



Standard Specification for Manufacture and Joining of Polyethylene (PE) Gas Pressure Pipe With a Peelable Polypropylene (PP) Outer Layer¹

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1. Scope

1.1 This standard specification covers manufacturing and joining requirements for peelable (skinned) polyethylene (PE) pipe, which is PE pipe meeting the requirements of Specification **D2513**, with a peelable outer layer of polypropylene (PP). These requirements are in addition to those in Specification **D2513** for the PE pipe.

1.2 The peelable PP layer does not contribute to outside diameter and wall thickness used for pressure rating or tensile loading calculations.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in figures and tables) shall not be considered as requirements of the standard.

1.4 *Units*—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 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1600 Terminology for Abbreviated Terms Relating to Plastics

D2513 Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings

D4101 Specification for Polypropylene Injection and Extrusion Materials

F412 Terminology Relating to Plastic Piping Systems

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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.

F1055 Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing

F1563 Specification for Tools to Squeeze-off Polyethylene (PE) Gas Pipe or Tubing

2.2 *ISO Standard:*³

ISO 17454 Plastics piping systems - multilayer pipe - test method for the adhesion of the different layers using a pulling rig.

2.3 *EN Standard:*⁴

EN 1411 - Plastics piping and ducting systems – Thermoplastics pipes – determination of resistance to external blows by the staircase method.

3. Terminology

3.1 *Definitions*—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 *Peelable pipe, n*—Specification **D2513** polyethylene (PE) pipe coextruded with a peelable outer layer of polypropylene (PP). When the peelable PP layer is removed, the PE pipe is the same as **D2513** PE pipe.

4. PE Pipe and PP Layer Requirements

4.1 *PE Pipe Requirements:*

4.1.1 The PE pipe shall meet all the requirements of Specification **D2513**, excluding marking, when tested in accordance with **6.1**. Marking shall be in accordance with Section **7**.

4.2 *PP Layer Requirements:*

4.2.1 The PP peelable layer shall be made from unreinforced PP material in accordance with Specification **D4101**. Any unreinforced PP material may be used as long as the peelable pipe meets the peel force and impact test requirements in **4.2.2** and **4.2.3**.

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, <http://www.iso.ch>.

⁴ Available from European Committee for Standardization (CEN), 36 rue de Stassart, B-1050, Brussels, Belgium, <http://www.cenorm.be>.

4.2.2 The PP peelable layer shall be partially bonded to the PE pipe during the co-extrusion process. The peel test force shall be in the range 2.3 lbs/in to 11.5 lbs/in (0.3N/mm to 1.5N/mm) when measured at 73°F (23°C) in accordance with 6.2. This peel force demonstrates that the outer peelable layer does not adhere to the PE pipe. The pipe manufacturer shall provide peel force data at other temperatures, when the need arises.

4.2.3 The co-extruded peelable pipe shall have an impact test value of at least 185 ft-lbs (250J) when testing in accordance with 6.3 at 15°F (-10°C). The impact energy value for this test assures that the proper type of PP material is used for the peelable layer.

4.2.4 The PP peelable layer wall thickness shall meet the dimensions specified in Table 1.

NOTE 1—The peelable layer wall thickness is not used for pressure rating calculations.

4.2.5 The color of the PP peelable layer shall be yellow with a minimum of four equally spaced brown stripes to identify the pipe as peelable pipe.

5. Peelable Pipe Requirements

5.1 *Squeeze-Off*—The peelable pipe manufacturer shall qualify squeeze-off of peelable pipe per Specification D2513 using squeeze tools meeting Specification F1563. The same gap stops appropriate for the standard PE pipe DR shall be used, and the same squeeze-off procedures for PE pipe per the requirements in Specification D2513 shall be followed.

5.2 *Outdoor Storage*—The peelable PP layer shall protect the PE pipe from UV radiation to provide outdoor storage of peelable pipe for up to five years from date of manufacture. The peelable pipe shall be capped on both ends.

5.3 *Rework*—There shall be no rework used in the manufacture of peelable pipe.

6. Test Methods

6.1 *PE Pipe Testing*—To determine conformance to Specification D2513, the PE pipe shall be tested exclusive of the co-extruded PP peelable layer.

6.2 *PA Peel Force*—the peel force test shall be in accordance with ISO 17454.

6.3 *Impact test*—the impact test shall be in accordance with EN 1411.

7. Marking

7.1 Marking shall be applied to the co-extruded peelable layer and shall conform to the marking requirements of Specification D2513, except that peelable pipe made according to this standard specification shall be marked ASTM F2830.

7.2 The PE pipe is not marked.

7.3 The marking shall include the words “Peelable Pipe” to indicate this is peelable pipe.

8. Joining

8.1 For all joining methods (butt fusion, saddle fusion, socket fusion, electrofusion and mechanical fittings), the PP peelable layer shall be removed immediately before joining using only a cutting tool prescribed by the pipe manufacturer. This cutting tool is designed to safely remove the peelable layer without damaging the PE pipe. After removing the peelable layer, the PE pipe is joined immediately using ASTM D2513 PE pipe standard joining procedures as recommended by the respective manufacturer.

NOTE 2—After removing the peelable layer, the PE pipe should not be contaminated prior to joining.

8.2 The PP layer shall be peeled back sufficiently so that there is no interference with the recommended joining procedure.

8.3 Electrofusion joints do not require scraping since the PE layer is clean after removal of the PP peelable layer. To assure electrofusion joint integrity using peeled PE pipe that has not been scraped, the PE pipe and peelable PP layer shall not have release agents, lubricants, or other additives that will exude to the surface, and negatively affect the integrity of the electrofusion joints. An electrofusion joint made on non-scraped peeled pipe and evaluated per Specification F1055 to ensure a good quality joint without scraping shall demonstrate this.

9. Keywords

9.1 peelable; skinned; pipe; polyethylene; polypropylene

TABLE 1 Peelable Layer Wall Thickness

PE Nominal Pipe Size	Peelable Layer Wall Thickness
4 IPS and smaller	0.015 in. – 0.035 in. (0.4 mm to 0.9 mm)
6 IPS	0.023 in. – 0.04 in. (0.6 mm to 1.0 mm)
8 IPS and 10 IPS	0.03 in. – 0.045 in. (0.75 mm to 1.15 mm)
12 IPS	0.033 in. – 0.05 in. (0.85 mm to 1.3 mm)

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