

## SECTION 33 40 00

### STORM UTILITY WATER DRAINS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

This section specifies materials and procedures for construction of modular precast trench drain systems that are complete and ready for operation. This includes all other incidentals.

##### 1.2 SYSTEM DESCRIPTION

A. System requirements: Provide a trench drain system of prefabricated modular components. The system shall incorporate a frame to carry the specified load. Gratings shall comply with the load requirements of AASHTO loading. Polymer concrete systems shall include a continuous anchoring rib at the base of each side of the channels to help resist floating during concrete placement. All piping interface connections shall be compatible with PVC adhesive.

##### 1.3 QUALITY ASSURANCE:

A. Products Criteria:

1. When two or more units of the same type or class of materials or equipment are required, these units shall be products of one manufacturer.
2. A nameplate bearing manufacturer's name or trademark, including model number, shall be securely affixed in a conspicuous place on equipment. In addition, the model number shall be either cast integrally with equipment, stamped, or otherwise permanently marked on each item of equipment.

##### 1.4 SUBMITTALS

A. Manufacturers' Literature and Data shall be submitted, as one package, for modular precast trench drain systems, pipes, fittings, and appurtenances, including jointing materials and other miscellaneous items.

## 1.5 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. AASHTO M306 - Standard Specification for Drainage, Sewer, Utility and Related Castings.
- C. American Society of Mechanical Engineers (ASME):
  - 1. ASME A112.6.3, Section 7.12 Heel Resistant Strainers and Grates
- D. The Americans with Disabilities Act (ADA) of 1990: Section 4.5.4 - Gratings
- E. ASTM International (ASTM):
  - 1. ASTM A 36 - Standard Specification for Carbon Structural Steel
  - 2. ASTM A 48 - Standard Specification for Gray Iron Castings
  - 3. ASTM D 536 - Standard Specification for Ductile Iron Castings
  - 4. ASTM D 543-06 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
  - 5. ASTM D 570-05 - Standard Test Method for Water Absorption of Plastics
  - 6. ASTM D 635-06 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position
  - 7. ASTM D 695 - Compressive Properties of Rigid Plastics
  - 8. ASTM D 2444-05 - Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
  - 9. D1056-07 - Flexible Cellular Materials—Sponge or Expanded Rubber
  - 10. D1785-06 - Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
  - 11. D3034-08 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
  - 12. D5926-09 - Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems
  - 13. F477-10 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
  - 14. F794-03(2009) - Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
  - 15. F1668-08 - Construction Procedures for Buried Plastic Pipe

## 1.6 WARRANTY

The Contractor shall remedy any defect due to faulty material or workmanship and pay for any damage to other work resulting within a period of one year from final acceptance. Further, the Contractor will furnish all manufacturers' and suppliers' written guarantees and warranties covering materials and equipment furnished under this Contract.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Hubbell Power Systems, Inc.
  - 3621 Industrial Park Drive
  - Lenoir City, TN 37771
  - Telephone: (800) 346-3061, (865) 986-9726
  - Fax: (865) 986-0585
  - Website: [www.polycastdrain.com](http://www.polycastdrain.com)
  
- B. ACO Polymer Products, Inc.
  - 825 W. Beechcraft Street
  - Casa Grande, AZ 85122
  - Telephone: (888) 490-9552, (520) 421-9988
  - Fax: (520) 421-9899
  - Website: [www.acousa.com](http://www.acousa.com), [www.acodrain.us](http://www.acodrain.us)
  
- C. ABT, Inc.
  - 259 Murdock Road
  - Troutman, NC 28166
  - Telephone: (800) 438-6057, (704) 528-9806
  - Fax: (704) 528-5478
  - Website: [www.abtdrains.com](http://www.abtdrains.com)

### 2.2 POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS

- A. General Requirements for Polymer-Concrete, Channel Drainage Systems:
  - Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include quantity of units required to form total lengths indicated.
  
- B. Narrow-Width, Level-Invert, Polymer-Concrete Systems:
  - 1. Channel Sections:
    - a. Interlocking-joint, precast, modular units with end caps.
    - b. 6 inch maximum and 3 inch minimum outside width and 3 inch maximum invert depth, flat bottom, with level invert.
  - 2. Grates:
    - a. Perforated, ADA compliant that fit recesses in channels.

- b. Material: Galvanized steel, Stainless steel.
- 3. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- C. Drainage Specialties: Precast, polymer-concrete units.
  - 1. Small Catch Basins:
    - a. 9 to 12 inches by approximately 6 to 8 inches deep polymer-concrete body, with PVC piping compatible outlets.
    - b. Grates: Gray-iron, Galvanized steel, Stainless steel.
    - c. Frame: Include gray-iron or steel frame for grate.
- D. Supports, Anchors, and Setting Devices: Manufacturer's standard unless otherwise indicated.
- E. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

## **2.3 PIPE AND FITTINGS**

- A. PVC Pipe And Fittings
  - 1. Schedule 80, PVC pipe with plain ends for solvent-cemented joints.
  - 2. Fittings: PVC socket-type fittings.

## **PART 3 - EXECUTION**

### **3.1 PIPE BEDDING**

- A. The bedding surface of the pipe shall provide a firm foundation of uniform density throughout the entire length of pipe. When necessary, the bedding shall be tamped. Plastic pipe bedding requirements shall meet the requirements of ASTM D2321. Bedding, haunching and initial backfill shall be either Class IB or Class II material.

### **3.2 PIPING INSTALLATION**

- A. Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping with 6 inches minimum cover.
- C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

1. Do not lay pipe on unstable material, in wet trench or when trench and weather conditions are unsuitable for the work.
  2. Support pipe on compacted bedding material.
  3. Inspect pipes and fittings, for defects before installation.  
Defective materials shall be plainly marked and removed from the site. Cut pipe shall have smooth regular ends at right angles to axis of pipe.
  4. Clean interior of all pipe thoroughly before installation. When work is not in progress, open ends of pipe shall be closed securely to prevent entrance of storm water, dirt or other substances.
  5. Lower pipe into trench carefully and bring to proper line, grade, and joint. After jointing, interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, non-pressure drainage piping according to the following:
1. Install piping pitched down in direction of flow.
  2. Install PVC piping according to ASTM D2321 and ASTM F1668.

### **3.3 CONNECTIONS TO EXISTING MANHOLES**

- A. Make pipe connections and alterations to existing manholes so that finished work will conform as nearly as practicable to the applicable requirements specified for new manholes, including concrete and masonry work, cutting, and shaping.

### **3.4 CHANNEL DRAINAGE SYSTEM INSTALLATION**

- A. Install with top surfaces of components, except piping, flush with finished surface.
- B. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- C. Embed channel sections and drainage specialties in 4 inch minimum concrete around bottom and sides.
- D. Assemble channel sections with flanged or interlocking joints.

### **3.5 CATCH BASIN INSTALLATION**

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

### **3.6 CONNECTIONS**

- A. Connect non-pressure, gravity-flow drainage piping to existing storm drain system.
- B. Make connections to existing manholes or catch basins.
  - 1. Make connections to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, use epoxy-bonding compound as interface between new and existing concrete and piping materials.
  - 2. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### **3.7 FIELD QUALITY CONTROL**

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Prior to final acceptance, ensure the lines are free from obstructions, properly sloped and joined.
  - 1. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 2. Reinspect and repeat procedure until results are satisfactory.

### **3.8 CLEANING**

- A. Clean interior of piping of dirt and superfluous materials. Flush with water.

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