

PLASTIC PIPE – STRUCTURES, DRAINS AND CULVERTS

1. SCOPE

The work shall consist of furnishing and installing plastic pipe and necessary fittings and appurtenances as shown on the drawings and outlined in this specification.

2. MATERIALS

Pipe

The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other defects. The pipe shall be uniform as commercially practicable in color, opaqueness, density, and other specified physical properties. The dimensions of the pipe shall be measured as prescribed in ASTM D-2122.

When perforations are specified, the water inlet area shall be a minimum of 1 square inch per lineal foot of pipe. The inlets either shall be circular perforations or slots equally spaced along the length and circumference of the pipe. Unless otherwise specified, circular perforations shall not exceed 3/16 inch in diameter, and slot perforations shall not be more than 1/8 inch wide.

Geotextile filter socks, when required, shall meet the material requirements outlined in section 9 of this specification.

Granular bedding material, when specified, shall conform to the requirements specified in section 9 of this specification.

The pipe shall be appropriately marked with ASTM or AASHTO designation.

Pipe shall conform to requirements of the following Standard Specifications:

Polyvinyl Chloride (PVC)

ASTM D-1785 Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, 120

ASTM D-2241 Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)

ASTM D-2672 Joints for IPS PVC Pipe Using Solvent Cement

ASTM D-2729 Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

ASTM D-2949 3.25-Inch Outside Diameter Polyvinyl Chloride (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D-3034 Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

ASTM F-679 Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

ASTM F-758 Smooth-Wall Polyvinyl Chloride (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

ASTM F-794 Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

AASHTO Specification M304 Polyvinyl Chloride (PVC) Ribbed Drain Pipe and Fittings Based on Controlled Inside Diameter

Acrylonitrile-Butadiene-Styrene (ABS)

ASTM D-1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80

ASTM D-2661 Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe

ASTM D-2751 Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings

CONSTRUCTION SPECIFICATION

Polyethylene (PE)

ASTM D-2239 Polyethylene (PE) Plastic Pipe, (SIDR-PR) Based on Controlled Inside Diameter

ASTM D-3035 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter

ASTM F-667 Large Diameter Corrugated Polyethylene Tubing and Fittings. Use only High Density Polyethylene (HDPE) Type III; Class C; Category 3, 4, or 5; Grade P33, or P34, as described in ASTM D-1248, Polyethylene Plastic Molding and Extrusion Materials

ASTM F-714 Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Outside Diameter

ASTM F-894 Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe.

Fittings and Joints

The dimensions of fittings and joints shall be measured in accordance with ASTM D-2122. Joint and fittings shall be compatible with the pipe to which they attach and shall conform to the requirements of the same ASTM designation as the pipe used.

Solvents

Solvents for solvent welded pipe joints shall conform to requirements of the following Standard Specifications:

ASTM F-656 Primers for Use in Solvent Cement Joints of Polyvinyl Chloride (PVC) Plastic Pipe and Fittings

ASTM D-2235 Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings

ASTM D-2564 Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings

USDA-NRCS-MONTANA

Plastic Pipe--Structures, Drains, and Culverts MT-112-2

ASTM D-3138 Solvent Cement for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Polyvinyl Chloride (PVC) Non-Pressure Piping Components.

Gaskets

Rubber gaskets for pipe joints shall conform to the requirements of ASTM Specification F-477, "Elastomeric Seals (Gaskets) for Joining Plastic Pipe."

3. HANDLING AND STORAGE

Pipe shall be delivered to the job site and handled by means which provide adequate support to the pipe and do not subject it to undue stresses or damage. When handling and placing plastic pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal surface or rocks). The manufacturer's special handling requirements shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at a temperature of 40 degrees Fahrenheit or less.

Pipe shall be stored on a relatively flat surface so that the full length of the pipe is evenly supported. Unless the pipe is specifically coated to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when outdoors for a period of 15 days or longer.

4. EXCAVATION

Unless otherwise specified or approved by the engineer, excavation for and subsequent installation of each tube pipeline shall begin at the outlet end and progress upgrade. The trench or excavation for the pipe shall be constructed to the lines, depths, cross sections, and grade shown on the drawings, specified in section 9 of this specification, or as approved by the engineer.

APRIL 2013

Trench shields, shoring and bracing, or other suitable methods necessary to safeguard the contractor's employees and the works of improvement and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor.

5. PREPARING THE PIPE BED AND BLINDING THE PIPE

When a granular filter or envelope is specified, the filter or envelope material shall be placed in the bottom of the trench just before the pipe is laid. The pipe shall then be laid and the filter and envelope material placed to a depth over the top of the pipe of not less than that shown on the drawings or as specified in section 9 of this specification.

When a granular filter or envelope is not specified, the bottom of the trench shall be shaped to form a semicircular or trapezoidal groove in its center. This groove shall provide support for not less than a fourth of the outside circumference of the pipe. After the pipe is placed in the excavated groove, it shall be capped with friable material from the sides of the trench. The friable material shall be placed around the pipe, completely filling the trench to a depth of at least 3 inches over the top of the pipe. For material to be suitable, it must not contain hard clods, rocks, frozen soil, or fine material that will cause a silting hazard to the drain. Pipe placed during any day shall be blinded (place required soil material around and over pipe) and temporarily capped before construction activities are completed for that day.

6. PLACEMENT AND JOINT CONNECTIONS

All pipe shall be installed to grade as shown on the drawings. After the pipe is placed in the trench and blinded, allow sufficient time for the pipe to adapt to the soil temperature before backfilling.

Maximum allowable stretch of the pipe is 5 percent. Special precautions must be implemented on hot, bright days to ensure that the stretch limit is not exceeded and excessive deflection does not occur as a result of installation procedures, including backfill operations.

Unless otherwise specified in section 9 of this specification or shown on the drawings, connections are made with manufactured junctions comparable in strength with the specified pipe. All split fittings shall be securely fastened with nylon cord or plastic zip ties before any backfill is placed. All buried ends shall be supplied with end caps unless otherwise approved by the engineer.

7. BACKFILL

Unless otherwise specified in section 9 of this specification, the backfilling of the trench shall be as shown on the drawings and completed as rapidly as is consistent with the soil conditions. Automatic backfilling machines may be used only when approved by the engineer. Backfill shall extend above the ground surface and be well rounded and centered over the trench.

8. MEASUREMENT AND PAYMENT

(Used only if applicable)

Method 1. For items of work for which specific unit prices are established in the contract, the quantity of each kind and size of pipe is determined to the nearest foot of length measured along the centerline of the installed pipe. Payment for each kind and size of pipe is made at the contract unit price for that kind and size of pipe. Such payment constitutes full compensation for all labor, equipment, tools, and all other items necessary and incidental to furnishing, transporting, and installing the pipe, including excavation, shoring, geotextile or granular filter (when specified), backfill and all fittings, appurtenances, and other items

required to complete the work. Payment for appurtenances listed separately in the bid schedule is made at the contract unit price(s) for the size and type of appurtenance listed.

Method 2. For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe is determined to the nearest foot by measurement of the laid length along the crown centerline of the pipe. Payment for each kind, size, and class of pipe is made at the contract unit price for the kind, size, and class. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe, including shoring, all fittings, thrust blocks, appurtenances, and other items necessary and incidental to the completion of the work. Payment for appurtenances listed separately in the bid schedule are made at the contract prices for those items.

Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS