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An American National Standard

Standard Guide for Development of ASTM Standards Relating to the Proper Recycling and Use of Recycled Plastics[1]

This standard is issued under the fixed designation D 5033; 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] This guide is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.95 on Recycled Plastics.

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1. Scope*

1.1 This guide provides information for the development of ASTM standards (guides, practices, terminology, test methods, and specifications) relating to recycling and the proper use of recycled plastics.

1.2 This guide is directed to the development of useful consumer, commercial, and industrial products made in whole or in part with recycled plastic feedstocks plastics or discarded recovered plastic products.

1.3 This guide addresses the important issues of terminology, overall quality and control of quality, performance standards, identification specifications and labeling of generic classes of polymers, identification and removal of contaminate, their revisions, quality assurance, separation or segregation of products by classes, identification and labeling of generic classes of polymers, contaminants, fillers, designing for recycling, degradable plastics, and certification and percentages of recycled plastics.

1.4 This guide does not address general parameters or factors involving the original manufacture of virgin polymers or the fabrication of consumer products from these virgin polymers.

1.5 *This standard does not purport to address the safety problems 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 equivalent ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics[2]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 1972 Practice for Generic Marking of Plastic Products[2]

D 5577 Guide for Techniques to Separate and Identify Contaminants in Recycled Plastics[3]

2.2 *U.S. Federal Trade Commission Document:*

16 CFR Part 260 Guides for the Use of Environmental Marketing Claims[4]

3. Terminology

3.1 *Definitions:*

3.1.1 *commingleddegradable plastic*, *n*—a plastic designed to undergo a significant change in its chemixcal structure under specific environmental conditions resulting in a loss of plastics, some properties that may vary as measured by standard test methods appropriate to the components plastic and the application in a period of which may have widely differing properties. time that determines its classification. **(D 883)**

3.1.1.1 *Discussion*—Types of degradable plastics include: biodegradable, hydrolytically degradable, oxidatively degradable, and photodegradable. Refer to Terminology D 883 for definitions.

3.1.2 *industrial plastic scrapdepolymerization*, *n*—material originating from a varietyv—the reversion of in-plant operations that may consist of a single material polymer to its monomer(s) or to a blend polymer of materials. lower molecular mass.

3.1.3 *off-spec or off-grade virgin plasticsplastics recycling*, *n*—a process by whinch plastic materials or products that does not

[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 08.03.

[4] Available from U.S. Federal Trade Commission, 6th and Pennsylvania Ave., Washington, DC 20580. Phone: 202-326-5022; Fax: 202-326-3259; or e-mail: www.ftc.gov

~~meet its manufacturer's specification.~~ would otherwise become solid waste are collected, processed, and returned to use as plastic products or components of products.

3.1.4 ~~*performance standard*~~*post-consumer plastic material*, *n*—a ~~document~~ plastic material or finished product that has served its intended use and has been diverted or recovered from waste destined for disposal~~e~~, having completed its life as a consumer item.

3.1.4.1 *Discussion*—Post-consumer material is part of ~~p~~ the broader category of recovered material. Post-consumer plastics may come from households or commercial, industrial, and ~~provides both evaluation techniques and end-use criteria.~~ institutional facilities in their role as end users of a product. Some entities use the term "post-commercial" to identify substantial amounts of similar or identical post-commercial material from a non-household source. Another term for post-consumer plastic is "post-consumer resin" (PCR).

3.1.5 ~~*plastic container*~~*pre-consumer plastic material*, *n*~~—a receptacle used to hold~~—plastic material ~~for shipment, transport,~~ diverted from the waste stream following an industrial process, but excluding reutilization of material such as rework, regrind, or ~~storage~~ scrap generated in a process and ~~composed~~ capable of being reclaimed within the~~r~~ same~~o~~ pl~~a~~rocess.

3.1.5.1 *Discussion*—Pre-consumer material is part of the broader category of recovered material. Other terms for this material include post-industrial scrap and secondary material. For environmental marketing claims in the United States, The Federal Trade Commission requires substantiation that pre-consumer material would otherwise enter the waste stream.

3.1.6 ~~*plastic recycling*~~product performance standard, *n*—a ~~process~~ document that defines a product by ~~which plastic materials~~ listing the functions to be accomplished, identifies the tests that ~~would otherwise become solid waste~~ are ~~collected, separated, or processed and returned~~ to be used, and establishes criteria for the levels of performance that must be met.

