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Polyethylene Pipe Used for Microirrigation Laterals



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Developed by the Drip Irrigation Tubing Standards Committee of The Irrigation Association and the ASAE Subsurface and Trickle Irrigation Committee; approved by the ASAE Soil and Water Division Standards Committee; adopted by ASAE December 1985; reconfirmed December 1990; revised editorially and reconfirmed December 1991; reaffirmed December 1996, December 1997, December 1998, December 1999; revised editorially February 2000; reaffirmed January 2001, December 2001, February 2003, February 2004, February 2009, November 2013; revised January 2015.

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1 Purpose and Scope

This standard covers requirements and methods for testing of polyethylene (PE) materials as well as pipe or tubing made from those materials for drip irrigation. The standard covers classification, nomenclature, test requirements and methods, workmanship, dimensions and methods of marking.

2 References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D618, *Standard Practice for Conditioning Plastics for Testing*

ASTM D883, *Standard Terminology Relating to Plastics*

ASTM D1599, *Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings*

ASTM D1600, *Standard Terminology for Abbreviated Terms Relating to Plastics*

ASTM D1603, *Standard Test Method for Carbon Black Content in Olefin Plastics*

ASTM D2122, *Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings*

ASTM D2837, *Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products*

ASTM D3350, *Standard Specification for Polyethylene Plastics Pipe and Fittings Materials*

ASTM F412, *Standard Terminology Relating to Plastic Piping Systems*

ISO 18553, *Method for the assessment of the degree of pigment or carbon black dispersion in polyolefin pipes, fittings and compounds*



3 Definitions

3.1 General. Definitions are in accordance with ASTM D883 and ASTM F412. Abbreviations are in accordance with ASTM D1600. The latest approved editions apply.

3.2 design factor (DF): A number less than 1.00 (which takes into consideration all the variables and degree of safety involved in a thermoplastic pressure piping installation) which is multiplied by the Hydrostatic Design Basis (HDB) to give the Hydrostatic Design Stress (HDS). The design factor for PE pipe and tubing in water service is equal to 0.5.

3.3 hoop stress: The tensile stress in the wall of the pipe in the circumferential orientation due to internal hydrostatic pressure.

3.4 relation between hoop stress and pressure in the pipe:

For controlled outside diameter (OD) pipe or tubing:

$$p = \frac{2S}{SDR - 1}$$

For controlled inside diameter (ID) pipe or tubing:

$$p = \frac{2S}{SIDR + 1}$$

S = hoop stress, kPa (psi)

p = pressure in the pipe, kPa (psi)

SDR = diameter ratio for OD controlled pipe

= average OD/ minimum wall thickness

$SIDR$ = diameter ratio for ID controlled pipe

= average ID/ minimum wall thickness

3.5 thermoplastic pipe standard dimension ratio (SDR) and standard internal dimension ratio (SIDR):

For outside diameter controlled pipe:

$$SDR = \frac{OD}{t}$$

For inside diameter controlled pipe:

$$SIDR = \frac{ID}{t}$$

OD = average outside diameter, mm (in.)

ID = average inside diameter, mm (in.)

t = minimum wall thickness, mm (in.)

The SDR and SIDR values should be rounded off to the nearest tenth (0.1)

3.6 failure under hydrostatic pressure: Bursting, cracking, splitting, or weeping (seepage of liquid) of the pipe during test.