

SECTION 22 14 16

STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide plumbing piping to serve all fixtures and equipment, as shown on drawings.
- B. Storm sewer piping

1.2 RELATED SECTIONS

- A. Section

1.3 QUALITY ASSURANCE

- A. Plumbers shall be fully qualified and licensed by State authorities.
- B. The manufacturer's mark or name shall be attached to each length of pipe, fitting or device employed in the piping system.
- C. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Institute (CISPI) and manufactured trademark.
- D. Products made of, or containing lead, asbestos, mercury, or other known toxic or hazardous materials are not acceptable for installation under this Section. Any such products installed as part of the work of this Section shall be removed and replaced with all costs for removal and replacement shall be borne solely by the Contractor(s).

1.4 REFERENCE STANDARDS

- A. ANSI (American National Standards Institute)
- B. ASTM (American Society for Testing and Materials)
- C. ASTM B828, Procedures for soldered joints
- D. CISPI 301, Latest Issue, Cast Iron Piping
- E. ASTM C564, Hubless Coupling Gaskets
- F. ASTM A74 and 888, Latest Issue, Cast Iron Piping

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Cast Iron Soil Pipe and Fittings: AB & I, Tyler Pipe and Charlotte Pipe. Manufactured by a CISPI Member company. Pipe and fittings shall bear the collective trademark of the CISPI.
- B. Grooved Piping Systems: Victaulic or approved equal.

- C. No-Hub Fittings: Anaco, Clamp-All, Husky, Mission, Tyler, or approved equal.

2.2 PIPE AND FITTINGS

A. No-hub Fittings:

1. Storm sewer – below grade: Equal to Husky SD4000 or Clamp-All Hi Torque 125 no-hub coupling with a shield constructed of 304 corrugated stainless steel with a minimum thickness of 0.016 inches. Coupling sizes 1-1/2 through 4 inches shall have four bands and sizes 5 through 10 inches shall have 6 bands. The worm gear drive clamps shall have a hexagon head to accept a 3/8 inch socketed torque wrench. Clamps shall be tightened to a minimum of 80 inch pounds. Gaskets shall be manufactured using neoprene rubber meeting the requirements of ASTM C-564. Sealing rings shall be molded into the gasket and positioned under each torquing band. Coupling shall meet the performance requirements of standard FM 1680 Class 1. Smooth shielded couplings shall have a 304 stainless steel shield with a minimum shield thickness of 24 gauge. Coupling sizes 1-1/2 through 4 inches shall have two bands and sizes 5 through 10 inches shall have four bands. The coupling shall be torqued to between 115 and 125 inch pounds.
2. Storm sewer – above grade: Equal to Husky SD4000 or Clamp-All Hi Torque 125 no-hub coupling with a shield constructed of 304 corrugated stainless steel with a minimum thickness of 0.016 inches. Coupling sizes 1-1/2 through 4 inches shall have four bands and sizes 5 through 10 inches shall have 6 bands. The worm gear drive clamps shall have a hexagon head to accept a 3/8 inch socketed torque wrench. Clamps shall be tightened to a minimum of 80 inch pounds. Gaskets shall be manufactured using neoprene rubber meeting the requirements of ASTM C-564. Sealing rings shall be molded into the gasket and positioned under each torquing band. Coupling shall meet the performance requirements of standard FM 1680 Class 1. Smooth shielded couplings shall have a 304 stainless steel shield with a minimum shield thickness of 24 gauge. Coupling sizes 1-1/2 through 4 inches shall have two bands and sizes 5 through 10 inches shall have four bands. The coupling shall be torqued to between 115 and 125 inch pounds.