3.1.7 ~~*post-consumer materials*~~*purge (plastic)*, *n*~~—those products generated by~~—material resulting from the passing of polymer through a ~~business~~ molding machine or ~~consumer that have served their intended end uses, and that have been separated~~ extruder to clean the machine, or ~~diverted~~ when changing from ~~solid waste for the purpose~~ one polymer to another, or from one color or grade of ~~collection, recycling, and disposition.~~ polymer to another, or any combination of these.

3.1.8 ~~*purge (plastic)*~~*reconstituted plastic*, *n*~~—material resulting from the passing of polymer through a molding machine~~—a material made by chemical or ~~extruder to clean the machine, or when changing from one polymer to another, or one color or grade~~ thermal breakdown of plastic scrap into components followed by~~m~~ their conversion into a final composition by chemical action.

3.1.8.1 *Discussion*—Recovered plastic materials include depolymerized materials.

3.1.9 *recovered plastic material*, *n*—a plastic material~~s~~ and by-products that have been ~~recovered or~~ diverted from or recovered from solid waste, but not including those materials and by-products generated from, and commonly reused within, an original manufacturing process.

3.1.9.1 *Discussion*—This definition includes post-consumer and pre-consumer material only, whether or not plastic material has been commingled, reprocessed, reground, or reconstituted. Wide-spec virgin plastics as well as reworked, reprocessed, and regrind plastic and purge from the same manufacturing process are excluded.

3.1.10 ~~*reconstituted plastic*, *n*—a material made by chemical or thermal breakdown of plastic waste into components followed by their conversion into a final composition by chemical action.~~

~~3.1.11~~ *recycled plastic*, *n*~~—those plastics~~—plastics feedstocks or products composed of ~~post-consumer material or~~ recovered plastic material ~~only, or both,~~ that may or may not ~~have been subjected to additional processing steps~~ include a percentage of post-consumer material.

3.1.10.1 *Discussion*—Another term is recyclate. Recycled plastic is a feedstock that can be used ~~to make products such as recycled-regrind,~~ alone or ~~reprocessed or reconstituted plastics.~~

~~3.1.12~~ in combination with materials from other sources.

3.1.11 *recycled-regrind plastic*, *n*—a product or scrap such as sprues and runners that has been reground for sale to or use by another party.

3.1.11.1 *Discussion*—Some entities use the term "regrind" inaccurately when buying and selling reground scrap plastics from both pre-consumer and post-consumer sources.

3.1.12 *regrind (plastic)*, *n*—a product or scrap such as sprues and runners that have been reclaimed by shredding and granulating for use in-house.

3.1.1~~4~~3 *reprocessed (plastic)*, *n*—regrind or recycled-regrind material that has been processed for reuse by extruding and forming into pellets or by other appropriate treatment.

3.1.1~~4~~3.1 *Discussion*—Often called "repro."

~~3.1.15 *reuse*—the use of a product more than once in its original form.~~

~~3.1.16~~

3.1.14 *reworked plastic*, *n*—a plastic from a processor's own production that has been reground, pelletized, or solvated after having been previously processed by molding, extrusion, ~~e~~ and so fort~~e~~h. **(D 883)**

3.1.1~~7~~5 *source reduction*, *n*—a ~~system including~~ process that reduces the waste from any step, such as, design, manufacturing, packaging, acquisition, and provision for reuse of ~~materials (including product and packaging), that reduces the quantity of waste produced.~~

~~3.1.18~~ material.

3.1.16 *thermoplastics*, *n*—plastics that can repeatedly be softened by heating and hardened by cooling through a temperature

range characteristic of the plastic, and, in the softened state, can be shaped by flow into articles by molding or extrusion. **(D 883)**

3.1.197 *thermosets, n*—a plastics that, after having been cured by heat or other means, are is substantially infusible insoluble and insolfusible. **(D 883)**

3.1.197.1 *Discussion*—Cross-linking prevents thermosets from being melted and resolidified.

3.1.2018 *virgin plastic, n*—plastic material in the form of pellets, granules, powder, floc, or liquid that has not been subjected to use or processing other than that required for its initial manufacture. **(ThD 883)**

3.1.19 *wisdef-spec resin, n*—resin that devionates from T the manufacturer's virgin resin specification in one or more properties.

