



Designation: F1741 – 22

Standard Practice for Installation of Machine Spiral Wound Poly (Vinyl Chloride) (PVC) Liner Pipe for Rehabilitation of Existing Sewers and Conduits¹

This standard is issued under the fixed designation F1741; 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 the procedures for the rehabilitation of sewer lines and conduits for existing pipelines 6 to 180 in. in diameter by the insertion of a machine-made field-fabricated spiral wound liner pipe into the existing pipeline using a winding machine which remains stationary in the insertion pit or, alternatively, which travels along the interior of the existing pipeline. These rehabilitation processes can be used in a variety of gravity applications such as sanitary sewers, storm sewers, culverts, and process piping.

1.1.1 When using stationary installation equipment for existing pipelines 6 to 48 in., after insertion, the spiral wound liner pipe is expanded until it presses against the interior surface of the existing pipeline. Alternatively, for existing pipelines 6 to 108 in. in diameter, the spiral wound liner pipe is inserted as a fixed diameter into the existing pipeline and is not expanded, and the annular space between the spiral wound liner pipe and the existing pipe is grouted.

1.1.2 When using the traveling installation equipment for existing pipelines 6 to 180 in. the spiral wound liner pipe is installed in contact with the interior surface of the existing pipeline to form a close fit liner, except in the corners of rectangular pipes or where obstructions or offsets occur. Alternatively, for existing pipelines 6 to 180 in. in diameter and for similar sized existing non circular pipelines such as arched or oval or rectangular shapes, the spiral wound liner is installed as a fixed diameter into the exiting pipeline to form a non-close fit liner and the annular space between the spiral wound liner pipe and the existing pipe is grouted.

1.2 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 This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.67 on Trenchless Plastic Pipeline Technology.

Current edition approved Nov. 15, 2022. Published December 2022. Originally approved in 1996. Last previous edition approved in 2018 as F1741–18. DOI: 10.1520/F1741-22.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3.1 Particular attention is drawn to those safety regulations and requirements involving entering into and working in confined spaces.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)

C495 Test Method for Compressive Strength of Lightweight Insulating Concrete

C1920 Practice for Cleaning of Vitrified Clay Sanitary Sewer Pipelines

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

F412 Terminology Relating to Plastic Piping Systems

F1417 Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air

F1697 Specification for Poly(Vinyl Chloride) (PVC) Profile Strip for Machine Spiral-Wound Liner Pipe Rehabilitation of Existing Sewers and Conduit

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.

*A Summary of Changes section appears at the end of this standard

2.2 Uni-Bell Standard:

UNI-B-5-89 Recommended Practice for the Installation of PVC Sewer Pipe³

3. Terminology

3.1 *General*—Definitions are in accordance with Terminologies D883 and F412. Abbreviations are in accordance with Terminology D1600, unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *extruded PVC profile strip*—a product available in various widths, consisting of a smooth inside surface and a ribbed outer surface with mechanically locked male and female edges which are self interlocking, or separate locking strips which serve the same purpose Type A and Type B are different profiles and are installed by different installation methods. See Fig. 1 and Table 1 for Type A and Fig. 2 and Table 2 for Type B. See Fig. 1 and Fig. 3 for installation method for Type A and Fig. 2 and Fig. 4 for installation method for Type B.

3.2.2 *insertion point*—an existing manhole, existing access shaft, or excavated pit that serves as the point where a winding machine field fabricates the spiral wound liner pipe and simultaneously inserts the spiral wound liner pipe into the existing pipeline.

3.2.3 *non-circular pipe*—arched, oval or rectangular or a combination thereof.

3.2.4 *production run*—a continuous extrusion of a given profile type.

3.2.5 *spiral wound liner pipe*—a product field fabricated from extruded PVC profile strip to a round shape, or noncircular shape, such as arched or oval or rectangular. (See Fig. 5.)

3.2.6 *steel reinforcement*— a shaped steel strip or clip inserted into the inside of the PVC profile to provide additional reinforcement and stiffening. (See Fig. 3 and Fig. 4.)

3.2.7 *termination point*—an existing manhole, existing access shaft, or an excavated pit that serves as the point of exit of the spiral wound liner pipe from the existing pipe.

4. Significance and Use

4.1 This practice is for use by designers and specifiers, regulatory agencies, owners, and inspection organizations who are involved in the rehabilitation of non-pressure sewers and conduits. Modifications may be required for specific job conditions.

5. Materials

5.1 The extruded profile strip used for the field fabrication of spiral wound liner pipe shall be in accordance with Specification F1697.

5.2 The profile strip should be coiled onto a reel in a continuous length for storage and shipping to the job site. Handling and storage should be in accordance with the manufacturer's published recommendations.

5.3 The adhesive or sealants, or both, used with the male and female mechanical locking elements should be compatible with the PVC compound and the spiral wound liner pipe process so as not to affect the properties of the spiral wound finished liner pipe.

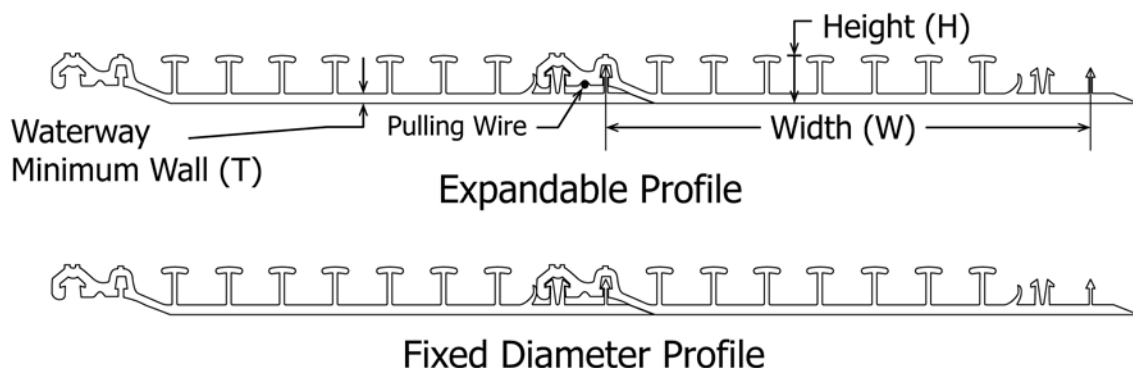
5.4 The steel reinforcing strips shall be used to reinforce the extruded PVC profile strip, where the design conditions requires additional stiffness, such as for non-circular shaped pipes.

6. Installation Recommendations

6.1 Cleaning and Inspection:

6.1.1 Prior to entering access areas such as manholes and performing inspection or cleaning operations, an evaluation of the atmosphere to determine the presence of toxic or flammable vapors or lack of oxygen must be undertaken in accordance with local, state, or federal safety regulations.

6.1.2 *Cleaning of Pipeline*—Internal debris shall be removed from the existing pipeline. Non-pressure gravity pipes shall be cleaned with hydraulically powered equipment, high-velocity jet cleaners, or mechanically powered equipment in accordance with manufacturers guidelines, Practice C1920, for VCP pipe or NASSCO recommended specifications, as applicable.



NOTE 1—For values of width, height, and waterway minimum wall, see Table 1.

FIG. 1 Type A-Typical PVC Profile Strip