



Designation: D 5033 – 00

Standard Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics¹

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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 use of recycled plastics.

1.2 This guide is directed to consumer, commercial, and industrial products made in whole or in part with recycled plastics or recovered plastic products.

1.3 This guide addresses terminology, performance standards, specifications and 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 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:²

D 883 Terminology Relating to Plastics

D 1600 Terminology for Abbreviated Terms Relating to Plastics

D 1972 Practice for Generic Marking of Plastic Products

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

¹ This guide is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.95 on Recycled Plastics.

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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.

2.2 U.S. Federal Trade Commission Document:

16 CFR Part 260 Guides for the Use of Environmental Marketing Claims³

3. Terminology

3.1 Definitions:

3.1.1 *degradable plastic, n*—a plastic designed to undergo a significant change in its chemical structure under specific environmental conditions resulting in a loss of some properties that may vary as measured by standard test methods appropriate to the plastic and the application in a period of 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 *depolymerization, v*—the reversion of a polymer to its monomer(s) or to a polymer of lower molecular mass.

3.1.3 *plastics recycling, n*—a process by which plastic materials or products that would otherwise become solid waste are collected, processed, and returned to use as plastic products or components of products.

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

3.1.4.1 *Discussion*—Post-consumer material is part of the broader category of recovered material. Post-consumer plastics may come from households or commercial, industrial, and 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 *pre-consumer plastic material, n*—plastic material diverted from the waste stream following an industrial process, but excluding reutilization of material such as rework, regrind,

³ 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

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

or scrap generated in a process and capable of being reclaimed within the same process.

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 *product performance standard, n*—a document that defines a product by listing the functions to be accomplished, identifies the tests that are to be used, and establishes criteria for the levels of performance that must be met.

3.1.7 *purge (plastic), n*—material resulting from the passing of polymer through a molding machine or extruder to clean the machine, or when changing from one polymer to another, or from one color or grade of polymer to another, or any combination of these.

3.1.8 *reconstituted plastic, n*—a material made by chemical or thermal breakdown of plastic scrap into components followed by 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 and by-products that have been 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 *recycled plastic, n*—plastics feedstocks or products composed of recovered plastic material that may or may not include a percentage of post-consumer material.

3.1.10.1 *Discussion*—Another term is recycle. Recycled plastic is a feedstock that can be used alone or 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.

3.1.13 *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.

3.1.13.1 *Discussion*—Often called “repro.”

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, and so forth. (D 883)

3.1.15 *source reduction, n*—a process that reduces the waste from any step, such as, design, manufacturing, packaging, acquisition, and provision for reuse of 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)

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

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

3.1.18 *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. (D 883)

3.1.19 *wide-spec resin, n*—resin that deviates from the manufacturer’s virgin resin specification in one or more properties.

3.1.19.1 *Discussion*—Also known as utility grade. Obsolete 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 Definitions 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.

(I) *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 3.1.8).

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.

(I) *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. Significance and Use

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

4.2 This guide identifies some current approaches and strategies for the development of such standards. Key elements discussed in Section 5 include:



Documents

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