



Standard Practice for Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields¹

This standard is issued under the fixed designation F481; 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 describes procedures for handling and installing thermoplastic pipe and corrugated pipe in septic tank leach fields, curtain drains, and from the septic tank to the leach field. Proper installation ensures that the pipe will satisfactorily convey and distribute partially treated waste water to a leaching field for additional treatment and disposal by soil absorption. The curtain or perimeter drain will function to protect the soil absorption capacity of the leach field.

1.2 To ensure compliance with local regulatory provisions, the local approving authority (local health departments and so forth) should be contacted regarding specific requirements for leach field design materials and installation.

1.3 This practice applies to pipe and fittings made under each of the following ASTM specifications:

1.3.1 For transport from tank to leach field: Specifications [D2680](#), [D2729](#), [D2751](#), [D2852](#), [D3034](#), [F405](#), [F758](#), [F789](#), [F810](#), [F891](#), [F892](#), and [F949](#).

1.3.2 Perforated, for use in leach field or curtain drain: Specifications [D2729](#), [D2751](#), [F405](#), [F810](#), [F891](#), and [F892](#).

1.4 Pipe intended for installation in accordance with this practice should have a minimum pipe stiffness as specified in the appropriate product standard referenced in [1.3.1](#) or [1.3.2](#).

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *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.* For specific precautionary statements, see Section [7](#).

2. Referenced Documents

2.1 *ASTM Standards*:²

[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)

[D2321 Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications](#)

[D2680 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) and Poly\(Vinyl Chloride\) \(PVC\) Composite Sewer Piping](#)

[D2729 Specification for Poly\(Vinyl Chloride\) \(PVC\) Sewer Pipe and Fittings](#)

[D2751 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Sewer Pipe and Fittings \(Withdrawn 2014\)³](#)

[D2852 Specification for Styrene-Rubber \(SR\) Plastic Drain Pipe and Fittings](#)

[D3034 Specification for Type PSM Poly\(Vinyl Chloride\) \(PVC\) Sewer Pipe and Fittings](#)

[F405 Specification for Corrugated Polyethylene \(PE\) Pipe and Fittings](#)

[F412 Terminology Relating to Plastic Piping Systems](#)

[F449 Practice for Subsurface Installation of Corrugated Polyethylene Pipe for Agricultural Drainage or Water Table Control](#)

[F758 Specification for Smooth-Wall Poly\(Vinyl Chloride\) \(PVC\) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage](#)

[F789 Specification for Type PS-46 and Type PS-115 Poly\(Vinyl Chloride\) \(PVC\) Plastic Gravity Flow Sewer Pipe and Fittings \(Withdrawn 2004\)³](#)

[F810 Specification for Smoothwall Polyethylene \(PE\) Pipe for Use in Drainage and Waste Disposal Absorption Fields](#)

[F891 Specification for Coextruded Poly\(Vinyl Chloride\) \(PVC\) Plastic Pipe With a Cellular Core](#)

[F892 Specification for Polyethylene \(PE\) Corrugated Pipe With a Smooth Interior and Fittings \(Withdrawn 2001\)³](#)

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

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

F949 Specification for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

3. Terminology

3.1 Definitions are in accordance with Terminology F412 and abbreviations are in accordance with Terminology D1600, unless otherwise specified.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *dual-wall pipe*—pipe with corrugated exterior and smooth interior.

3.2.2 *pipe*—smooth or corrugated interior wall thermoplastic pipe.

4. General Requirements

4.1 *Storage*—Pipe should be stored with support from a flat surface to prevent the pipe from developing a permanent set.

4.2 *Handling*—Care should be exercised during loading, unloading, and in transit because pipe may be damaged by abrasion and sharp edges. Because thermoplastics are temporarily softened by high temperatures, care should be taken under these conditions to avoid damage during handling operations.

4.3 If contact with chemicals not ordinarily present in sanitary sewage is anticipated, the approval of the regulatory authority to install pipe should be obtained.

NOTE 1—The manufacturer should be contacted for information on chemical resistance.

4.4 Coiled pipe is not recommended for use in leach fields because it is difficult to install at the proper grade and alignment; it is acceptable with special equipment installation.

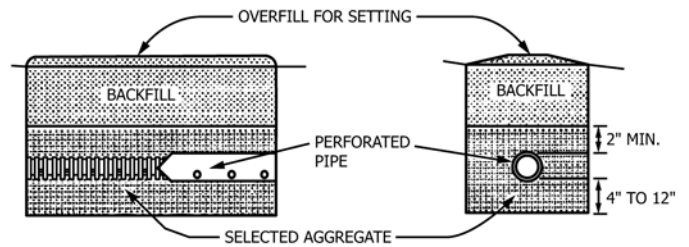
NOTE 2—Corrugated interior pipe should not be used between the dwelling and the waste water treatment unit (septic tank or similar device) because the corrugations may inhibit the flow of solids contained in the waste.

