

RADON AND SUB-SLAB VENTILATION PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 RELATED REQUIREMENTS

- A. Related Documents: General provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications, apply to this Section.
- B. The General Conditions state that the Contract Documents are complementary. Examine all Drawings and all other Sections of the Specifications for requirements therein effecting the intent of this Section.
- C. Section includes systems for the following:
 - 1. Radon system.
 - 2. Sub-slab ventilation system.
- D. Related Sections include the following:
 - 1. Division 07 Waterproofing sections.
 - 2. Section 312000 "Earth Moving."

1.03 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. CPVC: Chlorinated polyvinyl chloride plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PS: Polystyrene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.04 SUBMITTALS

- A. Product Data: For the following:
 - 1. Perforated-wall pipe and fittings.

2. Solid-wall pipe and fittings.
3. Vapor barriers.
4. Approval of waterproofing manufacturer's service agent for use of drainage panels against and for waterproofing membrane protection.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 PIPING MATERIALS

- A. Refer to the "Piping Applications" Article in Part 3 for applications of pipe, tube, fitting, and joining materials.

2.03 PIPES AND FITTINGS

- A. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.
 1. Gaskets: ASTM C 443 (ASTM C443M), rubber.
- B. Solid Wall PVC Pipe: ASTM D 2665, drain, water, and vent.
 1. PVC Socket Fittings: ASTM C 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.
- C. Hubless Cast-Iron Pipe and Fittings:
 1. Pipe and Fittings: ASTM A 888 or CISP 301.
- D. CPVC pipe and fittings.
- E. ASTM Cell Classification 23447 for fittings and 24448 for pipe, with Schedule 40 dimensions, from CPVC Type IV Grade 1 compounds. Cements shall conform to ASTM F 493. All CPVC piping and fittings shall have a flame spread rating of less than 25 and a smoke development rating of less than 50 and shall be rated for use in plenums.

2.04 SPECIAL PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant metal tension band and tightening mechanism on each end.
 1. Sleeve Materials:
 - a. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - b. For Cast-Iron Soil Pipes: ASTM C 646, rubber.
 - c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
 - d. Unshielded Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant metal tension band and tightening mechanism on each end.

- e. Shielded Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant metal tension band and tightening mechanism on each end.

2.05 SOIL MATERIALS

- A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Section 312000 "Earth Moving."

2.06 GEOTEXTILE FILTER FABRICS

- A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.
 - 1. Structure Type: Nonwoven, needle-punched continuous filament or woven, monofilament or multifilament.
 - 2. Style(s): Flat and sock.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Examine surfaces and areas for suitable conditions where sub-slab ventilation systems are to be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.03 PIPING APPLICATIONS

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.04 PIPING APPLICATIONS

- A. Under-slab Radon and Sub-slab Ventilation Piping:
 - 1. Perforated PVC pipe and fittings and loose, bell-and-spigot joints.
 - 2. Solid-wall PVC pipe and fittings.
- B. Above-grade Piping:
 - 1. Hubless cast-iron pipe and fittings.
 - 2. Solid wall PVC pipe and fittings.
- C. Piping within Plenums:
 - 1. Hubless cast-iron pipe and fittings.
 - 2. CPVC pipe and fittings.

3.05 RADON AND SUB-SLAB VENTILATION PIPING

- A. Place impervious fill material on subgrade adjacent to bottom of slab after concrete footing forms have been removed. Place and compact impervious fill to dimensions indicated, but not less than 6 inches deep and 12 inches wide.
- B. Place impervious fill on subgrade adjacent to bottom of slab and compact to dimensions indicated, but not less than 6 inches deep and 12 inches wide after concrete footing forms have been removed.
- C. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- D. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric to depth of not less than 4 inches. (Do not compact drainage layer.)
- E. Install piping as indicated in Part 3 "Piping Installation" Article for radon and sub-slab ventilation piping.
- F. After satisfactory testing, cover piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.
- G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.
- H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.

3.06 PIPING INSTALLATION

- A. Install piping beginning at low point of system. Install true to grades and alignment indicated, with unbroken continuity of invert. Install required gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
- B. Lay perforated pipe with perforation down.
- C. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- D. Install underground PVC piping according to ASTM D 2321.
- E. Install cast-iron piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- F. Make changes in direction for vent piping using appropriate branches and bends. Straight tees and elbows may be used for vent lines. Do not change direction of flow more than 90 degrees. Use proper size if standard increasers and reducers if pipes of different sizes are connected.

3.07 PIPE JOINT CONSTRUCTION

- A. Join PVC pipe and fittings according to ASTM D 3034 with elastomeric seal gaskets according to ASTM D 2321.
- B. Join perforated PVC pipe and fittings according to ASTM D 2729, with loose bell-and-spigot joints.
- C. Join CPVC piping according to ASTM D 2846/D2846M appendix.
- D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

3.08 HANGER AND SUPPORT INSTALLATION

- A. Seismic restraints devices are specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet or Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
 - 3. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support vertical piping at base and at each floor.
- D. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 6: 60 inches and 3/4-inch rod.
- E. Install supports for vertical cast-iron piping every 15 ft.
- F. Install hangers for PVC and CPVC piping with the following maximum horizontal spacing minimum rod diameters:
 - 1. NPSG: 48 inches and 3/4-inch rod.
- G. Install supports for vertical PVC and CPVC piping every 48 inches.
- H. Support piping not listed above according to MSS SP-69 and manufacturer's written instructions.

3.09 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Use transition fitting to join dissimilar piping materials.

3.10 IDENTIFICATION

- A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tapes directly over piping.
 - 1. Install PE warning tape or detectable warning tape over ferrous piping.
 - 2. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.11 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Test vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new vent piping until it has been tested and approved.
 - 3. Roughing-in Plumbing Test Procedure: Test vent piping on completion of roughing in. Close opening of piping system and fill with water to point of overflow, but not less than 10-ft. head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 - 4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 5. Prepare reports for tests and required corrective action.

3.12 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 22 13 20

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