



Designation: F1698 – 02(Reapproved 2008)

# Standard Practice for Installation of Poly(Vinyl Chloride)(PVC) Profile Strip Liner and Cementitious Grout for Rehabilitation of Existing Man- Entry Sewers and Conduits<sup>1</sup>

This standard is issued under the fixed designation F1698; 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 ( $\epsilon$ ) 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 by the installation of a field-fabricated PVC liner. After installation of the liner, cementitious grout is injected into the annular space between the liner and the existing sewer or conduit. The rehabilitation of the host structure by this installation practice results in a rigid composite structure (PVC/grout/existing pipe). This rehabilitation process may be used in a variety of gravity applications, such as sanitary sewers, storm sewers and process piping of man-entry sizes (36 to 144 in. in vertical dimension). The profile strips used for field fabrication of PVC liners are supplied in coils for spiral winding of the liner or in custom-cut flat panels for circumferential lining of all or any portion of the circumference of the host conduit (see [Figs. 1 and 2](#)).

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.

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

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

<sup>1</sup> 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.

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<sup>2</sup> 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.

C942 Test Method for Compressive Strength of Grouts for Preplaced-Aggregate Concrete in the Laboratory  
C969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines  
D883 Terminology Relating to Plastics  
D1600 Terminology for Abbreviated Terms Relating to Plastics  
D1735 Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus  
F412 Terminology Relating to Plastic Piping Systems

### 2.2 NASSCO Standard:

Specification Guidelines for Sewer Collection System Maintenance and Rehabilitation<sup>3</sup>

## 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 joiner strip*—a companion product to the profile former strip of such configuration as to provide the locking mechanism at the edges of the former strips; the joiner strip contains within it a coextruded flexible PVC seal which forms a compression seal when mated with the edges of the former strips.

3.2.2 *extruded PVC profile former strip*—a product, available in various sizes, consisting of a smooth inner surface and a ribbed outer surface (profile) with edge configurations to allow mechanical locking of adjacent strips.

3.2.3 *PVC liner*—a product field fabricated from extruded PVC profile strip into a shape substantially conforming to the shape of the existing pipe or conduit, for example, circular, oval, ovoid, and so forth (see [Fig. 1](#)).

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

<sup>3</sup> Available from, NASSCO, Inc., 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117.