B. Exterior Utilities:

1. Storm Sewer:
 - a. Extra strength vitrified clay pipe, ASTM C200, assembled with flexible compression joints, ASTM C425.
 - b. Bell and spigot cast iron pipe with neoprene gasketing system.
 - c. Hubless cast iron pipe with no-hub couplings. Apply bituminous coating as described in Part 3.
 - d. 12 Inch and larger: Reinforced concrete pipe, ASTM C76, Class III or greater, depending on trench loading calculations, with rubber gasket joints, ASTM C361.
2. Cast iron or ductile iron fittings, ANSI A21.20; Class 250 for 12 inch and smaller; Class 150 for 14 inch and larger. Mechanical joints, ANSI A21.11. Pipe and fittings tar coated outside and cement lined inside, ANSI A21.4.

2.3 PIPING WITHIN BUILDING

A. Rainwater Piping:

1. Below Grade:
 - a. Bell and spigot cast iron with neoprene compression joints.

- b. Hubless cast iron with no-hub fittings. Apply bituminous coating as described in Part 3.
 - c. Ductile iron with mechanical joints.
 - d. 12 Inch and Larger: Reinforced concrete pipe, ASTM C-76, Class III or greater, depending on trench loading calculations with rubber gasket joints, ASTM C-361.
2. Above Grade:
- a. Bell and spigot cast iron with neoprene compression joints.
 - b. Hubless cast iron pipe with no-hub fittings.
 - c. Schedule 40 galvanized steel with cast iron screwed or grooved drainage fittings.
 - d. Mechanical couplings with EPDM gaskets suitable for 230° F. and galvanized grooved end couplings are acceptable. Equal to Victaulic Style 07 (rigid), 75 or 77 (flexible).

PART 3 - EXECUTION

3.1 SEISMIC RESTRAINT

- A. Fabricate and support piping in accordance with specifications herein, and latest edition of CPC. Provide seismic restraint in accordance with a current OSHPD pre-approved system that carries a current OSHPD OPA Number. For seismic restraint, see Section 23 05 48.
- B. Install seismic separation assemblies at building seismic joints.

3.2 SIZE OF FIXTURE WASTE AND VENTS

- A. Size of fixture wastes and vents shall be as noted in plumbing schedule on drawings.

3.3 PREPARATION OF PIPING

- A. Ream pipe ends to remove burrs. Make joints smooth and unobstructed inside. Remove any obstructions or debris inside piping, blowing it out with compressed air or otherwise cleaning it internally immediately prior to assembly.
- B. Cap or cover open piping during erection to prevent entry of foreign objects.

3.4 GENERAL

- A. All excavation and backfilling shall be performed in accordance with Section.
- B. No lead bearing solders shall be used for assembly of piping specified under this Section. Flux shall be water-flushable and lead-free.
- C. Install horizontal piping parallel with adjacent walls and partitions unless otherwise shown. All risers shall be plumb. Springing or forcing piping into place will not be permitted unless specifically called for.
- D. Nipples shall be the same material, composition and weight classifications as the pipe with which they are installed. Close or running thread nipples shall not be used.
- E. Take branches and riser arms off the top of mains at a 45 degree angle, unless otherwise shown.
- F. Use a minimum of two field fabricated or installed fittings or joints when connecting piping to equipment or prefabricated piping assemblies.

