



# Standard Classification for Recycled Post-Consumer Polyethylene Film Sources for Molding and Extrusion Materials<sup>1</sup>

This standard is issued under the fixed designation D 5491; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This document provides for the classification of post-consumer polyethylene (PE) film derived from specific sources. It also identifies characteristics that the user and supplier can agree upon in determining the acceptability of the film for recycling into molding and extrusion materials. It is neither the intent nor the purpose of this classification to specify the suitability of the recycled material for specific applications.

1.2 This classification provides that the source of the material be listed as an aid in identification. The separation by source also improves the usefulness of the material. Sources are post-consumer PE films from shrink wrap, dry cleaning film, merchandise bags, grocery sacks, stretch wrap, recycle bags, redemption bags, bubble packaging film, and commercial/industrial liners/bags and overwrap. Other post-consumer PE films may be added to this classification when such material streams are defined.

1.3 It is not the function of this classification to provide data for specific product design or process-performance purposes.

1.4 The supplier shall provide a written certification with each shipment stating that the material is derived from post-consumer PE film sources described within this classification.

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

NOTE 1—There are no equivalent ISO standards.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D 883 Terminology Relating to Plastics

D 1600 Terminology of Abbreviated Terms Relating to Plastics

<sup>1</sup> This classification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

D 5033 Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics

## 3. Terminology

3.1 *Definitions*—the definitions used in this classification are in accordance with Terminology D 883 and Guide D 5033.

### 3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *bubble packaging film, n*—clear or tinted LDPE or LLDPE film with little or no print, used to cushion or to protect surfaces, or both, and which may contain a barrier resin or tie layers, or both.

3.2.2 *commercial/industrial liners/bag, n*—clear LDPE, LLDPE, or MDPE film with light or no print, used for the shipment of industrial parts, mattresses or textile products, dry nonputrescible foods, nonhazardous chemicals, etc.

3.2.3 *commercial overwrap, n*—clear LDPE, LLDPE, or MDPE film with light or no print, used to cover finished products such as carpeting, furniture, yarn, and other intermediate or retail items during shipment to the distribution outlet or final consumer.

3.2.4 *dry-cleaning film, n*—clear or pigmented film made from LDPE, LLDPE, or their blends, with light or no print, used as the outer protective wrap by dry-cleaning establishments.

3.2.5 *grocery sacks, n*—pigmented or unpigmented blends of polyethylene with or without print, used to carry groceries from a food market.

3.2.6 *merchandise bags, n*—pigmented LDPE, LLDPE, MDPE, HDPE, or a combination of these resin types, with print, used to carry dry goods from a retailer.

3.2.7 *nominal density, n*—the density of the unpigmented polyethylene resin, which may differ from the apparent density of the material due to the addition of fillers or pigments to the resin.

3.2.8 *recycle bags, n*—blue tinted LLDPE or LDPE film with light or no print, used to transport items to a recycling facility.

3.2.9 *redemption bags, n*—clear or tinted LLDPE or LDPE film with little or no print, used to transport beverage bottles and cans to a recycler in a “bottle bill” state where beverage containers require a refundable deposit upon purchase.

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

3.2.10 *shrink wrap, n*—pigmented or unpigmented film made from LDPE, LLDPE, or their blends, clear or pigmented, with light or no print, that is typically used to unitize an item or items for stability.

3.2.11 *source, n*—the original end use of the PE materials described in this specification.

3.2.12 *stretch wrap, n*—clear or tinted LLDPE film, with no print, used to unitize an item or items for stability and which may include a tackifier.

#### 4. Significance and Use

4.1 This classification identifies sources of PE film. The separation by sources also improves the usefulness of the material. Sources are post-consumer PE films from shrink wrap, dry cleaning film, merchandise bags, grocery sacks, stretch wrap, recycle bags, redemption bags, bubble packaging film, commercial/industrial liners/bags, and commercial over-wrap.

4.2 This classification is intended for use by the following:

4.2.1 Persons/organizations who collect or separate film, or both, as feedstock for recycling.

4.2.2 Persons/organizations who reprocess film into a raw material for molding and extrusion materials.

4.3 It is neither the intent nor the purpose of this classification to specify the suitability of the recycled material for specific applications.

