



Designation: D 4801 – 05

Standard Specification for Polyethylene Sheeting in Thickness of 0.25 mm [0.010 in.] and Greater¹

This standard is issued under the fixed designation D 4801; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers requirements for extruded- and compression-molded sheeting made from low-, medium- and high-density polyethylenes and copolymers in thickness of 0.25 mm [0.010 in.] and greater. Sheeting conforming to this specification is intended for use in the thinner gages principally for chemical tank linings, spacers in electrical equipment, and for thermoforming into such items as trays, pallets, and shipping containers. The thicker gages are used principally as machine-shop stock.

1.2 Polyethylene materials, being thermoplastics, are reprocessible and recyclable (see Guide D 5033). This specification allows for the use of those polyethylene plastic materials, provided that any specific requirements as governed by the producer and end user are met.

1.3 The values stated in SI units are to be regarded as standard. The values given in brackets are for information only.

1.4 The following precautionary caveat pertains only to the test methods portion, 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 and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no similar or equivalent ISO standard.

2. Referenced Documents

2.1 ASTM Standards:²

D 374 Test Methods for Thickness of Solid Electrical Insulation

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

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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.

- D 618 Practice for Conditioning Plastics for Testing
- D 638 Test Method for Tensile Properties of Plastics
- D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D 883 Terminology Relating to Plastics
- D 1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
- D 1248 Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- D 1505 Test Method for Density of Plastics by the Density-Gradient Technique
- D 2103 Specification for Polyethylene Film and Sheeting
- D 3892 Practice for Packaging/Packing of Plastics
- D 5033 Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics
- 2.2 *Military Standard:*³
 - MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes
- 2.3 *Federal Standard:*³
 - Fed. Std. No. 406, Plastics: Methods of Testing (Method 6051, Warpage)
- 2.4 *Federal Specification:*³
 - L-P-390C-Plastic, Molding and Extrusion Material, Polyethylene and Copolymers (Low, Medium, and High Density)

3. Terminology

3.1 *Definitions:* Unless otherwise indicated, the terminology used in this specification is in accordance with Terminology D 883.

4. Classification

4.1 The polyethylene sheeting in accordance with this specification is classified by special types as follows:

- 4.1.1 *Type I*—General purpose, natural and colors.
- 4.1.2 *Type II*—Dielectric, natural and colors.

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

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

4.1.3 *Type III*—Weather-resistant, black.

5. Ordering Information

5.1 Users should select the preferred options permitted herein and include the following information in the purchase contract.

5.1.1 Title, number, and date of this specification.

5.1.2 Classification in accordance with Specification **D 1248** (Tables 4A, Tables 4B, and Tables 4C) of the material to be used to manufacture the sheet (see 6.1).

5.1.3 Length and width of sheets (see 7.5 and 7.6).

5.1.4 Thickness of sheets (see 7.5).

5.1.5 Color (see 7.7).

5.1.6 Requirements for packaging, packing, and marking (see 13.1).

6. Materials and Manufacture

6.1 *Materials*—The sheeting shall be manufactured from polyethylene thermoplastic material of the special grade specified in 5.1.2. The supplier shall furnish, for the material used, data for the classification properties.

6.2 *Manufacture*—Sheeting shall be formed by extrusion molding and roll polishing, or compression molding.

7. Detail Requirements

7.1 *Form*—The sheeting shall be furnished flat or in rolls in the dimensions specified.

7.2 *Tensile Strength and Elongation*—Sheeting having a thickness of 3.2 mm [0.125 in.] and under shall have tensile strength and elongation not less than 90 % of the values specified in Specification **D 1248** (Tables 4A, Tables 4B, and Tables 4C) for the applicable type and grade. Sheetting greater than 3.2 mm [0.125 in.] in thickness shall meet the tensile strength and elongation requirements of Specification **D 1248**. The type, class, and grade requirements for Fed. Spec. L-P-390C are included in the tables in Specification **D 1248**.

7.3 *Shrinkage*—The sheeting, when tested as specified in 11.3, shall conform to the requirements as determined between the user and the supplier.

7.4 *Warp and Twist*—The sheeting, when tested as specified in 11.4, shall conform to the requirements as determined between the user and the supplier.

7.5 *Dimensions*—Sheeting shall be supplied in the width, length (or weight), and thickness as specified between the user and the supplier, except a maximum of 4 % of the sheet in a shipment may be trimmed 55-mm [2-in.] undersize or half-size. Such trimmed sheet shall be packed separately from full-sized sheet. The thickness shall be tested according to 11.5. Thickness tolerances are shown in **Table 1**.

7.6 *Length or Weight and Diameter of Rolls*—Sheeting in rolls shall be supplied with either the length or weight specified, except that one roll in a shipment may have the lesser

length or weight required to make the total length or weight of the shipment equal to the quantity ordered. The diameter of the roll may be specified.

7.7 *Color*—The sheeting shall be of the color specified by the user.

7.8 *Grade*—The sheeting shall be of the grade specified by the user.

7.9 *Workmanship*—The sheeting shall have a smooth finish and shall be free of cracks, blisters, bubbles, discolorations, craze, surface scratches that form definite indentations, and other defects that could affect appearance or serviceability.

7.9.1 *Dimensional Defects*—The sheeting shall show none of the defects described in **Table 2**.

7.9.2 *Defects in Color, Appearance, and Workmanship*—The sheeting shall show none of the defects described in **Table 3**.

8. Sampling

8.1 Unless otherwise agreed upon between the user and the supplier, the materials shall be sampled in accordance with the sampling procedure prescribed in Practice D 1898. Adequate statistical sampling shall be considered an acceptable alternative. A lot of material shall be considered as a unit of manufacture as prepared for shipment, and may consist of a blend of two or more production runs or batches.

9. Testing

9.1 Test the sheeting for the applicable characteristics listed in 7.2, 7.3, and 7.4 and **Table 1** and **Table 2** in accordance with the test methods specified herein, for each lot submitted for inspection.

10. Conditioning

10.1 Condition the test specimens at $23 \pm 2^\circ\text{C}$ [$73.4 \pm 3.6^\circ\text{F}$] and $50 \pm 5\%$ relative humidity for not less than 40 h prior to testing in accordance with Procedure A of Practice **D 618**.

11. Test Methods

11.1 Conduct tests at $23 \pm 2^\circ\text{C}$ [$73.4 \pm 3.6^\circ\text{F}$] and $50 \pm 5\%$ relative humidity.

TABLE 2 Examination of the Sheeting for Defects in Dimensions

Examine	Defects
Length and width (sheet)	not of the length and width specified varies by more than +3.2, -0 mm [$+\frac{1}{8}$, -0 in.] varies by more than ± 13 mm [$\pm \frac{1}{2}$ in.] from true rectangles
Width (sheeting)	not of the width specified varies by more than +13, -0 mm [$+\frac{1}{2}$, -0 in.]
Length or weight of rolls (sheeting)	not of the length or weight specified varies by more than +3, -1 %
Diameter of rolls (sheeting) Cores (sheeting)	not of the diameter specified not having lengths equal to the nominal width of the sheeting, +13, -0 mm [$+\frac{1}{2}$, -0 in.] not having inside diameters as specified varies by more than +3.2, -0 mm [$+\frac{1}{8}$, -0 in.] for a 76-mm [3-in.] diameter hole unless otherwise specified

TABLE 1 Thickness Tolerances

Nominal Thickness, mm [in.]	Thickness Tolerance, Percent of Nominal
0.254 to 1.78 [0.010 to 0.070], incl	± 10
Greater than 1.78 [0.070]	± 5