

SECTION 15430 – DRAINAGE AND VENT PIPING

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. The work shall include labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items essential for proper installation and operation, even though not specifically mentioned or indicated on the drawings but which are usually provided or are essential for proper installation of systems related to this Section, as indicated on the drawings and specified herein.
- B. The specifications and drawings describe the minimum requirements that must be met for the installation of work as shown on the drawings and as specified hereinunder.
- C. Shop drawings.
- D. Field acceptance testing.
- E. Specific Work
 - 1. Provide storm, sanitary and specialty drain piping, fittings, piping network, branches and connections to piping, as shown on the drawings and as specified complete.

1.2 RELATED SECTIONS

- A. Examine drawings and criteria sheets and other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.
 - 1. Section 15050 – Basic Mechanical Materials and Methods
 - 2. Section 15055 – Through-Penetration Firestop Systems
 - 3. Section 15060 – Hangers and Supports
 - 4. Section 15075 – Mechanical Identification
 - 5. Section 15410 – Plumbing Valves
 - 6. Section 15420 – Plumbing Distribution Piping
 - 7. Section 15440 – Plumbing Specialties
 - 8. Section 15450 – Plumbing Fixtures
 - 9. Section 15460 – Plumbing Equipment
 - 10. Section 15470 – Laboratory Plumbing Systems
 - 11. Section 15480 – Medical Plumbing Systems

1.3 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.
- B. Material standards shall be as specified or detailed hereinafter and as follows:
 - 1. ANSI American National Standards Institute
 - 2. ANSI B16.1, B16.2, B16.5, B16.4, B.16.9: Cast Iron Fittings & Flanges
 - 3. ANSI B16.3: Malleable Iron Fittings
 - 4. ARI American Refrigeration Institute
 - 5. ASHRAE American Society of Heating, Refrigeration and Air Conditioning Engineers
 - 6. ASME American Society of Mechanical Engineers
 - 7. ASTM American Society of Testing Materials
 - 8. ASTM A-888: Cast Iron Piping
 - 9. AWS American Welding Society
 - 10. CS Commercial Standards, U.S. Dept. of Commerce
 - 11. FM Factory Mutual
 - 12. FS Federal Specification, U.S. Government
 - 13. MSS Manufacturers Standardization Society of the Valve and Fittings Industry
 - 14. UL Underwriters Laboratories, Inc.
 - 15. OSHA Occupational Safety and Health Act
 - 16. CISPI Cast Iron Soil Pipe Institute CISPI 301 Cast Iron Pipe and Fittings
 - 17. ASPE American Society of Plumbing Engineers

1.4 SUBMITTALS

- A. Refer to Section 01330 – SUBMITTAL PROCEDURES.
- B. Prepare and submit shop drawings in accordance with the requirements of the General Conditions and Supplementary Conditions and in the manner described therein, modified as noted hereinafter.
- C. Submittals: The following documents shall be provided:
 - 1. Pipe and fittings for each system.

1.5 QUALITY ASSURANCE

- A. Refer to Section 01400 – QUALITY REQUIREMENTS.

1.6 CROSS AND INTER-CONNECTIONS

- A. No plumbing fixtures, equipment, device or piping shall be installed which will provide a cross or interconnection between a distributing supply or a drainage system, waste or soil pipe which will permit or make possible the backflow of sewage, polluted water or waste into the domestic water supply system.

PART 2 – PRODUCTS

2.1 PIPING, FITTINGS AND JOINTS

A. Hubless Cast Iron Soil Pipe and Fittings

1. Aboveground Soil, Waste, Vent and Rainwater Piping

- a. Hubless Cast Iron Soil Pipe: No-hub pipe with Husky SD-4000 soil pipe coupling manufactured by Anaheim Foundry, 4-band clamp or Clamp-All Hi Torq 125 2-band clamp. Sealing gasket shall be neoprene in accordance with ASTM C564, CISPI 301-75.

B. Hub and Spigot Cast Iron Soil Pipe and Fittings

1. Below Ground Soil, Waste, Vent and Rainwater Piping

- a. Asphaltum coated, service weight, cast iron pipe and fittings with resilient neoprene push-on or lead and oakum joints, ASTM A72, ASTM C564-70.
- b. Resilient Neoprene gaskets for 4" and smaller shall be lubricated as per manufacturer's recommendations and for 5" and larger on adhesive type lubricant shall be used.

2. Above Ground Soil, Waste, Vent and Rainwater Piping

- a. Service weight cast iron pipe and fittings with resilient neoprene push-on joints or lead and oakum joints. ASTM A72, ASTM C564-70.

C. Copper Tubing and Fittings

1. Waste and Vent Systems 2" and Smaller

- a. Tubing to be Type L hard temper with wrought copper fittings conforming to ASTM B88-and ASME B16.22. All joints shall be soldered with ASME AWS/A5.8 lead free solder.
- b. Shall not be used for urinal waste piping which shall remain cast iron. May be used for sewage ejector and sump pump discharge piping.

- c. Copper tubing with grooved ends and mechanical joints are acceptable for sizes 2-1/2" to 6" only. Tubing to be Type L hard temper with wrought grooved end fittings conforming to ASTM B88 and ASTM B75.

D. Copper Tubing and Fittings

1. Type K Below Ground Water Systems (3" and Smaller)

- a. Tubing to be Type K, soft temper brazed joints with bituminous coating. Conforming to ASTM B88 and fittings conforming to ASME B16.22.

E. Galvanized Steel Pipe

1. Aboveground, Sanitary Vent Piping (2" and Smaller), Sewage Ejector and Sump Pump Discharge

- a. Schedule 40 American Standard weight and manufacture galvanized steel pipe conforming to ASTM A120-74. Threads to be American pipe thread standard. Fittings shall be 125# cast iron screwed.

2.2 AIR VENTING AND DRAINAGE

- A. Sanitary vent piping shall be graded so that airflow to the outside will be continuously upward and so that all low points will be drained.

PART 3 – EXECUTION

3.1 EXAMINATION / PREPARATION

- A. Inspect existing site conditions in areas where piping and equipment will be installed and verify existing systems and the impact of the proposed modifications before fabricating systems to be installed.
- B. Notify the Architect immediately regarding any substantially different conditions than those shown in the Contract Documents.

3.2 CORE DRILLING

- A. All core drilling required for the installation of the plumbing system is to be done by the Plumbing Subcontractor. This contractor shall carry all costs for core drilling. The General Contractor will not be responsible for any circular penetrations required for the proper installation of the plumbing system. Locate all required openings prior to coring, coordinate the opening with the General Contractor and all other trades. Do not disturb the existing systems. Thoroughly investigate the existing conditions in the vicinity of the required opening prior to

coring. This Subcontractor shall be responsible for damages to the building and its systems from the coring operations. Disturbances from coring shall be kept to a minimum.

3.3 SOIL, WASTE, VENT AND RAINWATER PIPING INSTALLATION

- A. Pipes shall be plumb and parallel to building walls, beams, and columns. All horizontal lines are to be evenly pitched and properly secured with iron or steel hangers. A pitch of 1/4" per lineal foot shall be maintained on all soil, waste, and conductor lines, wherever possible. Where long runs of piping require less pitch due to space restrictions, a less pitch shall be allowed on main lines 4" and over in size, but in no event should any pipeline have a slope less than 1/8" per lineal foot.
- B. No hub cast iron pipe couplings shall be installed as follows:
 - 1. Place gasket on the end of the pipe and the stainless steel clamp assembly on the end of the other pipe.
 - 2. Firmly seat the pipe ends against the integrally molded shoulder inside the neoprene gasket.
 - 3. Slide the clamp assembly into position over the gasket and tighten the bands using a properly calibrated torque wrench, set at 60 inch pounds or as required by manufacturer. Tighten the bands alternately and firmly, first the inner bands, then the outer bands.
- C. Bell and spigot cast iron with lead and oakum joints shall be installed as follows:
 - 1. Pipe lines shall be thoroughly put together with joints made with oil free oakum packed tightly to a depth of 1 1/2" and the remaining space filled in by pouring molten lead.
 - 2. The joint shall be caulked in a manner which will insure tight joints without straining the bell. After caulking, the lead shall be practically flush with the ends of the bell.
- D. Service weight cast iron piping below ground shall be installed as follows:
 - 1. Piping laid in trenches shall be continuously supported on undisturbed or compacted earth. Hand excavate at the bell to allow barrel to bear loading, not the bell.
 - 2. Lay pipe to a straight line and uniform grade between point where changes in grade or alignment occur. Check line and grade frequently. Keep a stopper in the pipe end when pipe laying is not in progress. Commence at lowest point in the system and work upwards.
 - 3. Carefully clean interior joint surfaces before joining sections. Firmly insert spigot end into bell completely.
 - 4. Excavation and backfill are specified elsewhere. It shall be the plumbing subcontractor's responsibility to insure that the backfill shall be carefully packed around the piping as it is being laid, and that the backfill operation is carried in 6" tamper layers to a point at least 12" above the piping.
- E. All soil and waste pipes shall be carried out full size through the roof or connected to a common vent above the fixture and as shown on the drawings.

