



Designation: F 1871 – 98<sup>ε1</sup>

## Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation<sup>1</sup>

This standard is issued under the fixed designation F 1871; 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.

<sup>ε1</sup> NOTE—Sections 6.1 and 15.2.3 and Table 1 were editorially updated in July 2002.

### 1. Scope

1.1 This specification covers requirements and test methods for materials, dimensions, workmanship, flattening resistance, impact resistance, pipe stiffness, extrusion quality, and a form of marking for folded/formed poly (vinyl chloride) (PVC) pipe for existing sewer and conduit rehabilitation.

1.2 Pipe produced to this specification is for use in non-pressure sewer and conduit rehabilitation where the folded PVC pipe is installed into and then expanded to provide a close fit to the wall of the original conduit, forming a new structural pipe-within-a-pipe.

NOTE 1—For installation procedures refer to Practice F 1867.

1.3 This specification includes pipe made only from materials specified in Section 6. This specification does not include pipe manufactured from reprocessed, recycled, or reclaimed PVC.

1.4 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are provided for information only.

1.5 The following precautionary statement pertains only to the test method portion, Section 11, of this specification. *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.*

1.6 There is no similar or equivalent ISO Standard.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 618 Practice for Conditioning Plastics for Testing<sup>2</sup>
- D 638 Test Method for Tensile Properties of Plastics<sup>2</sup>
- D 648 Test Method for Deflection Temperature of Plastics Under Flexural Load<sup>2</sup>
- D 790 Test Method for Flexural Properties of Unreinforced

and Reinforced Plastics and Electrical Insulating Materials<sup>2</sup>

D 1600 Terminology for Abbreviated Terms Relating to Plastics<sup>2</sup>

D 1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds<sup>2</sup>

D 2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings<sup>3</sup>

D 2152 Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion<sup>3</sup>

D 2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading<sup>3</sup>

D 2444 Test Method for Determination of Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)<sup>3</sup>

F 412 Terminology Relating to Plastic Piping Systems<sup>3</sup>

F 1057 Practice for Estimating the Quality of Extruded Poly(Vinyl Chloride) (PVC) Pipe by Heat Reversion Technique<sup>3</sup>

F 1867 Practice for Installation of Folded/Formed Poly (Vinyl Chloride) (PVC) Pipe Type A for Existing Sewer and Conduit Rehabilitation<sup>3</sup>

2.2 *Federal Standard:*<sup>4</sup>

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

2.3 *Military Standard:*<sup>4</sup>

MIL-STD-129 Marking for Shipment and Storage

### 3. Terminology

3.1 *Definitions:* Definitions are in accordance with Terminology F 412, and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation for poly(vinyl chloride) plastics is PVC.

3.1.1 The term TYPE A is not an abbreviation, but rather an arbitrary designation for PVC compounds with a minimum value for modulus in tension as listed in 6.1 and a maximum value as defined by cell limit 1 of Specification D 1784.

<sup>1</sup> This standard is under the jurisdiction of 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> *Annual Book of ASTM Standards*, Vol 08.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 08.04.

<sup>4</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

**3.2 Definitions of Terms Specific to This Standard:**

3.2.1 *folded pipe, n*—pipe that has been manufactured and calibrated round, then subsequently cooled and deformed into a folded shape for use in existing sewer and conduit rehabilitation (see Fig. 1).

3.2.2 *formed pipe, n*—A folded pipe that has been inserted into an existing sewer or conduit and expanded with steam heat and pressure, and, if required by the manufacturer, with a squeegee device or similar device to provide a close fit to the existing pipe (see Fig. 1).

3.2.3 *formed field sample, n*—A formed field sample is formed when the folded pipe has been inserted into a mold pipe and expanded with steam heat and pressure, and, if required by the manufacturer, with a squeegee device or similar device to provide a close fit to the mold pipe.

3.2.4 *squeegee or similar device, n*—a device to sequentially heat and expand the folded pipe to provide a close fit to the existing pipe.

**4. Significance and Use**

4.1 This specification 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, depending on specific job conditions to establish a project specification. The manufacturer of the product should be consulted for design and

installation information. Industrial waste disposal lines should be installed only with the specific approval of the cognizant code authority, since chemicals not commonly found in drains and sewers and temperatures in excess of 140°F (60°C) may be encountered.

