



Standard Practice for Performing Accelerated Outdoor Weathering of Pressure- Sensitive Tapes Using Concentrated Natural Sunlight¹

This standard is issued under the fixed designation D 5105; 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 covers one procedure for the exposure of pressure-sensitive tapes to an accelerated outdoor weathering environment.

1.2 This practice describes sample preparation and accelerated environment to which it shall be exposed. It does not specify what observations or tests are to be performed on the material following exposure.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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:

D 3715/D 3715M Practice for Quality Assurance of Pressure-Sensitive Tapes²

G 90 Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight³

2.2 Federal Specifications:

QQ-A-250/5 Aluminum Alloy Alclad 2024, Plate and Sheet⁴

2.3 SAE Document:

SAE J576 Plastic Materials for Use in Optical Parts Such as Lenses and Reflectors of Motor Vehicle Lighting Devices—Recommended Practice⁵

3. Summary of Practice

3.1 The pressure-sensitive tapes are exposed to the solar

radiation in accordance with the conditions provided by the apparatus described in Practice G 90, Procedure B, Cycle 3. Following this exposure, the specimen is ready for any prescribed examination of appearance and physical characteristics by other standards as determined by the applicable material specification or other documents.

4. Significance and Use

4.1 This practice provides a means of qualitative assessments of outdoor weathering effects on pressure-sensitive tapes.

4.2 If tests described in this practice produce the same type of degradation as found in real-time exposures of the same materials, it is possible to use the results from these short-term tests to determine the quantitative effects of natural weathering.

4.3 The timing of exposure testing covering both outdoor conventional and outdoor accelerated exposure of this practice, using levels of ultraviolet solar radiation exposure (MJ/m²) of UV (300 to 385 nm) is an improvement in the timing of exposure testing. Testing specific levels of solar radiant exposure (MJ/m²) may be used to establish relative equivalent exposure, but the use of (MJ/m² of UV (300 to 385 nm)) is the preferred method.^{5,6,7}

4.4 The radiant exposure (308 or 616 MJ/m²) suggested in this practice approximates one and two years, respectively, of exposure in the Southwest and Florida. Since all materials “weather” at different rates in different environments, results obtained using this practice should not be represented as equivalent to natural weathering until the degree of quantitative correlation has been established for the material tested in the environment of its use.

NOTE 1—The acceleration factors that can be experienced are material and time-of-year dependent. That is, the ultraviolet content of natural sunshine is time-of-year dependent, both qualitatively and quantitatively. Thus, wintertime testing requires longer exposure periods on the Flesnel-reflector test machines described to achieve equal ultraviolet energy

¹ This practice is under the jurisdiction of ASTM Committee D-10 on Packaging and is the direct responsibility of Subcommittee D10.14 on Tapes and Labels.

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² *Annual Book of ASTM Standards*, Vol 15.09.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from the Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096.

⁶ G. A. Zerlaut, M. W. Rupp, and T. E. Anderson, DEST Laboratories, Inc., Phoenix, AZ, “Ultraviolet Radiation Timing Technique of Outdoor Weathering of Materials,” SAE Technical Paper Series #850348 presented at the International Congress and Exposition, Detroit, MI, Feb. 25–March 1, 1985. Available from SAE.

⁷ Bauer, D. R., Paputa Peck, M. C., and Carter III, R. O., “Evaluation of Accelerated Spectroscopy,” *Journal of Coatings Technology*, Vol 59, No. 755, pp 103–109.