

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

SUBSURFACE DRAIN

(Feet)
Code 606

INSTALLATION

Inspecting and handling materials. Material for subsurface drains shall be carefully inspected before the drains are installed. Plastic pipe and tubing shall be protected from hazard-causing deformation or warping. Plastic pipe and tubing with physical imperfections shall not be installed. A damaged section shall be removed and a suitable joint made connecting the retained sections. All material shall be satisfactory for its intended use and shall meet applicable specifications and requirements.

Materials

The following specifications pertain to products currently acceptable for use as subsurface drains. These specifications are also to be applied in determining the quality of materials referenced by other standards:

Type of Pipe	ASTM Spec. ^{1/}
<i><u>Plastic</u></i>	
Corrugated polyethylene (PE) tubing and fittings 3-6 inches	F-405
Corrugated polyethylene (PE) tubing and fittings 8-24 inches	F-667
Polyvinyl chloride (PVC) corrugated sewer pipe with a smooth interior and fittings 4-8 inches	F-949
Polyvinyl chloride (PVC) sewer pipe and fittings	D-2729
Polyvinyl chloride (PVC) pipe	D-3034
<i><u>Corrugated metal</u></i>	
Pipe, corrugated steel (metallic-coated)	A-760
Pipe, corrugated (aluminum alloy)	B-745

^{1/} Specifications can be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103

GENERAL

The installing contractor shall certify that the installation complies with the requirements of these specifications. The contractor shall also name the source of materials.

Conduit perforations special requirements

Where perforated conduit is required, the water inlet area shall be at least 1 in.²/ft of conduit length. Round perforations shall not exceed 3/16-inch in diameter except where filters, envelopes, or other protection is provided or for organic soils, where a maximum hole diameter of 1/2 inch may be used. Slotted perforations shall not exceed 1/8 inch in width.

SPECIFICATIONS - FLEXIBLE CONDUIT

I. General requirements

All conduits shall be laid to line and grade in such a way that the side walls are continuously and uniformly supported with suitable bedding material. Such material shall be properly placed and compacted to provide lateral restraint against deflection and to protect the conduit against collapse during backfilling.

II. Trenching

Trench widths must be adequate for proper installation of the conduit, allow proper joining of sections, and allow proper placement of filter, envelope, or blinding materials. The trench bottom shall be constructed to proper grade before placement of the conduit.

Where rock is encountered the trench will be over excavated a minimum of 6 inches and refilled to proper grade with a suitable bedding material.

Provisions for safety during trenching operations shall be in compliance with the applicable safety and health regulations for construction.

III. Plow installation

Plow installation has been satisfactorily used in many situations. Special care needs to be exercised relative to grade control and bedding conditions.

IV. Bedding

The trench bottom shall be smooth and free of clods and loose or exposed rock. Where a gravel envelope is not specified, the bottom of the trench shall be shaped to conform to the pipe. The groove may be semi-circular, trapezoidal, or a 90 degrees "V"-shape (90 degree "V" suitable for 3-8 inch only) and shall be of such dimensions that the bottom quarter of the pipe is below the contact points of the groove.

In unstable soils a firm foundation shall be provided by over excavation and backfilling with processed stone or gravel, suitably graded so as to act as a mat into which unstable soil will not penetrate.

V. Filters and envelopes

If a sand-gravel filter is specified, it shall be clean, hard, durable material and of the gradation specified.

When sand-gravel envelopes are used they will be of clean, hard, durable material with less than 5 percent passing the No. 200 sieve, not more than 30 percent passing the No. 60 sieve, and with a maximum size of 1 ½ inches.

VI. Placement

Conduit will be placed in such a way that maximum stretch does not exceed 5 percent.

Fittings shall be installed in accordance with instructions furnished by the manufacturers. Couplers are recommended at all joints and fittings, at all changes in direction (where the centerline radius is less than three times tubing diameter), at changes in diameter, and at junction with another line.

Caps are needed at the ends of lines. All fittings shall be compatible with the tubing. Where certain fittings are not available, hand cut holes are acceptable provided care is taken when making the connection not to create a means of obstructing flow, catching debris, or allowing soil to enter the line. Place selected bedding material, containing no hard object larger than 1 ½ inches in diameter in the trench to a minimum depth of 6 inches over the conduit. The conduit will be held in place mechanically until secured by blinding.

VII. Backfilling

Place backfill material so that displacement or deflection of the conduit will not occur. This is preferably on an angle, so the material flows down the front slope. Avoid large stones, frozen material, and dry clods that cause concentrated point loads on the tubing. The trench should be backfilled as soon as practical. When installing the tubing on a hot day, backfilling should be delayed until tubing temperature cools to the soil temperature.