#### 5. Basis of Classification

5.1 The basis of classification is solely by source.

5.1.1 *Shrink Wrap*—Pigmented or unpigmented film made from LDPE, LLDPE, or their blends, clear or pigmented, with light or no print, that is typically used to unitize an item or items for stability.

5.1.2 *Dry-Cleaning Film*—Clear or pigmented film made from LDPE, LLDPE, or their blends, with light or no print, used as the outer protective wrap by dry-cleaning establishments.

5.1.3 *Merchandise Bags*—Pigmented LDPE, LLDPE, MDPE, HDPE or a combination of these resin types, with print, used to carry dry goods from a retailer.

5.1.4 *Grocery Sacks*—Pigmented or unpigmented blends of polyethylene with or without print, used to carry groceries from a food market.

5.1.5 *Stretch Wrap*—Clear or tinted LLDPE film, with no print, used to unitize an item or items for stability and which may include a tackifier.

5.1.6 *Recycle Bags*—Blue tinted LLDPE or LDPE film with little or no print, used to transport items to a recycling facility.

5.1.7 *Redemption Bags*—Clear or tinted LLDPE or LDPE film with little or no print, used to transport beverage bottles and cans to a recycler in a “bottle bill” state where beverage containers require a refundable deposit upon purchase.

5.1.8 *Bubble Packaging Film*—Clear or tinted LDPE or LLDPE film with little or no print, used to cushion or to protect surfaces, or both, and which may contain a barrier resin or tie layers, or both.

5.1.9 *Commercial/Industrial Liners/Bags*—Clear LDPE, LLDPE, or MDPE film with light or no print, used for the shipment of industrial parts, mattresses or textile products, dry nonputrescible foods, nonhazardous chemicals, etc.

5.1.10 *Commercial Overwrap*—Clear LDPE, LLDPE, or MDPE film with light or no print, used to cover finished products such as carpeting, furniture, yarn, and other intermediate or retail items during shipment to the distribution outlet or final consumer.

#### 6. Ordering Information

6.1 The purchase order or inquiry for these recycled post-consumer PE materials shall state this ASTM specification number, year of issue, and source.

6.2 Further definition as may be required for the sources listed in 5.1 shall be by agreement between user and supplier.

#### 7. Contamination (Note 2)

7.1 Contamination by non-polymeric materials, non-polyethylene films, and non-film plastics shall not exceed 2 % by weight and must be identified by type.

7.2 Shipments shall be essentially free (see Note 3) from dirt, mud, stones, grease, glass, metals, and paper.

7.3 Materials contaminated with agricultural chemicals, hazardous materials, flammable liquids, and medical wastes are prohibited.

7.4 All polymeric materials that present a health or safety hazard, or both, due to their decomposition products at polyethylene processing conditions are prohibited.

7.5 The material shall be free of any free-flowing liquid.

7.6 The plastic shall not have visible evidence of damage by ultraviolet exposure, that is embrittled, flaky film.

NOTE 2—It is recognized that some contaminants may result in an odor being present in the recycled material. The acceptability of the type and level of odor shall be as agreed upon between the user and supplier. Methods to evaluate odors in recycled materials are being developed elsewhere in the plastics industry.

NOTE 3—It is recognized that despite all efforts to completely prevent the presence of contamination, some may be contained within a shipment. The term “essentially free” shall mean film that has been inspected and is as free of contamination as would be acceptable by use of good commercial practice with use of reasonable care in collecting and packing film for accumulation and shipment.

#### 8. Inspection and Certification

8.1 The supplier shall provide a written certification with each shipment that the material is derived from post-consumer sources. The source of these materials, as specified in 5.1, shall also be identified in the certification.

8.2 Certification shall be that the material is in accordance with this classification and meets the contamination requirements of Section 7.

#### 9. Keywords

9.1 plastic films; polyethylene; post-consumer material; recovered material; recycled

## SUMMARY OF CHANGES

This section identifies the location of selected changes to this classification. For the convenience of the user, Committee D20 has highlighted those changes that may impact the use of this classification. This section may also include descriptions of the changes or reasons for the changes, or both.

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| <i>D 5491 – 03:</i>   | (1) Revised 3.1 and deleted all definitions. |
| (1) Added reference to non-polyethylene films in paragraph 7.1. | (2) Revised 3.2.7— <i>nominal density</i> .  |
| <i>D 5491 – 98:</i>   | (3) Specified <i>commercial overwrap</i> .   |

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