5. Installation—Leach Field

5.1 Leach fields should be constructed to meet the requirements of the local Department of Health or other governing authority, which should be contacted for information and requirements on design, location, installation, materials, and so forth.

5.2 Before installation, pipe should be inspected for damage such as kinks, crushed portions, splits, and so forth. Any damaged portions of pipe shall be cut out as a cylinder and discarded. Make a visual check of the bore to ensure it is clear of foreign objects that might impede flow.

5.3 *Gravel Systems*—For proper waste water flow into the surrounding soils and to provide for support of pipe, a uniform layer of 4 to 6 in. (100 to 150 mm) of graded aggregate should be placed in the trench bottom and leveled true to grade prior to laying the pipe (see Fig. 1). Aggregate should range from 3/4 to 2 1/4 in. (13 to 54 mm) in size. The aggregate under the pipe should not be compacted; for example, by tamping or walking, as this may damage the soil interface.



NOTE 1—1 in. = 25.4 mm.

FIG. 1 Gravel Leach Trench

5.4 Fittings recommended by the pipe manufacturer should be used at all joints and for changes of direction except that pipe may be bent to a radius of not less than 5 times the diameter.

5.5 Unless otherwise specified, pipe should be laid true to grade and aligned in the center of the trench, with the top print line or location stripe at the 12 o'clock position so that holes are placed down. It should be held in place by alignment supports, such as wooden stakes or steel rods.

NOTE 3—Some authorities require the covering of the line with untreated building paper or a geotextile to prevent entry of aggregate, prior to the next step. This is usually required only in areas that require the perforations to be oriented on the top instead of the bottom of the pipe.

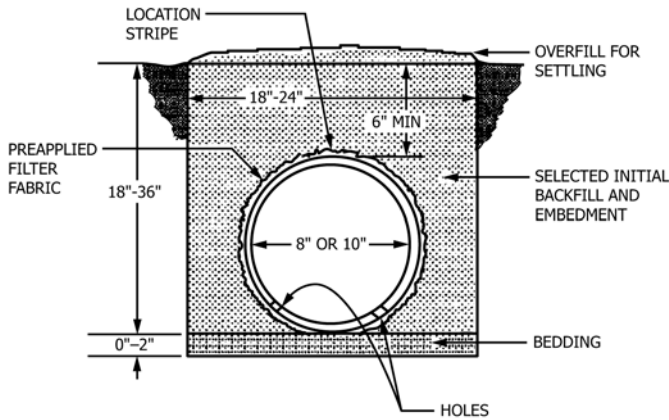
5.6 For gravel systems, place aggregate around the pipe until only the top center is still visible. Make a final check of grade and alignment. It is particularly important that the side walls be given uniform and continuous support to provide lateral restraint against deflection during backfilling operations. Care should be taken to prevent damage to the lines. Do not permit a dump truck or front-end loader to dump directly over the pipe. Call for final inspection by local authority if required.

5.6.1 Add additional aggregate until the lines are covered to a minimum depth of 2 in. (50 mm) above the pipe (see Fig. 1). Remove alignment supports, level the aggregate, and backfill to grade with soil. An additional 4 to 6-in. (100 to 150-mm) overfill is recommended to compensate for settling.

NOTE 4—Some authorities require that the top of the aggregate be protected from migration by a layer of nonbiodegradable, pervious material such as untreated building paper or a geotextile. Installers should note that the use of the impervious materials, such as plastic film, prevents upward evapotranspiration. The governing authority should be contacted to determine the type of material required.

5.7 For the gravel-less leach lines, the plastic protective covering used in shipping must be removed from the pipe before backfilling. The geotextile covering of the pipe must be continuous and not damaged. Gravel-less leach lines should be backfilled with the soil excavated from the trench. Place embedment material, free of large particles such as rocks, clods, and other extraneous materials up to the spring line of the pipe. Work sufficient material along the sides of the pipe to provide adequate side support, without compacting the material (see Fig. 2).

5.7.1 Add selected backfill to a minimum of 6 in. (150 mm) over the top of the pipe. Remaining backfill may consist of native soil. An additional 4 to 6 in. (100 to 150 mm) of overfill is recommended to compensate for settling.



NOTE 1—1 in. = 25.4 mm.

