



Designation: D4635 – 16

Standard Specification for Plastic Films Made from Low-Density Polyethylene and Linear Low-Density Polyethylene for General Use and Packaging Applications¹

This standard is issued under the fixed designation D4635; 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.

1. Scope*

1.1 This specification covers unpigmented, unsupported, low-density polyethylene and linear low-density polyethylene films (hereafter referred to as film or films) with densities ranging from 0.910-0.925 g/cm³ per Specification D4976.

NOTE 1—The density of a film will not necessarily be equal to the density of a molded plaque from the same resin.

NOTE 2—Blends of ethylene/vinyl acetate (EVA) with low-density polyethylene may have densities up to 0.929 g/cm³.

1.2 This specification is applicable to homopolymer polyethylene, but is not restricted to it. It is applicable to films made from polyethylene copolymers, and also applicable to films made from blends of homopolymers and copolymers, including ethylene/vinyl acetate copolymers.

1.3 The thickness of the films covered by this specification is 101.6 μ m or less (0.004 in. or less), inclusive. The maximum width of the sheet or layflat is 3.30 m (130 in.).

1.4 This specification does not cover oriented heat-shrinkable films.

1.5 This specification allows for the use of recycled polyethylene film or resin as feedstock, in whole or in part, as long as all of the requirements of this specification are met and as long as any specific requirements as governed by the producer and end user are also met. (See Note 3.)

NOTE 3—Guide D7209 describes terminology and definitions related to recycled plastics.

1.6 This specification defines the levels of the various physical properties from which specifications for specific films may be described. The levels of physical properties required by a film for a given application are selected from Section 6. However, Sections 2 – 5 relating to tolerances shall apply without change to all film falling within the scope indicated by the title and 1.1 – 1.4.

¹ This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.19 on Film, Sheeting, and Molded Products.

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1.7 This specification covers dimensional tolerances, classifications, intrinsic quality requirements, and test methods. The dimensional tolerances include thickness, width, and length or yield. Classification defines types, classes, surfaces, and finishes. The intrinsic quality requirements include density, workmanship, tensile strength, heat sealability, and odor, as well as the classification properties for impact strength, coefficient of friction, optical properties, and surface treatment. A sampling method is included.

1.8 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.9 The following precautionary caveat pertains only to the test methods portion, Section 10, 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.*

NOTE 4—There is no known ISO equivalent to this standard.

2. Referenced Documents

2.1 ASTM Standards:²

- D618 Practice for Conditioning Plastics for Testing
- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D882 Test Method for Tensile Properties of Thin Plastic Sheeting
- D883 Terminology Relating to Plastics
- D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics
- D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- D1505 Test Method for Density of Plastics by the Density-Gradient Technique

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.

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

- D1709 Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method
- D1894 Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting
- D1922 Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method
- D1938 Test Method for Tear-Propagation Resistance (Trouser Tear) of Plastic Film and Thin Sheeting by a Single-Tear Method
- D2103 Specification for Polyethylene Film and Sheeting
- D2457 Test Method for Specular Gloss of Plastic Films and Solid Plastics
- D2578 Test Method for Wetting Tension of Polyethylene and Polypropylene Films
- D4321 Test Method for Package Yield of Plastic Film
- D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets
- D4976 Specification for Polyethylene Plastics Molding and Extrusion Materials
- D6988 Guide for Determination of Thickness of Plastic Film Test Specimens
- D7209 Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products (Withdrawn 2015)³
- E96/E96M Test Methods for Water Vapor Transmission of Materials
- E1870 Test Method for Odor and Taste Transfer from Polymeric Packaging Film
- F1249 Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
- F88 Test Method for Seal Strength of Flexible Barrier Materials

NOTE 5—If this product is intended for packaging foods, medicines, drugs, and cosmetics, it is subject to applicable regulations of the Food and Drug Administration or the Department of Agriculture and must comply with such regulations. If it is necessary to comply with regulations of other government agencies, such as the Consumer Product Safety Commission, Environmental Protection Agency, Department of Transportation, Federal Trade Commission, or others, such compliance should be arranged between the buyer and the seller prior to placing an order.

3. Terminology

3.1 *Definitions*—Unless otherwise indicated, the terminology used in this specification is in accordance with Terminology D883.

4. Classification

4.1 The low-density polyethylene film is, by this specification, classified by Types 1, 2, and 3; Surfaces 1, 2, and 3; Classes 1, 2, 3, and 4; and Finishes 1, 2, 3, and 4. These classifications are described in detail in 6.1.

5. Materials

5.1 The film shall be made from an ethylene homopolymer, ethylene copolymers, or blends of homopolymers or

copolymers, or homopolymer and copolymer, so that it meets the density and other film requirements listed herein.

5.2 The film shall be made from resins having densities between 0.910 and 0.925 g/cm³ (910.0 and 925.0 kg/m³), inclusive. This is the range of standard densities in the definition of low-density polyethylene (see Terminology D883). Standard density refers to the density of the material molded to a thickness of 1.9 mm (0.075 in.) using Procedure C of Annex A1 of Practice D4703 (see Note 1).

5.3 The film shall be natural in color (essentially colorless).

6. Physical Requirements

6.1 Classification Properties:

6.1.1 *Type*—The dart drop impact for all thickness of film shall be as specified in Table 1 for Types 1, 2, and 3.

6.1.2 *Surface*—The kinetic coefficient of friction shall be as specified in Table 2 for Surfaces 1, 2, and 3.

6.1.3 *Class*—The optical properties shall be as specified in Table 3 for Classes 1, 2, and 3. The optical properties of gloss and haze do not always correlate. The particular property of most importance for the specific application shall be established, and the value for this property shall then govern in case of any inconsistency.

6.1.4 *Finish*—The surface treatment level of the film shall be as specified in Table 4 for Finishes 1, 2, 3, and 4.

6.2 Other Properties:

6.2.1 *Tensile Properties*—The tensile strength and elongation at break for all thicknesses shall be as specified in Table 5.

6.2.2 *Heat Sealability*—The minimum ratio of heat-seal strength to the film strength in the two principal directions shall be as specified in Table 6.

6.2.3 *Odor*—The odor level of the film shall average no more than a 3.5 rating level.

7. Dimensions

7.1 *Size*—The nominal thickness, width, length per roll or roll diameter, and yield of the film shall be established by mutual agreement between the purchaser and the supplier.

7.2 *Thickness Tolerance*—The thickness variation across the film shall be within the tolerances given in Table 7.

7.3 *Width Tolerance*—The width shall be within the tolerances given in Table 8.

7.4 *Yield Tolerance*—The deviation of the actual yield from nominal yield shall be within the tolerances given in Table 9.

TABLE 1 Classification for Type

Film Thickness		Drop Dart (g, min) ^a		
		Type 1	Type 2	Type 3
<25.4 μm	(<0.001 in.)	not specified	not specified	not specified
25.4 μm	(0.001 in.)	40	75	105
38 μm	(0.0015 in.)	65	105	140
51 μm	(0.002 in.)	85	135	175
76.2 μm	(0.003 in.)	125	195	245
101.6 μm	(0.004 in.)	165	255	315

^a Impact limits for thickness not covered in this table will be determined by linear interpolation between successive values in this table.

³ The last approved version of this historical standard is referenced on www.astm.org.