

**SECTION 22 14 00
FACILITY STORM DRAINAGE**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section describes the requirements for storm drainage systems, including piping and all necessary accessories as designated in this section.

1.2 RELATED WORK

- A. Section 07 84 00, FIRESTOPPING: Penetrations in rated enclosures.
- B. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING: Pipe Hangers and Supports, Materials Identification.
- C. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION: Pipe Insulation.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Piping.
 - 2. Roof Drains.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American National Standards Institute (ANSI).
- C. American Society of Mechanical Engineers (ASME): (Copyrighted Society)
 - A112.21.2m-83.....Roof Drains
 - A13.1-07.....Scheme for Identification of Piping Systems
- D. American Society for Testing and Materials (ASTM):
 - A74-06.....Standard Specification for Cast Iron Soil Pipe and Fittings
 - C564-06a.....Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
- E. International Code Council (ICC):
 - IPC-06.....International Plumbing Code
- F. Cast Iron Soil Pipe Institute (CISPI):
 - 301-05.....Hubless Cast Iron Soil and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

310-04.....Couplings for Use in Connection with Hubless
 Cast Iron Soil and Fittings for Sanitary and
 Storm Drain, Waste, and Vent Piping
 Applications

PART 2 - PRODUCTS

2.1 STORM WATER DRAIN PIPING

A. Cast Iron Storm Pipe and Fittings:

1. Cast iron storm pipe and fittings shall be used for the following applications:
 - a. Extension of pipe to a distance of approximately 1500 mm (5 feet) outside of building walls.
 - b. Interior storm piping above grade.
2. The cast iron storm Pipe shall be bell and plain end (below ground), no-hub (above ground).
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 no-hub pipe and fittings shall conform to the manufacturer's installation instructions. Couplings for no-hub joints shall conform to CISPI 310. Joints for hub and plain end pipe shall be installed with compression gaskets conforming to the requirements of ASTM Standard C-564.

B. Roof drain piping and bottom of roof drain receivers shall be insulated.

2.2 CLEANOUTS

- #### **A. In horizontal runs above grade, cleanouts shall consist of cast brass tapered screw plug in fitting or caulked/no hub cast iron ferrule. Plain end (no-hub) piping in interstitial space or above ceiling may use plain end (no-hub) blind plug and clamp.**

2.3 ROOF DRAINS AND CONNECTIONS

- #### **A. RD1: Zurn Industries Model Z163-EA-SC-W3 15" diameter combination main roof and overflow drain with low silhouette domes and double "Top-Set" deck plate, CCI body, adjustable extension, combined flashing collar and gravel stop, secondary clamping collar, 3" high internal water dam, 4" size, No-Hub bottom outlet. Furnish Model ZC100-ST (dome only) cast iron dome with solid top for overflow drain, in lieu of regulary furnished dome.**

- B. **RD2:** Zurn Industries Model Z-100-C-EA-R-SC, 15" diameter main roof drain, low silhouette dome, CCI body, adjustable extension, combined flashing collar and gravel stop, underdeck clamp, secondary clamping collar, roof sump receiver, size to match existing roof drain that is being removed, No-Hub bottom outlet.
- C. **DN1:** Zurn Industries Model ZANB199-SS downspout nozzle, NB body, threaded inlet, decorative face of wall flange and outlet nozzle, removable stainless steel screen.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

- A. The pipe installation shall comply with the requirements of the International code and these specifications.
- B. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe shall be reamed to full size after cutting.
- C. All pipe runs shall be laid out to avoid interference with other work.
- D. The piping shall be installed above accessible ceilings to allow for ceiling panel removal.
- E. Unless otherwise stated on the documents, minimum horizontal slope shall be one 1.0%.
- F. The piping shall be installed free of sags and bends.
- G. Seismic restraint shall be installed where required by code.
- H. Changes in direction for storm drainage piping shall be made using appropriate branches, bends and long sweep bends. Sanitary tees and short sweep $\frac{1}{4}$ bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. 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.
- I. Buried storm drainage 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.
- J. 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"

3.2 JOINT CONSTRUCTION

- A. Hub and plain end 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. 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.

3.3 PIPE HANGERS, SUPPORTS AND ACCESSORIES:

- A. All piping shall be supported according to the International plumbing code, Section 22 05 11, 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 shall be supported within 300 mm (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 4 to NPS 5 (DN 100 to DN 125): 1500 mm (60 inches) with 16 mm (5/8 inch) rod.
 - 2. NPS 6 to NPS 8 (DN 150 to DN 200): 1500 mm (60 inches) with 19 mm (3/4 inch) rod.
 - 3. NPS 10 to NPS 12 (DN 250 to DN 300): 1500 mm (60 inches) with 22 mm (7/8 inch) rod.
- E. Vertical piping shall be supported at the base, at each floor, and at intervals no greater than 4.57 m (15 feet).
- F. In addition to the requirements in Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING, floor, Wall and Ceiling Plates 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. Hangers and supports utilized with insulated pipe and tubing shall have 180 degree (min.) metal protection shield Centered on and welded to the hanger and support. The shield shall be 4 inches in length and be 16 gage steel. The shield shall be sized for the insulation.

G. Miscellaneous Materials shall be provided as required for proper installation of hangers, supports and accessories. If the vertical distance exceeds 6 m (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.

H. 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 specified in Section 07 84 00, FIRESTOPPING.

2. Water proofing: At floor penetrations and exterior wall penetrations, clearances around the pipe shall be completely sealed and made watertight.

3.4 TESTS

A. Storm sewer system shall be tested either in its entirety or in sections.

B. Storm Water Drain tests shall be conducted before trenches are backfilled. A water test shall be conducted, as directed.

1. If entire system is to be tested in it's entirety, tightly close all openings in pipes except the highest opening, and fill system with water to point of overflow. If 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 3 m (10 foot) head of water. In testing successive sections, test at least upper 3 m (10 feet) of next preceding section so that each joint or pipe except upper most 3 m (10 feet) of system has been submitted to a test of at least a 3 m (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.

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