- F. Threaded joints shall have American National taper screw thread with graphite and oil compound applied to the male threads.
- G. Piping to be run straight and plumb and all offsets shall be made at an angle of not less than 45° and all threaded joints shall be as specified above.
- H. Carefully lay out the work in advance so that the pipes will pass through the opening and permit the proper pitch to the pipelines. Due to the extensive system of ventilation and lighting systems, it will be necessary for all trades to properly coordinate their work with the work of other trades so as to avoid the necessity of taking down work installed without prior checking. Flush out and clean all existing soil and waste piping buried within the existing building prior to making any new connections.
- I. Provide and connect cleanouts with brass caps and screws same size as pipe up to 6" and not less than 6" for larger piping at the ends of all branches on soil and waste piping, and in such other portions of the piping where run is over 50'-0". Underfloor cleanouts shall be installed as detailed.
- J. Where stacks enter drains near walls or piers causing difficult access to end cleanouts, there shall be a vertical cleanout on the stack just above the floor with a 1/4 bend at the foot of the stack.
- K. Where such conditions occur in walls or partitions, the cleanout cover shall be accessible through an opening left in the wall and covered with the flush chrome plated brass plate or access panel securely fastened in place.
- L. Brass cleanouts shall be solid nut construction.
- M. Provide the Owner with wrench for removing cleanout plugs.
- N. Where test tees are installed at the base of the stack, or on the stack, they may be used as a cleanout.

3.4 CONNECTIONS TO EXISTING SYSTEMS

A. Sanitary, Vent and Rainwater Conductor Systems

- 1. Verify all points of connection to existing underslab and above floor piping prior to fabrication. In accordance with the "shutdown" section of this Specification, coordinate the tie-in of that system with the Owner. Any piping cut, but not immediately connected to shall be made gastight.

3.5 TESTING OF PIPING SYSTEMS

A. General

1. All piping systems shall be subjected to testing with water, gas or air as noted and shall hold tight at the pressure head stated for the time interval required without adding air or water. While any system is being tested, required head or pressure shall be maintained until all joints are inspected. All systems tested in the existing building shall be tested with air before water.
2. All tests shall be witnessed by the inspector having jurisdiction and the Architect/Engineer, with 48 hour notice given these authorities.
3. All equipment, material and labor required for testing any of the various systems or any part thereof shall be furnished by this Contractor.

B. Sanitary, Waste and Vent and Rainwater Systems: Water test shall be applied to drainage systems either in their entirety or in sections as required, after piping has been installed. If applied to the entire system, all openings in the piping system shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly closed except the highest opening in the section under test, and each section shall be filled with water but no section shall be tested with less than a 10'-0" head of water. In testing successive sections at least the upper 10'-0" of the next preceding section shall be tested so that no joint of piping in the building, except the uppermost 10'-0" of the system, shall be submitted to a test of less than a 10'-0" head of water. The water shall be kept in the system for at least (30) minutes before inspection starts; the system shall then be made tight at all points.

1. Any points of the drainage systems to be tested with air instead of water shall be made by attaching an air compressor testing apparatus to any suitable opening and after closing all other inlets or outlets, forcing air into the systems until there is a uniform gauge pressure of 5 psi or sufficient to balance a 10" Hg high column. This pressure shall be held without the introduction of additional air for a period of at least (30) minutes.

C. Defective Work: If inspection or tests show defects, such defective work or material shall be replaced and inspection and tests shall be repeated. All repairs to piping shall be made with new materials. No caulking of screwed joints or holes will be acceptable.

3.6 FIXTURE ROUGHINGS

A. Install rough plumbing, including fixture carriers and supports, valves and water hammer arrestors within chase tolerances. Supply roughing through finish walls and at hose bibbs and shower heads shall be secure and free of movement. Locate valves and water hammer arrestors within 12" of approved access panel location.

- B. Align exposed waste and supply pipe roughings with fixture connections within 1" tolerance. Provide flush valves in alignment with the fixture, without vertical or horizontal offsets. Obtain fixture manufacturer roughing data sheets for recommended roughing dimensions.
- C. Provide fixture templates for casework Contractor for counter mounted sinks and lavatories.
- D. Secure fixture supports to floor slab construction with lag bolts and metal expansion shields to support at least 500 lbs. for (5) minutes.
- E. Provide fixture rough-in piping connection sizes in accordance with the drawing schedule.

3.7 IDENTIFICATION OF SYSTEMS

- A. Provide clip-on color coded piping identification markers on piping systems installed under this Section. Provide matching flow arrows to indicate direction of flow. Markers shall be Seton Nameplate Co., W.H. Brady, Westline Products or approved equal.
- B. Color coding shall comply with the American Hospital Association or ANSI A13.1 Standards as directed by the Owner.
- C. Install markers on each side of wall penetrations, at each valve, at tee fittings and base of risers. Spacing of markers shall not exceed 20'-0" and shall include at least one marker in each room. Letters shall not be less than 1 1/2" in height. Arrows shall not be less than 9' long.
- D. Install markers on cleaned or painted piping only after piping is complete and has been accepted by the Architect. Install marker adjacent to access panels where piping is concealed.
- E. Stencil equipment, such as pumps, compressors, water heaters, and tanks with the name of the equipment and equipment number. Stencils shall be at least 6" high and of a color to provide a contrast with the equipment finish.

END OF SECTION