



Standard Practice for Design of High-Density Polyethylene (HDPE) Manholes for Subsurface Applications¹

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1. Scope

1.1 This specification covers general and basic procedures related to the design of manholes and components manufactured from high-density polyethylene (HDPE) for use in subsurface applications and applies to personnel access structures. The practice covers the material, the structural design requirements of the manhole barrel (also called vertical riser or shaft), floor (bottom), and top, and joints between shaft sections.

1.2 This practice offers the minimum requirements for the proper design of an HDPE manhole. Due to the variability in manhole height, diameter, and the soil each manhole must be designed and detailed individually. When properly used and implemented, this practice can help ensure a safe and reliable structure for the industry.

1.3 *Disclaimer*—The reader is cautioned that independent professional judgment must be exercised when data or recommendations set forth in this practice are applied. The publication of the material contained herein is not intended as a representation or warranty on the part of ASTM that this information is suitable for general or particular use, or freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability arising from such use. The design of structures is within the scope of expertise of a licensed architect, structural engineer, or other licensed professional for the application of principles to a particular structure.

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 *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:

¹ This specification is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.26 on Olefin Based Pipe.

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D 653 Terminology Relating to Soil, Rock, and Contained Fluids²

D 1600 Terminology for Abbreviated Terms Relating to Plastics³

D 2321 Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications⁴

D 2657 Practice for Heat Joining of Polyolefin Pipe and Fittings⁴

D 2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials⁴

D 3035 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter⁴

D 3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals⁴

D 3350 Specification for Polyethylene Plastics Pipe and Fittings Materials⁴

F 412 Terminology Relating to Plastic Piping Systems⁴

F 477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe⁴

F 714 Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter⁴

F 894 Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe⁴

3. Terminology

3.1 Definitions:

3.1.1 Definitions used in this practice are in accordance with Terminology F 412 and Terminology D 1600 unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *anchor connection ring*—an HDPE ring attached to the manhole riser on which to place an antifloatation device, such as a concrete anchor ring.

3.2.2 *arching*—mobilization of internal shear resistance within a soil mass that results in a change in soil pressure acting on an underground structure.

² *Annual Book of ASTM Standards*, Vol 04.08.

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 08.04.