**5. Applications of Material**

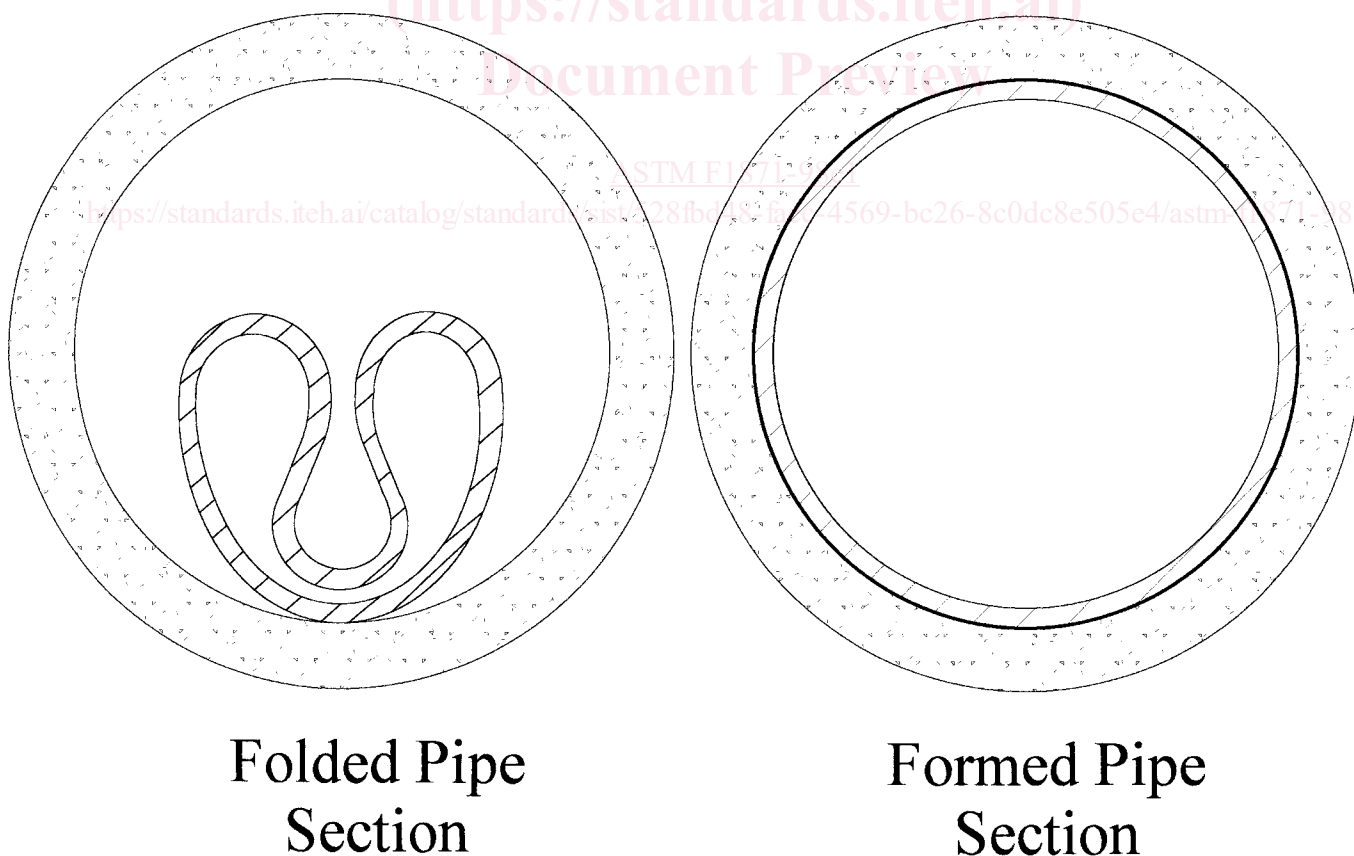
5.1 The nominal folded PVC pipe sizes specified in Section 8 can be obtained for use in a range of original pipe inside diameters. Table 1 presents recommended ranges that are available for each nominal size.

**6. Materials and Manufacture**

6.1 *Basic Materials*—The pipe shall be made from virgin PVC compound meeting all the requirements for cell classification 12111 as defined in Specification D 1784 and with minimum physical properties as listed below:

Tensile Strength	Test Method D 638	3 600 PSI	(25 MPa)
Tensile Modulus	Test Method D 638	155 000 PSI	(1069 MPa)
Flexural Strength	Test Method D 790	4 100 PSI	(28 MPa)
Flexural Modulus	Test Method D 790	145 000 PSI	(1000 MPa)
Heat Deflection	Test Method D 648	115°F	(46°C)
Temperature tested at	(2 MPa)		
		264 psi	

6.1.1 Compounds meeting the above minimum properties that have different cell classifications because one or more properties are greater than those of the specified compounds



NOTE 1—This figure is intended only for clarification of terms specific to this specification, and shows a representative folded pipe shape. Other folded pipe shapes may meet the requirements of this specification.

**FIG. 1 Folded Pipe and Formed Pipe—Clarification of Terms**