



Standard Practice for Accelerated Weathering of Pressure-Sensitive Tapes by Open-Flame Carbon-Arc Exposure Apparatus¹

This standard is issued under the fixed designation D3815/D3815M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This practice describes one environment for the exposure of pressure-sensitive tapes to a laboratory accelerated weathering environment.

1.2 This practice describes sample preparation and the laboratory-accelerated weathering 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.

NOTE 1—Practice [D6551/D6551M](#) describes xenon-arc exposures of tapes.

1.3 The values stated in either SI 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 must be used independently without combining values in any way.

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

[D6551/D6551M](#) Practice for Accelerated Weathering of

Pressure-Sensitive Tapes by Xenon-Arc Exposure Apparatus

[G147](#) Practice for Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests

[G151](#) Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

[G152](#) Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

3. Summary of Practice

3.1 The pressure-sensitive tape is exposed in accordance with the conditions provided by Practices [G151](#) and [G152](#). Exposure time is determined by applicable material specification or by mutual agreement by all interested parties.

4. Significance and Use

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

4.2 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.

4.3 Variations in results are possible when the operating conditions vary within the accepted limits for the instrument specified in Practices [G151](#) and [G152](#).

5. Apparatus

5.1 *Exposure Apparatus*, conforming to the requirements defined in Practices [G151](#) and [G152](#) for exposure using the open-flame carbon arc with daylight filters.

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

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.

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.

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.

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 to follow the exposure.

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

7. Test Specimens

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 750 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.

7.4 Follow the procedures described in Practice **G147** for identification, conditioning, and handling of test specimens prior to, during, and after exposure.

8. Procedure

8.1 Apply the specimen 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 specimen with the panel.

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

8.1.2 It is usually assumed that it is the backside of the pressure-sensitive tape that is to receive the energy. Any deviation from this would be expressed by the commodity specification.

8.2 Expose specimens in the open-flame carbon arc apparatus in accordance with Practice **G151** and Cycle 1 of Practice **G152** 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 is controlled at equilibrium at 63°C at the control point. The maximum operational fluctuation allowed is $\pm 3^\circ\text{C}$. The chamber air temperature shall be controlled at 44°C at the control point with a maximum operational fluctuation of $\pm 2^\circ\text{C}$. Apparatus equipped with means of humidification shall be operated with the humidifier turned off. The total time of exposure shall be as specified in the material specification.

8.3 Expose the specimens according to Cycle 1 of Practice **G152**. Apparatus equipped with means of humidification shall be operated with the humidifier turned off. The total time of exposure shall be as specified in the material specification.

8.4 Follow the instructions of the commodity specification relative to observations, physical tests, or both to be performed on the specimens following the 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 items referenced in the Report section of Practices **G151** and **G152**, and

9.1.2 The information required by the subsequent standard.

10. Keywords

10.1 accelerated weathering; open-flame carbon-arc exposure apparatus; pressure-sensitive tape



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