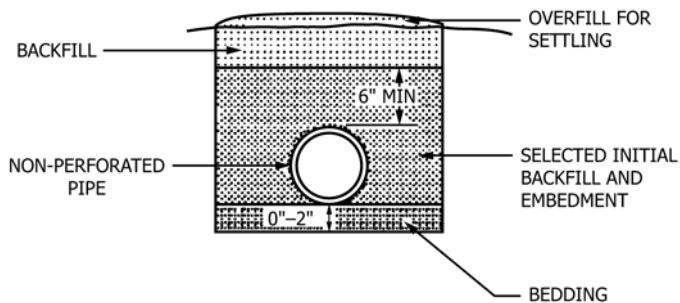
FIG. 2 Gravel-less Leach Trench

NOTE 5—A record of the installation should be made, including a dimensional sketch, name of installer, date of installation, type and brand of pipe installed, and other system details. It is suggested that the system owner be provided with a copy of this record.

6. Installation—Non-Perforated Pipe

6.1 Non-perforated laterals and connector lines are not normally bedded in an aggregate envelope but are usually backfilled with the soil excavated from the trench. Therefore, place embedment material, free of large particles such as rocks, clods, and other extraneous materials, up to the spring line of the pipe and compact by hand or mechanical tamping. Work sufficient material under the sides of the pipe to provide adequate side support (see Fig. 3).

6.2 Take care to avoid contact between the pipe and compaction equipment. The initial backfill and backfill material should generally be compacted in such a way that the compaction equipment is not used directly above the pipe until sufficient backfill has been placed to ensure that such equipment will not have a damaging effect on the pipe. Refer also to Practice D2321 or F449 for additional details and definitions.



NOTE 1—1 in. = 25.4 mm.

FIG. 3 Non-Aggregate Installation

7. Installation—Curtain Drains

7.1 Curtain drains are installed to prevent water seepage into a leach field area. They should be installed in accordance with Practice D2321 or F449 and at least 1 ft (0.3 m) deeper than the leach lines and 8 to 10 ft (2.4 to 3 m) from the leach line. The curtain drain should be directed to a free or pump outlet.

7.2 When perforated, slotted, or slitted pipe is used, gravel or porous backfill should extend as specified or to any seep plane (see Fig. 4).

7.3 If edgedrain is used, permeable soil or gravel backfill may be used (see Fig. 5).

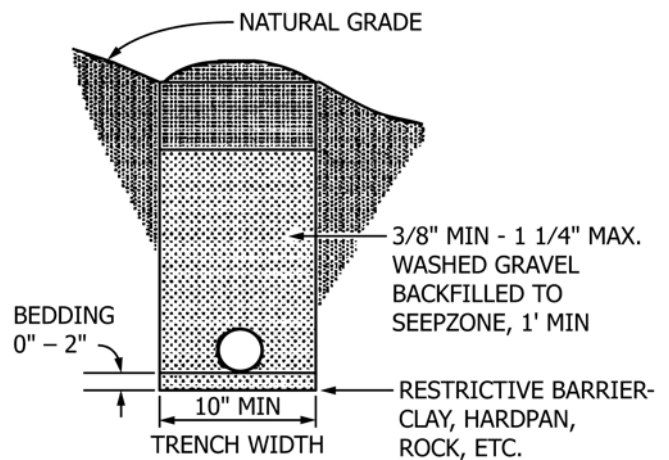
8. Special Precautions

8.1 *Effect of High Temperatures*—Pipe can reach comparatively high temperatures when exposed to the sun and this reduces the pipe stiffness appreciably. Therefore, precautions must be taken to prevent the impact of sharp or heavy objects, the sudden imposition of heavy overburden or excessive pull on such pipe. The pipe regains full strength and stiffness as the temperature decreases to that of the soil; this will normally require about 5 min.

8.2 *Effect of Low Temperatures*—Care in handling and installation should be exercised under low-temperature conditions to avoid damage. As temperatures decrease, some types of pipe tend to become more brittle and less flexible.

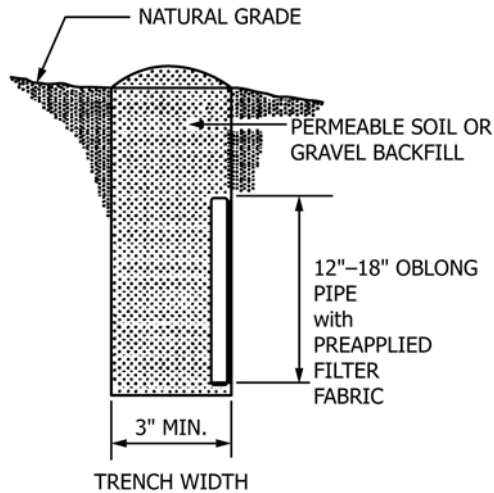
9. Keywords

9.1 curtain drain; gravel-less; installation; leach field



NOTE 1—1 in. = 25.4 mm.

FIG. 4 Curtain Drain With Pipe



NOTE 1—1 in. = 25.4 mm.

FIG. 5 Curtain Drain With Edgedrain

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