Designation: ~~D5814 – 18~~ D5814 – 23

Standard Practice for Determination of Contamination in Recycled Poly(Ethylene Terephthalate) (PET) Flakes and Chips Using a Plaque Test[1]

This standard is issued under the fixed designation D5814; 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 practice covers an indication of the quality of recycled transparent poly(ethylene terephthalate) by examination of a wafer or plaque formed by melting a representative sample and quenching it to prevent crystallization.

1.2 Specific contaminants and impurities such as aluminum particles, dirt particles, paper, and fibers are identified in the transparent wafer. This method is only limited to contamination observable through visual methods. If there are low levels (0–200 ppm) of certain types of contamination, which are transparent and partially/wholly miscible with PET, they will not be apparent through this method.

1.3 The overall color of the plaque is indicative of oxidizable contaminants such as ethylene-vinyl acetate (EVA) glue residue and the number of bubbles present in the plaque gives an indication of the moisture content of the sample.

1.4 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 8.

NOTE 1—There is no known ISO equivalent to this standard.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

~~IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System~~

[1] This practice 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.

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

3. Terminology

3.1 *Definitions*—~~The terminology used in this practice is in accordance with~~ For definitions of terms that appear in this specification relating to plastics, refer to Terminology ~~D1600~~D883. ~~Units and symbols are in accordance with~~For abbreviations that appear in the specification, ~~IEEE/ASTM SI 10: Standard for~~refer to Terminology D1600~~Use of the International System of Units (SI).~~.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 ~~*plaque*—~~*plaque, n*—a transparent wafer resulting from melting and rapid quenching of the polymer.

4. Summary of Test Method

4.1 Transparent poly(ethylene terephthalate) flakes are melted in an aluminum pan, then the molten sample is rapidly quenched in ice water to prevent crystallization. The resulting clear plaque is examined for color indicative of oxidizable contaminants, bubbles indicative of moisture, and solid contaminant particles.

5. Significance and Use

5.1 Presence of paper, metal, or incompatible polymer contamination in poly(ethylene terephthalate) renders the recycled polymer unfit for use in secondary product manufacturing operations. This procedure is useful for identifying different types of contamination in recycled PET flakes.

6. Apparatus

6.1 *Oven,* forced convection type capable of heating samples to 300°C.

6.2 *Tongs,* long arm.

6.3 *Stopwatch,* 0.1-s accuracy.

6.4 *Bucket,* 1 L, stainless steel.

6.5 *Aluminum Weighing Dishes,* 57 mm diameter by 16 mm deep (60 mL capacity).

6.6 *Thermally Insulated Gloves.*

7. Materials

7.1 *Virgin Poly(ethylene ~~terephthalate).~~ terephthalate) (PET).*

7.2 *Ice.*

7.3 *Paper Towels.*

8. Hazards

8.1 Always wear thermally insulated gloves when introducing or removing the polymer sample from the oven.

9. Procedure

9.1 Preheat the oven to 275 ± 5°C and equilibrate for 30 min.

NOTE 2—Accuracy of both time and temperature is critical to valid sample-to-sample comparisons using this test.