

# CONSTRUCTION SPECIFICATION

## VA-745. PLASTIC PIPE

### 1. SCOPE

The work shall consist of furnishing and installing plastic pipe and the necessary fittings specified herein or as shown on the drawings. This specification does not cover subsurface drainage systems.

### 2. MATERIALS

<b>Poly Vinyl Chloride (PVC) Pipe</b>	
Plastic Pipe - Schedules 40, 80, 120	ASTM D 1785
Pressure Pipe, 4 inches through 12 inches	AWWA C 900
Pressure Rated Pipe - SDR Series	ASTM D 2241
Plastic Drain, Waste, and Vent Pipe and Fittings	ASTM D 2665
Joints for IPS PVC Pipe Using Solvent Cement	ASTM D 2672
ABS and PVC Composite Sewer Pipe	ASTM D 2680
Type PSM PVC Sewer Pipe and Fittings	ASTM D 3034
Large-Diameter Gravity Sewer Pipe and Fittings	ASTM F 679
Smooth-Wall Underdrain Systems for Highway, Airport, and Similar Drainage	ASTM F 758
Type PS-46 Gravity Flow Sewer Pipe and Fittings	ASTM F 789
Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter	ASTM F 794
Corrugated Sewer Pipe with a Smooth Interior and Fittings	ASTM F 949
Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch	AWWA C 905
<b>Polyethylene (PE) Plastic Pipe</b>	
Schedule 40	ASTM D 2104
SIDR-PR based on Controlled Inside Diameter	ASTM D 2239
Schedules 40 and 80 Based on Outside Diameter	ASTM D 2447
SDR-PR Based on Controlled Outside Diameter	ASTM D 3035
Plastic Tubing	ASTM D 2737
Pressure Pipe and Tubing, ½ inch through 3 inches	AWWA C901
Corrugated PE Pipe and Fittings	ASTM F 405
<b>High Density Polyethylene (HDPE) Plastic Pipe</b>	
Plastics Pipe and Fittings Materials	ASTM D 3350
SDR-PR Based on Controlled Outside Diameter	ASTM F 714
Heat Joining Polyolefin Pipe and Fittings	ASTM D 2657
<b>Acrylonitrile-Butadiene-Styrene (ABS) Pipe</b>	
Plastic Pipe, Schedules 40 and 80	ASTM D 1527
Plastic Pipe	ASTM D 2282
Schedule 40 Plastic Drain, Waste, and Vent Pipe	ASTM D 2661
ABS and PVC Composite Sewer Pipe	ASTM D 2680
Sewer Pipe and Fittings	ASTM D 2751

<b>Gas Pipe</b>	
Thermoplastic Gas Pressure Pipe, Tubing and Fittings	ASTM D 2513
<b>Plastic Pressure Pipe Fittings</b>	
Threaded PVC Plastic Pipe Fittings, Schedule 80	ASTM D 2464
PVC Plastic Pipe Fittings, Schedule 40	ASTM D 2466
Socket-Type PVC Plastic Pipe Fittings, Schedule 80	ASTM D 2467
Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	ASTM D 2609
Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing	ASTM D 2683
Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	ASTM D 3139
Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene Plastic Pipe and Tubing	ASTM D 3261
<b>Solvents for Solvent-Welded Plastic Pipe Joints</b>	
Solvent Cement for ABS Plastic Pipe and Fittings	ASTM D 2235
Solvent Cements for PVC Plastic Piping Systems	ASTM D 2564
Making Solvent-Cemented Joints with PVC Pipe and Fittings	ASTM D 2855
<b>Rubber Gaskets</b>	
Elastomeric Seals (Gaskets) for Joining Plastic Pipe	ASTM F 477

a. Fittings and Joints

Where pressure pipe is specified, fittings shall have a design capacity equal to or exceeding that specified for the pipe to which it is attached. Fittings shall be cast iron, steel, one piece injection molded plastic fitting, or fabricated from plastic pipe and one piece injection molded plastic fittings.

Where nonpressure pipe is specified, the fittings shall be of the same or similar materials as the pipe and shall provide the same durability and strength as the pipe.

Joints may be bell and spigot type with elastomeric gaskets, coupling type with elastomeric gasket on each end, or solvent cemented. When a lubricant is required to facilitate joint assembly, it shall be a type having no detrimental effect on the gasket or pipe material.

Mechanical joints (split couplings and snap couplings) may be used when joining PE pipe and fittings with nonpressure flow and a free draining sand or gravel bedding material. Elastomeric-sealed mechanical joints shall be used when joining PE pipe and fittings under pressure flow or where seepage cannot be tolerated.

Pipe joints shall conform to the details shown on the drawings and specified herein.

Pipe shall be installed and joined in accordance with the manufacturer's recommendations, except as otherwise specified.

3. HANDLING AND STORAGE

Pipe shall be delivered to the job site and handled by means which provide adequate support to the pipe and does 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 surfaces or rocks). All special handling requirements of the

manufacturer shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at temperatures of 40°F (4.4°C) or less.

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

#### 4. LAYING AND BEDDING THE PIPE

Plastic pipe conduits and fittings shall be installed as shown on the drawings and specified herein. The pipe shall be laid so that there is no reversal of grade between joints, unless otherwise shown on the drawings. The pipe shall be placed with the bell end upstream, unless otherwise specified. The pipe shall be carefully placed on the bedding or into the pipe trench.

Care shall be taken to prevent distortion and damage during unusually hot (over 90°F) or cold weather (under 40°F). After the pipe has been assembled in the trench, it shall be allowed to reach ground temperature before backfilling to prevent pull out of joints due to thermal contraction.

The pipe ends and the couplings shall be free of foreign material when assembled. During the placement of the pipe, each open end of the pipeline shall be closed off by a suitable cover or plug at the end of work on the pipeline each day and until work resumes or installation is complete.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

Pipe shall be firmly and uniformly supported throughout the entire length. Bell-holes shall be made in the bedding under bells or couplings and other fittings to prevent the pipe from being supported by fittings.

- a. Earth Bedding. When bedding is specified, the pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a depth equal to a minimum of 1 inch or 5 percent of the diameter of the pipe, whichever is greater. The bedding material shall be free of rocks or stones greater than 0.5 inch diameter and earth clods greater than 2 inch diameter.
- b. Sand or Gravel Bedding, or Drain Fill. When sand or gravel bedding is specified, the pipe shall be firmly and uniformly placed on a sand or gravel bed. Sand or gravel fill shall be carefully placed and compacted as specified herein and as shown on the drawings.

#### 5. BACKFILL

The pipe shall be held down during backfilling to the top of the pipe to prevent its being lifted from its original placement.

Backfill shall be compacted to the degree required to prevent settlement of the backfill material after construction.

The water content of cohesive backfill material shall be such that, kneaded in the hand, the soil will form a ball which does not readily separate. For non-cohesive sand and gravel backfill material, water content is not a concern for thin lifts.