Designation: D6551/D6551M – 05 (Reapproved 2011)

Standard Practice for Accelerated Weathering of Pressure-Sensitive Tapes by Xenon-Arc Exposure Apparatus[1]

This standard is issued under the fixed designation D6551/D6551M; 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 describes one environment for the exposure of pressure-sensitive tape, used primarily for packaging, to a laboratory accelerated weathering environment.

1.2 This practice describes sample preparation and the accelerated environment to which it shall be exposed. It does not specify the length of time of the exposure nor what tests shall be performed on the material following the exposure.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A666 Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

D3330/D3330M Test Method for Peel Adhesion of Pressure-Sensitive Tape

D3715/D3715M Practice for Quality Assurance of Pressure-Sensitive Tapes

D5105 Practice for Performing Accelerated Outdoor Weathering of Pressure-Sensitive Tapes Using Concentrated Natural Sunlight

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Summary of Practice

3.1 The pressure-sensitive tape is exposed for the time specified in accordance with the conditions provided in Practice G155. Following this exposure the specimen is ready for a prescribed examination of physical characteristics by other standards as determined by the applicable material specification or other document.

4. Significance and Use

4.1 This practice describes one method for accelerated weathering of pressure-sensitive tapes used primarily for packaging. It is not intended for evaluation the weathering characteristics of pressure-sensitive tapes used in long-term outdoor exposure conditions (see Practice D5105).

4.2 This practice does not necessarily provide direct simulation of natural exposure.

4.3 Results from use of this practice shall not be represented as being equivalent to those of any natural weathering test until a satisfactory degree of correlation has been established for the material in question.

4.4 Variation in results are possible when operating conditions vary within accepted limits for the instrument specified in Practices G151 and G155.

5. Apparatus

5.1 *Exposure Apparatus,* a xenon-arc weathering apparatus with daylight filters conforming to all parameters as described in Practices G151 and G155.

5.2 *Panels*[3,4], for holding or supporting specimens approximately 75 by 225 mm [3 by 9 in.] and rigid enough to resist deformation during use.

[1] This practice is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.14 on Tape and Labels.

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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.

[3] The sole source of supply of the apparatus known to the committee at this time is Chemsultants International, 9349 Hamilton Dr., Mentor, OH 44061–1118. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

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5.2.1 The material shall be Type 302 or 304 stainless steel in accordance with Specification A666 having a bright annealed finish. The surface roughness height shall be 50 ± 5 mm [2.0 ± 0.1 µ-in.] arithmetical average deviation from the mean line.

5.2.2 Other dimensions or materials and finishes are acceptable when defined by the subsequent test standard or commodity specification.

5.2.3 A panel or frame of the dimensions required by the exposure apparatus may be used to support the specimen panel when it is more convenient to do so, as long as the light and water paths are not interrupted or shortened by doing so.

5.3 *Rubber Covered Roller,* at least as wide as the specimen with any diameter and rubber hardness.[3,4]

6. Sampling

6.1 Sampling shall be in accordance with the requirements of the applicable material or commodity specification.

6.2 Lacking the previously mentioned specification, sampling shall be in accordance with the physical property method applicable to the testing following exposure.

6.3 When no other sampling requirement is applicable, sampling shall be in accordance with Practice D3715/D3715M.

7. Test Specimen

7.1 Unless otherwise specified, prepare and expose at least three replicate specimens of each tape to be tested. The test specimen dimensions shall be in accordance with the standard to be used subsequent to this exposure or the commodity specification.

7.2 Unwind and discard at least three, but no more than six, outer wraps of tape from the sample roll before taking specimens for testing.

7.3 Remove specimens from a freely rotating roll at the rate of 500 to 700 mm [20 to 30 in.]/s. Where width or other factors causing a high adherence to backing make it impossible to remove the specimen at the prescribed rate, remove it at a rate as close to 500 mm [20 in.]/s as possible.

8. Procedure

8.1 Apply specimens as directed by the standard to be used subsequent to this exposure. If none, apply the specimen, centered lengthwise, to the panel using the rubber covered roller (5.3), holding the specimen so that the roller causes the first contact of the specimen with the panel.

8.1.1 When the test, such as in Test Methods D3330/D3330M, is to follow this exposure, it is customary to apply the tape to the prescribed panel in accordance with Test Methods D3330/D3330M preparatory to the exposure and to peel it without reapplication following exposure.

8.1.2 Usually, it is assumed that the backside of the pressure-sensitive tape receives the energy. Any deviations from this would be expressed by the commodity specification.

8.2 Set up xenon-arc apparatus with the daylight filter system and operate in accordance with Practices G151 and G155. Unless otherwise mutually agreed on or specified, set machine irradiance level of 0.35 W/(m^2·nm) at 340 nm maintained at a tolerance level of ±0.02 W/(m^2·nm) at 340 nm. The equivalent broad band irradiance and tolerance levels are 41.5 ± 2.5 W/m^2 at 300–400 nm and 365 ± 20 W/m^2 at 300–800 nm.

8.2.1 Unless otherwise mutually agreed on or specified, expose specimens in the filtered xenon arc apparatus in accordance with Practice G151 and Cycle 1 of Practice G155 using continuous light and a test cycle consisting of 102 min light only followed by 18 min of light with water sprayed on the front surface of the specimens. The uninsulated black panel temperature shall be controlled at equilibrium at 63°C at the control point. The maximum operational fluctuation allowed is ±3°C. In apparatus that has the means of humidification, the relative humidity is set at 50 % at the control point with a maximum operational fluctuation of ±5 %. The chamber air temperature shall be controlled at 44°C at the control point with a maximum operational fluctuation of ±2°C. Conduct exposures for the time specified in the relevant product standard or specification. If no other exposure time is specified, expose the specimens for 2000 h.

8.3 Follow the instructions of the material specification, or other document, relative to observations, physical tests, or both to be performed on the specimen following exposure. Determine the average of the result for physical property tests performed on the specimens.

9. Report

9.1 In reporting data, including observations, obtained by any examination following this exposure, make reference to this practice by designation. Provide the following information:

9.1.1 Any deviation from this practice and any item referenced in the Report section of Practice G151, and

9.1.2 The information required by the applicable material specification or other document.

10. Keywords

10.1 accelerated weathering; pressure-sensitive tape; xenon-arc exposure apparatus

[4] The sole source of supply of the apparatus known to the committee at this time is Panel Lab Products, 26200 First Street, Cleveland, OH 94145. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

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