterproof membranes, where penetrated.

**3.9 CONNECTIONS**

- A. Provide drainage and vent piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated; as required by the plumbing code.
- B. Locate piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

**3.10 FIELD QUALITY CONTROL**

- A. Inspect and test drainage and vent piping as follows:
  - 1. Rough Plumbing Test Procedure: Except for outside leaders and perforated or open jointed drain tile, test the piping of plumbing drainage and venting systems upon completion of the rough piping installation. Tightly close all openings in the piping system, and fill with water to the point of overflow, but not less than 10 feet head of water. Water level shall not drop during the period from eight hours before the inspection starts, through completion of the inspection. Inspect all joints for leaks.
  - 2. Repair all leaks and defects with new materials and retest system or portion thereof until satisfactory results are obtained.

3. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the building inspector and DC-FO&M or the clerk of the works.
4. Arrange for rough-in and final inspection of the piping systems With the Town Building Inspector, DC-FO&M, and the clerk of the works.
5. Prepare inspection reports, signed by the building inspector.

3.11 ADJUSTING AND CLEANING

- A. Clean drain strainers, domes, and traps. Remove dirt and debris.

3.12 PROTECTION

- A. Protect drains during construction, to avoid clogging with dirt and debris, and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

END OF SECTION 15420