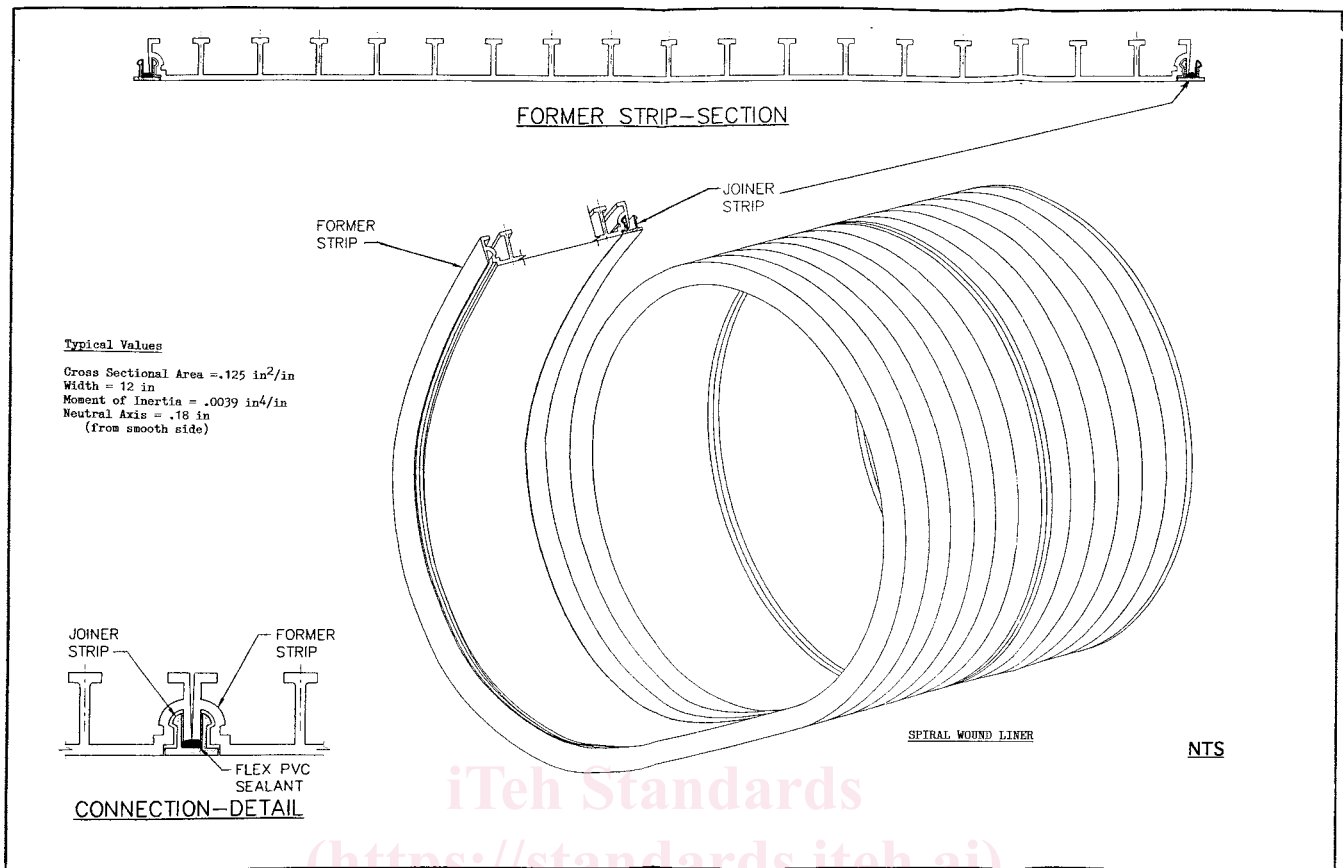


FIG. 1 Example of Profile PVC Strip

#### 4. Significance and Use

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

#### 5. Materials

5.1 The extruded PVC profile strip (former and joiner) used for the field fabrication of PVC liner should be made as specified in Specification D1735.

5.2 The profile strip should be coiled in a continuous length as long as practical, or cut in custom length panels 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/sealant, used should be compatible with the PVC compound and the liner process, so as not to effect the properties of the finished liner. (A polyurethane-base product is suggested.)

#### 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 shall be undertaken in accordance with local, state, or federal safety and confined space entry regulations.

6.1.2 *Cleaning of Pipeline*—Internal debris should be removed from the existing pipeline. Gravity pipes should be cleaned with hydraulically powered equipment, high-velocity jet cleaners, or a combination of these methods and manually directed high-pressure (2500-psi minimum) water blasting to ensure that the exposed pipe wall is free of contamination of foreign materials and corrosion products and the surface is hard, competent original pipe material.

6.1.3 *Inspection of Pipeline*—Inspection of pipeline should be performed by experienced personnel trained in locating breaks, obstacles, and service connections, either by direct visual observation or by closed-circuit television. The interior of the pipeline should be carefully inspected to determine the location of any conditions that may prevent or adversely impact proper installation of the profile liner, such as protruding service taps, collapsed or crushed pipe, significant line sags, and deflected joints. These conditions should be noted, and as appropriate, corrected prior to installation.

6.1.4 *Line Obstructions*—The existing pipeline should be clear of obstructions that will prevent the proper placement of the PVC liner. If inspection reveals an obstruction that cannot be removed by conventional equipment, then a point repair excavation should be made to uncover and remove or repair the obstruction.