- G. Pitch horizontal drainage and vent piping 1/4 inch per foot minimum for sizes smaller than 3 inch and 1/8 inch for sizes 3 inch and larger, unless indicated otherwise.
- H. Piping in finished portions of the building, except in mechanical equipment rooms where otherwise indicated on the drawings, shall be concealed.
- I. Install same type of underground piping material specified for inside building to 5 feet outside of building.
- J. Do not install piping within 3 feet in horizontal direction from electrical panels or equipment. Coordinate with Division 16 contractor.
- K. Rigidly secure drop elbow ears to structure.
- L. Test piping systems after erection and before concealing or covering. Arrange and pay for all tests of mechanical systems as required by code and as herein specified. Replace any materials or workmanship found faulty and retest the system.
- M. All vertical and horizontal offsets in sanitary waste and rainwater piping shall be restrained in a manner satisfactory to the engineer regardless of their location in the piping system or the height of the system. In addition, when any stack in a piping system exceeds five (5) floors or 65 feet in height (whichever is greater), all joints including cleanouts in any pipe associated with that piping system shall be restrained. As a minimum, each restrained joint shall have an individual two (2) two-bolt riser clamp on each side of each joint with washer welded to one half of each riser clamp for piping 10" and smaller and for all larger piping provide a four (4) bolt riser clamp (two bolts on each arm of each riser clamp) on each side of each joint. In all cases, the riser clamps across a joint shall be connected by all thread rods on each side of the riser clamps. The rods shall be extended between the riser clamp arms outside of the bolts on each arm for 10" and smaller piping and between the bolts on each arm for 12" and larger piping with nuts and washers on both sides of the riser clamp arms. Submit the proposed restraint detail for each type of joint or fittings to the engineer for review.
- N. Repair any damage resulting from leakage of piping during testing or guarantee periods without any expense to Owner.
- O. Perform tests in the presence of the proper inspectors or an authorized representative of Architect/Engineer.
- P. With remodeling projects, where it is not possible to isolate new piping for testing, take special care in the installation and in the inspection for leaks after connecting into an existing system. Where it is possible to isolate new piping, perform tests as required by governing codes or requirements hereinafter specified.
- Q. Furnish certificates to Architect/Engineer that tests have been satisfactorily completed.

3.5 INSPECTION OF PLUMBING PIPING

- A. All plumbing systems shall be inspected at completion of each phase while under tests required by the Administrative Authorities, prior to concealment.
- B. Below Grade: All piping installed below grade shall be inspected prior to burial by the Architect, the Owner's Representative or the Engineer. Contractor must notify Architect or Engineer no less than 24 working hours prior to the desired inspection time. Should the piping be buried prior to inspection the contractor may be requested to uncover the piping at no delay to the project and at no cost to the Owner.

- C. Above Grade: All piping installed above grade shall be made available for inspection upon completion and prior to finish of walls and ceiling. Contractor must notify Architect or Engineer no less than 24 working hours prior to the desired inspection time. Should the piping be hidden prior to inspection the contractor may be requested to uncover the piping at no delay to the project and at no cost to the Owner

3.6 TESTING OF PLUMBING SYSTEMS

- A. Test storm piping with air pressure of 5 psig for a period of 15 minutes.
- B. Provide final test with fixtures in place with 1 inch water column air pressure.

3.7 GROOVED CONNECTIONS

- A. Couplings, fittings, valves and pipe shall be assembled in accordance with latest published instructions of the manufacturer and local codes.
- B. All grooved couplings, fittings and valves shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- C. Pipe shall be checked to be certain it is free of indentations, projections, grooves, weld seams or roll marks on the exterior of the pipe over the entire gasket seating area to assure a leak-tight seal. Pipe ends must be square cut and in accordance with manufacturer's standards.
- D. Gaskets shall be of the central cavity pressure responsive design. Gasket style and grade shall be checked to be certain gasket supplied is suited for the intended service.
- E. Thorough lubrication of the gasket exterior including the lips and/or pipe ends and housing exterior is essential to prevent pinching of the gasket. Lubricants shall be of type recommended by the gasket manufacturer for the intended use.
- F. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products.
- G. Factory trained representative shall periodically inspect the product installation. Contractor shall remove and replace any improperly installed products.

3.8 CORROSION PROTECTION FOR UNDERGROUND PIPING

- A. After testing of underground piping, apply one heavy coat of a coal tar bituminous material, equal to Bitumastic 50, to stainless steel, aluminum, cadmium plated or galvanized steel bolts, rods, banding and other items constructed of these materials.

3.9 SERVICE CONNECTIONS

- A. Provide connections to storm services as noted on the drawings in accordance with local utility or municipality requirements.

END OF SECTION