3.1.19.1 *Discussion*—Also known as utility grade. Obsolescent terms include "off-spec or off-grade virgin resin" previously defined as resin that does not meet the manufacturer's specification.

3.1.20 *Narrower D-efinitions of Plastics Recycling*:

3.1.20.1 *primary plastics recycling, n*—processing of scrap plastic product into a product with characteristics similar to those of the original product.

3.1.20.2 *secondary plastics recycling, n*—processing of scrap plastic into a product that has characteristics different from those of the original product.

3.1.20.3 *tertiary plastics recycling, n*—production of basic chemicals or fuels from segregated plastic scrap or plastic material that is part of a municipal waste stream or other source.

(*1*) *Discussion*—Often the basic chemicals are monomers or other component parts of the original plastic that are used to make more of the same plastic. Scrap nylon 6, poly(ethylene terephthalate), and acrylics are examples of materials that are used in tertiary plastics recycling to produce reconstituted plastics (see 3.1.88).

3.1.20.4 *quaternary plastics recycling, n*—useful retrieval of the energy content of scrap plastic by its use as a fuel to produce products such as steam, electricity, and so forth.

(*1*) *Discussion*—Quaternary plastics recycling is not recognized as recycling by some governmental agencies and other organizations who instead use *resource recovery* as the preferred term.

4. Summary of Guide

4.1 This guide identifies some current approaches and strategies for the development of standards for proper use of recycled plastics. Key elements include:

4.1.1 Objectives,

4.1.2 Terminology and Use,

4.1.3 Use of performance standards,

4.1.4 Quality assurance,

4.1.5 Separation/Segregation,

4.1.6 Identification of plastics,

4.1.7 Labeling of plastic parts,

4.1.8 Contaminates,

4.1.9 Fillers, and

4.1.10 Colors.

5. Significance and Use

54.1 This guide is intended for use primarily by product ASTM subcommittees concerned with the development of material testing and product standards related to recycling plastics and by users of products made with recycled plastics. Such standards are expected to be useful to manufacturer's, specifiers, authorities having jurisdiction, and consumers.

5.2 Plastics recycling technologies have been historically divided into four general types; primary, secondary, tertiary,

4.2 This guide identifies some current approaches and quaternary.

5.2.1 Primary recycling involves processing of a waste into a product with characteristics similar to those of strategies for the original product. The recycling development of relatively uncontaminated waste plastics, that has historically taken place such standards. Key elements discussed in the manufacturing sector, is an example Section 5 include:

4.2.1 *Objectives*:

4.2.1.1 Specifications and revision of primary recycling. However, materials standards,

4.2.1.2 Terminology and by-products generated from and commonly returned to an original manufacturing process are excluded from standard definitions its use,

4.2.1.3 Use of recycled materials.

5.2.2 Secondary recycling involves processing performance standards,

4.2.1.4 Quality assurance,

4.2.1.5 Separation/segregation,

4.2.1.6 Identification of waste plastics into materials that have characteristics different from those of the original plastic products. Some manufacturing and post-consumer wastes currently enter secondary recycling streams that allow higher contamination levels than primary recycling.

5.2.3 Tertiary recycling involves the production labeling of basic chemicals and fuels from plastic waste as part of the municipal waste stream or as a segregated waste. Pyrolysis and hydrolysis are examples of these processes.

5.2.4 Quaternary recycling retrieves the energy content of waste plastic by burning.

5.3 Only primary recycling of post-consumer materials or purchased industrial plastic scrap, products,

4.2.1.7 Contaminants,

4.2.1.8 Designing for recyclability,

4.2.1.9 Fillers,

4.2.1.10 Degradable plastics, and

4.2.1.11 Percentages and secondary and tertiary plastic recycling reduce current waste disposal volumes. Quaternary recycling falls within the term "resource recovery." Primary recycling certifications of scrap from in-plant operations is so commonly practiced that it is excluded from standard recycling definitions.

6. recycled plastics.

5. Factors Important to Standards Development

65.1 *Objectives*:

6.1.1 *ASTM Committees*—In

5.1.1 In order to reduce problems relating to waste disposal and to conserve energy when it is shown to be advantageous by lift-cycle analysis, ASTM committees and subcommittees should encourage the inclusion of recycled plastics in standards relating to materials and product specifications.

65.1.2 Standards related to recycling should be based upon performance standards (outlining that provide specific methods of evaluating end-use performance, with test methods and end use criteria), instead specification of levels of end-use criteria. Use of design standards (outlining that require a specific materials and dimensions).

