



Designation: F1504 – 21^{ε1}

Standard Specification for Folded Poly(Vinyl Chloride) (PVC) Pipe for Existing Sewer and Conduit Rehabilitation¹

This standard is issued under the fixed designation F1504; 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.

^{ε1} NOTE—Table 3 was editorially corrected in August 2022.

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 poly(vinyl chloride) (PVC) pipe for existing sewer and conduit rehabilitation.

1.2 Folded PVC pipe produced to this specification is for use in non-pressure sewer and conduit rehabilitation where the folded PVC pipe is inserted into and then expanded to conform to the wall of the original conduit forming a new pipe-within-a-pipe.

NOTE 1—For installation procedures and engineering design considerations refer to Practice F1947.

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

1.4 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.

1.5 The following precautionary statement pertains to the test method portion only, 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *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 Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- D618 Practice for Conditioning Plastics for Testing
- D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D1784 Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
- F1947 Practice for Installation of Folded Poly(Vinyl Chloride) (PVC) Pipe into Existing Sewers and Conduits
- D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
- D2152 Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
- D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- D2444 Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- F412 Terminology Relating to Plastic Piping Systems
- F1057 Practice for Estimating the Quality of Extruded Poly(Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique

2.2 Federal Standard:³

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

2.3 Military Standard:³

MIL-STD-129 Marking for Shipment and Storage

¹ This specification 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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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 Available from DLA Document Services Building 4/D 700 Robbins Avenue Philadelphia, PA 19111-5094 <http://quicksearch.dla.mil/>

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

3. Terminology

3.1 *General*—Abbreviations used in this specification are in accordance with Terminology D1600 and definitions are in accordance with Terminology F412 unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *folded pipe*—pipe that has been manufactured in a folded shape or that is subsequently folded for use in existing sewer and conduit rehabilitation. See Fig. 1.

3.2.2 *formed pipe*—folded pipe that has been inserted into an existing sewer or conduit and expanded with heat, pressure, and, if applicable, a rounding device to conform to and take the shape of the existing pipe (see Fig. 1).

3.2.3 *rounded pipe sample*—a folded pipe that has been inserted into a pipe mold and expanded with heat and pressure to conform to the mold pipe, intended for testing purposes.

4. Significance and Use

4.1 The requirements of this specification are intended to provide folded pipe suitable for the rehabilitation of existing pipelines and conduits conveying sewage, process flow, and storm water, under non-pressure conditions, through the heating, insertion, and expansion of the folded pipe.

NOTE 2—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) can be encountered.

5. Application of Materials

5.1 The nominal folded pipe sizes specified in Section 8 are applicable for a range of pipe inside diameters.

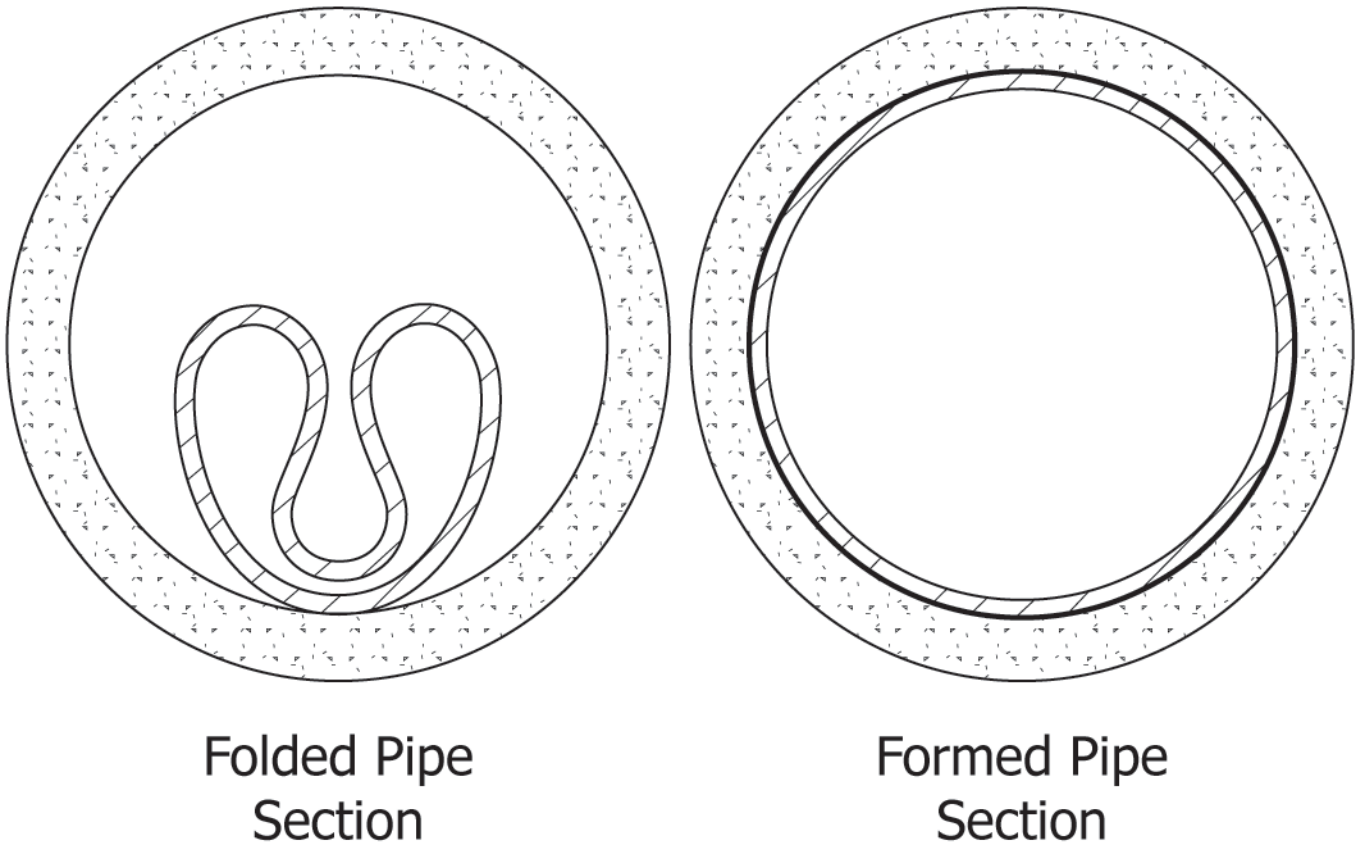
6. Materials and Manufacture

6.1 *Basic Materials*—Folded pipe shall be made from virgin PVC compound meeting all the requirements for cell classifications 12334, 13223, 32334, or 33223 as defined in Specification D1784.

6.2 *Rework Material*—Clean rework material, generated from the manufacturer's own folded PVC pipe production may be used by the same manufacturer provided that the rework material meets the requirements of 6.1 and that the folded pipe produced meets all the requirements of this specification. Reworked material of intermixed cell classifications shall be labeled as the minimum cell classification of this specification and labeled in accordance with 15.1.3.1. Reworked material containing any copolymer materials shall be labeled as copolymer material.

7. Other Requirements

7.1 *Pipe Flattening*—There shall be no evidence of splitting, cracking, or breaking when the rounded pipe sample is tested in accordance with 11.3.



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

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