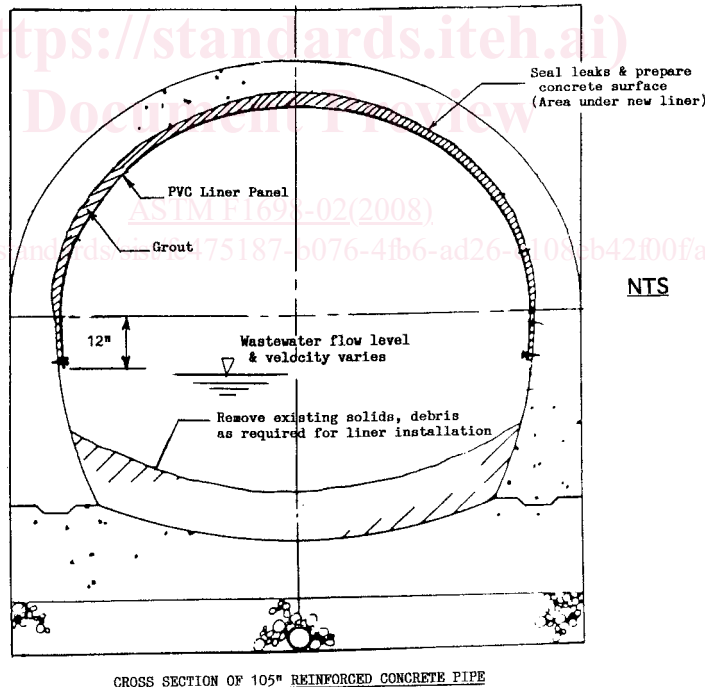
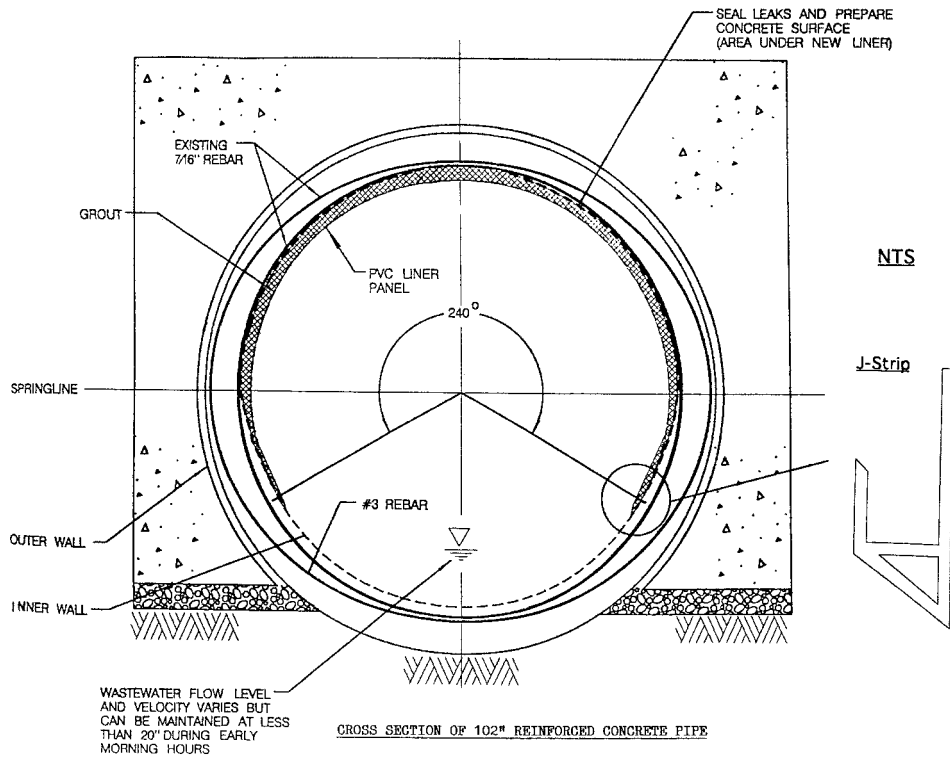


FIG. 2 Typical Installations with Panels

6.2 *Bypassing*—The profiled PVC liner process does not always require a dry pipeline and may be installed with some flow in the existing pipe or lateral connections, or both. If necessary, the bypass should be made by plugging the line at a point upstream of the pipe to be rehabilitated and pumping the flow to a downstream point or adjacent system. The pump and

bypass lines should be of adequate capacity and size to handle any extreme flows expected during the installation period.

6.2.1 Under certain conditions, part or all of the installation may be carried out with some flow in the existing pipeline or service connections, or both.