6.1.3 Standards material should not be downgraded by the use of recycled materials. Necessary levels of performance should be maintained. If feasible for individual products, a second and lower level of performance may be used if the level is separated and clearly defined.

6.1.4 Efforts should be made to resist the downgrading of existing ASTM performance standards, or adding additional testing requirements (and expense) when modifying standards to accommodate recycled plastics.

6.1.5 Standards discouraged.

5.1.3 Standards activities should concentrate on providing for the increased use of recycled plastics and not try to address modifications relating to "regrind," "reprocessed," or "reconstituted" plastics that are intermediate materials produced in the normal first time manufacturing.

65.1.64 Standards should reference appropriate ASTM standards where available.

65.1.75 PStandards may provide for identifying or labeling products that containing recycled plastics or other recycled recovered materials, or both, may be so identified or labeled.

6.2 *Specification both.*

5.2 *Revision of Specifications and Standard Revisions Other Standards*:

65.2.1 Unless a specification or other standard specifically restricts the use of recycled plastic, and justifies the restriction based on performance standards, requirements, then recycled plastics can be used as a feedstock. It is not necessary to specifically mention For clarification in a specification standard, either the scope or standard a footnote should state that recycled plastic can be used.

65.2.2 A specification or standard that currently restricts the use of recycled plastic, or implies the restriction by specifically mentioning the nonacceptability of reworked plastic (or other similar materials), should be promptly reviewed and, if necessary, revised by the subcommittee that has jurisdiction for the specification or standard. If the restriction is valid for known performance reasons, the justification should be stated. If the restriction cannot be justified by test data, it should be removed.

6.3 stated.

5.3 *Terminology and Use*—In order to have maximum effect and to reduce confusion, the list of terms related to recycled plastic should be clearly defined clearly and identical terms used for the same concept in all standards.

65.4 *Use of Performance Standards*—Standards developed for recycled plastics:

5.4.1 Requirements in performance standards should not be based upon performance standards, outlining specific methods of evaluating downgraded to permit the end use performance, and specifying of recycled plastic. Necessary levels of end use criteria. Design standards based upon specific materials performance should be maintained. If feasible for individual products, a second and physical dimensions lower level of performance may be specified if the level is separated and clearly defined.

5.4.2 Efforts should be made to resist adding additional testing requirements (and expense) when modifying standards to accommodate recycled plastics.

65.5 *Quality Assurance*—Standards for recycled materials should address quality assurance provisions to ensure consistent product quality. Where there is a lack of product history, tighter and more frequent controls may be required.

65.6 *Separation/Segregation*—Standards for recycling plastic materials should address, where appropriate, problems relating to separation of various plastics or initial segregation to prevent mixing. Refer to Appendix X1 for pertinent standards.

6 5.7 *Identification of Plastics and Labeling of Plastic Products*:

6 5.7.1 S Labeling of plastic parts as to material should be encouraged as an aid in separation and segregation of plastic parts since the value-in-use for the recovered material depends upon proper identification of the generic class. Refer to Practice D 1972.

6 5.7.2 Terminology D 1600 should be used to identify the generic classes.

~~6.8 *Labeling of Plastic Parts*:~~

~~6.8.1 Labeling of end use plastic parts should be encouraged as an aid in separation and segregation of plastic parts.~~

~~6.9~~

5.8 *Contaminants*:

6 5.9 8.1 Due to previous fabrication or use, recycled plastics may contain one or more contaminants. Standards should address ~~contaminants,~~ identification, quantification, and control of contaminants.

6 5.9 8.2 Standards should address known methods for removal of contaminants. ASTM subcommittees are developing practices that describe ways to separate contaminants or to analyze recycled plastics for contaminants. Appendix X1 lists pertinent documents.

6 5.9 *Designing for Recyclability*—Designers and manufacturers of plastic products should include durability, source reduction, reuse, and recyclability in design considerations. Components should be recyclable per se, or be readily dismantled for separation in a typical reclamation process.

5.10 *Fillers*—Recycled plastics of one generic class may be used as fillers in an alternate generic class. Other ~~recycled~~ recovered materials (such as glass and ~~ash), are~~ ash) also may be used as fillers.

