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Standard Practice for Subsurface Installation of Corrugated Polyethylene Pipe for Agricultural Drainage or Water Table Control[1]

This standard is issued under the fixed designation F 449; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice is recommended for and limited to gravity flow subsurface drainage systems or water table control, but not recommended for sanitary or storm sewer applications. Procedures are outlined to minimize pipe deflection or structural damage during and after the installation process. These installation procedures are in accordance with "flexible conduit" principles.

1.2 This practice applies to all agricultural subsurface drainage or water table control installations.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading[3]

F 405 Specification for Corrugated Polyethylene (PE) Tubing and Fittings[3]

F 412 Terminology Relating to Plastic Piping Systems[3]

F 667 Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings[3]

3. Terminology

3.1 Definitions are in accordance with Terminology F 412 and abbreviations are in accordance with Terminology D 1600, unless otherwise specified.

3.2 *backfill*—materials used to fill the trench following installation of the pipe and bedding.

3.3 *bedding*—material which provides stable bottom support for the pipe including the trench bottom groove support angle or select material placed around the pipe, and envelope or filter materials where used during installation.

3.4 *blinding*—the placement of soil, bedding material over and on the sides of the pipe or envelope to ensure proper grade, alignment, support, and protection of pipe during backfilling and after installation.

3.5 *boot (also shield)*— the protecting apparatus linked to the rear of the installation machine in a manner which allows placement of the pipe on the trench bottom, protection of the workman, or placement of envelope or filter material, or both.

3.6 *cradle*—a prefabricated rigid structure designed to provide trench bottom support for the pipe when soil support is inadequate.

3.7 *envelope*—porous material placed around the pipe to provide bedding, improve the flow of ground water into the drain, or function as a filter.

3.8 *filter*—an envelope of natural or synthetic materials placed completely around a drain to permit free water movement into the drain, provide stabilizing support at the soil-filter interface, and restrict movement of silt and sand into the drain.

3.9 *grade*—the slope of the pipe invert.

3.10 *groove support angle*— angle between the radii of the pipe at points of contact with the formed groove of undisturbed soil or a cradle.

3.11 *mineral soils*—soil containing (*1*) less than 30 % organic matter by weight provided the mineral fraction is 60 % or more clay, or (*2*) less than 20 % organic matter by weight provided the mineral fraction has no clay, or (*3*) less than a proportional content of organic matter between 20 and 30 % if the clay content of the mineral fraction is between 0 and 60 %.

3.12 *natural granular envelope*—an envelope of granular material, usually highly permeable well-graded sand and gravel.

3.13 *organic soil*—soil containing (*1*) 30 % or more organic matter provided the mineral fraction is 60 % or more clay, or (*2*) 20 % or more organic matter provided the mineral fraction has no clay, or (*3*) a proportional content of organic matter between 20 and 30 % if the clay content of mineral fraction is between 0 and 60 %. (It is a general rule that a soil is classed as an organic soil (histosol) either if more than one half of upper 80 mm (32 in.) of soil is organic or if organic soil material of any thickness rests on rock or on fragmental material having voids filled with organic material.)

3.14 *pipe stiffness*—force per unit length, per unit deflection as defined in Test Method D 2412.

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[1] This practice is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.65 on Land Drainage.

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 08.04.