~~6.11 *Colors*—Standards may consider the use of colored pigments in order to assist in reducing variations that may be present due to low level contamination.~~

~~6.12 *Biodegradable/Photodegradable*~~

5.11 *Degradable Plastics*:

6 5.12 1.1 Standards may consider “degradable products” and classify those degradable plastics and additives that stimulate degradation and should be ~~restricted~~ separated from ~~being mixed into~~ other recycled plastics.6 Types of degradable plastics include: biodegradable, hydrolytically degradable, oxidatively degradable, and photodegradable. Paragraph X1.2 lists pertinent ASTM Standards.

5.11.2 Consideration should be given to color coding or labeling of degradable products as ~~aids in preventing~~ an aid to prevent unintentional mixing.

5.12 *Percentages and Certification of Products Containing Recycled Plastics*:

5.12.1 A product manufacturer may specify percentages by weight of recovered plastic material, either pre-consumer material or post-consumer material, or both, in a finished plastic product.

5.12.2 The percentage of recycled content is based on weight, not volume, in finished products. In most cases, the percentage is based on the total weight of all ingredients used to manufacture the product. When only the plastic component of a composite product is considered, only the weight of the plastic ingredients is used in calculations.

5.12.3 Generally, the post-consumer material percentage is stated separately. If pre-consumer material is used as well, the total recovered material percentage will include both the pre-consumer and the post-consumer material components.

5.12.4 The percentages of pre-consumer material or post-consumer material, or both, in the finished product are derived separately, and can be calculated by dividing the weight of the desired recycled plastic component by the total weight of all the ingredients then multiplying by 100.

5.12.5 The product or material purchaser may require certification of the percentage and type (pre-consumer material or post-consumer material, or both) of recycled content.

5.12.6 Certifications of recycled content may be supported by feedstock purchasing records and manufacturing records for finished products.

5.12.7 Procedures to collect supporting data for certifications of recycled content can be incorporated in quality assurance, formulation, and quality control records.

6. Keywords

~~7~~6.1 definitions for recycling; proper use; recycled content; recycled plastics

APPENDIXES

(Nonmandatory Information)

X1. PERTINENT STANDARDS FOR USE WITH THIS GUIDE

X1.1 ASTM Standards Related to Separation and Contaminants

D 5577 Guide for Techniques to Separate and Identify Contaminants in Recycled Plastics[3]
D 5814 Practice for Determination of Contamination in Recycled Poly(Ethylene Terephthalate) (PET) Flakes and Chips Using a Plaque Test[3]
D 5991 Practice for Separation and Identification of Poly(Vinyl Chloride) (PVC) Contamination in Poly(Ethylene Terephthalate) (PET) Flake[3]

X1.2 ASTM Standards Related to Degradability

D 3826 Practice for Determining Degradation End Point in Degradable Polyolefins Using a Tensile Test[5]
D 5071 Practice for Operating Xenon ARC-Type Exposure Apparatus with Water for Exposure of Photodegradable Plastics[3]
D 5152 Practice for Water Extraction of Residual Solids from Degraded Plastics for Toxicity Testing[6]
D 5208 Practice for Operating Fluorescent UV and Condensation Apparatus for Exposure of Photodegradable Plastics[3]
D 5209 Test Method for Determining the Aerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewer Sludge[3]
D 5210 Test Method for Determining the Anaerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewer Sludge[3]
D 5247 Test Method for Determining the Aerobic Biodegradability of Degradable Plastics by Specific Microorganisms[3]
D 5271 Test Method for Determining the Aerobic Biodegradation of Plastic Materials in an Activated-Sludge-Wastewater-Treatment System[3]
D 5272 Practice for Outdoor Exposure Testing for Photodegradable Plastics[3]
D 5338 Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions[3]
D 5437 Practice for Weathering of Plastics Under Marine Floating Exposure[3]
D 5510 Standard Practice for Heat Aging of Oxidatively Degradable Plastics[3]

[5] *Annual Book of ASTM Standards*, Vol 08.02.
[6] Discontinued; see *1997 Annual Book of ASTM Standards*, Vol 08.03.

X2. ORGANIZATIONS CONCERNED WITH THE USE OF RECYCLED PLASTIC

X2.1 The recycled content in products has been addressed by other organizations. Their work may be relevant to producers and users of recycled plastic feedstocks and products.

X2.1.1 *International Organization for Standardization (ISO)*

X2.1.1.1 There is no ISO standard that addresses the range of issues covered by this guide. ISO, however, is developing terminology related to recycled materials in task groups and subcommittees. Drafts from the following technical committees and documents were consulted:

ISO/TC 61, Plastics
ISO/TC 207, Environmental Management
ISO/CD 472 DAM, Plastics – Vocabulary, developed by the ISO/TC 61, SC 1 Subcommittee for Terminology
ISO/FDIS 14020, Environmental Labels and Declaration – General Principles
ISO/DIS 14021.2, Environmental Labels and Declaration – Self-Declared Environmental Claims
ISO/FDIS 14041, Environmental Management – Life Cycle Assessment– Goal and Scope Definition and Inventory Analysis
ISO 14024, Environmental Labels and Declaration – Type I Environmental Labeling, Principles and Procedures

Current information may be obtained by contacting the ASTM Committee D20 staff manager who serves as the Administrator of the Technical Advisory Group.

X2.1.2 *U.S. Federal Trade Commission (FTC)*

X2.1.2.1 The FTC issued Part 260, "Guides for the Use of Environmental Marketing Claims," July 1992. The guides were revised in October 1996 and May 1998. The most recent revision was published in the federal Register on May 1, 1998. According to the FTC, the guides are intended to reduce consumer confusion and prevent the false or misleading use of environmental terms. Guidance for recycled content states:

"A recycled content claim may be made only for materials that have been recovered or otherwise diverted from the solid waste

stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer). To the extent the source of recycled content includes pre-consumer material, the manufacturer or advertiser must have substantiation for concluding that the pre-consumer material would otherwise have entered the solid waste stream. In asserting a recycled content claim, distinctions may be made between pre-consumer and post-consumer materials. Where such distinctions are asserted, any express or implied claim about the specific pre-consumer or post-consumer content of a product or package must be substantiated."

"It is deceptive to misrepresent, directly or by implication, that a product or package is made of recycled material, which includes recycled raw material, as well as used (5),[7] reconditioned and remanufactured components. Unqualified claims of recycled content may be made if the entire product or package, excluding minor, incidental components, is made from recycled material. For products or packages that are only partially made of recycled material, a recycled claim should be adequately qualified to avoid consumer deception about the amount, by weight, of recycled content in the finished product or package. Additionally, for products that contain used, reconditioned or remanufactured components, a recycled claim should be adequately qualified to avoid consumer deception about the nature of such components. No such qualification would be necessary in cases where it would be clear to consumers from the context that a product's recycled content consists of used, reconditioned or remanufactured components."

X2.1.3 *Association of Post-consumer Plastics Recyclers (APR)*

X2.1.3.1 A document from APR, "Design Guidelines for Plastic Bottle Recycling," provides much information related to recycling of packaging products.

X2.1.4 *U.S. Environmental Protection Agency, Office of Solid Waste*

[7] (5) The term "used" refers to parts that are not new and that have not undergone any type of remanufacturing and/or reconditioning.

SUMMARY OF CHANGES

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

D 5033 – 00:

This is a major revision of this standard.

(*1*) Title changed.

(*2*) Additions were made to 1.1, 1.2, 1.3, and 1.5 in the Scope.

(*3*) Explicit references were made to many pertinent documents.

(*4*) Definitions for the following terms were deleted: commingled plastic, industrial plastic scrap, off-spec or off-grade virgin plastics, reuse, and plastic container.

(*5*) Four definitions were included for terms discussed in Section 5 of D 5033-90(1997) for which definitions were not included earlier.

(*6*) The discussions were deleted from the text of Section 4 that replaces Section 5.

(*7*) Definitions for five terms were revised: performance standard, plastic recycling, post-consumer materials, recycled plastic, source reduction, recovered material (change in term).

(*8*) Two new terms and definitions were added (pre-consumer plastic material, and wide-spec) and several discussions were added or revised.

(*9*) Section 5, "Significance and Use" was renumbered as Section 4. A separate "Summary of Guide" was eliminated and most of the information in former Section 4 was retained in the new Section 4.

(*10*) Additions were made to the "Use" part of Section 4.

(*11*) Sections 6 and 7 were renumbered as Sections 5 and 6 and the new items discussed.

(*12*) A new section on percentages and certification of recycled plastics was added.

(*13*) Two appendixes were added to provide references to related ASTM standards and information on other organizations that have addressed recycled content of materials.

(*14*) The list of Keywords was expanded and this summary of changes was added.