



Designation: D5589 – 19

Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Algal Defacement¹

This standard is issued under the fixed designation D5589; 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 test method covers an accelerated method for determining the relative resistance of a paint or coating film to algal growth.

NOTE 1—It is hoped that a ranking of relative performance would be similar to that ranked from outdoor exposures. However, this test method should not be used as a replacement for exterior exposure since many other factors, only a few of which are listed will affect those results.

NOTE 2—ASTM weathering standards are no longer referenced in this document, but Practices [D822](#), [D4141](#), [D4587](#), [D5031](#), and [D6695](#) are commonly used.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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.*

1.4 *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

[D822 Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings](#)

[D4141 Practice for Conducting Black Box and Solar Concentrating Exposures of Coatings](#)

¹ This test method is under the jurisdiction of ASTM Committee [D01](#) on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee [D01.28](#) on Biodeterioration.

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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.

[D4587 Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings](#)

[D5031 Practice for Enclosed Carbon-Arc Exposure Tests of Paint and Related Coatings](#)

[D6695 Practice for Xenon-Arc Exposures of Paint and Related Coatings](#)

3. Summary of Test Method

3.1 This test method outlines a procedure to (1) prepare a suitable specimen for testing, (2) inoculate the specimen with a mixture of the proper algal species, (3) expose the inoculated samples under the appropriate conditions for growth, and (4) provide a schedule and guidelines for visual growth ratings. This test method is not designed to include all the necessary procedures to maintain the proper microbiological techniques required to provide the most accurate results.

4. Significance and Use

4.1 Defacement of paint and coating films by algal growth is a common phenomenon under certain conditions. It is generally known that differences in the environment, lighting, temperature, substrate, and other factors in addition to the coating composition affect the susceptibility of a given painted surface. This test method attempts to provide a means to comparatively evaluate different coating formulations for their relative performance under a given set of conditions. It does not imply that a coating that resists growth under these conditions will necessarily resist growth in the actual application.

4.2 Familiarity with microbiological techniques is required. This test method should not be used by persons without at least basic microbiological training.

5. Apparatus and Materials

5.1 *Balance*, capable of weighing to 0.10 g.

5.2 *Incubator*, or other device capable of maintaining a constant temperature between $25 \pm 2^\circ\text{C}$, relative humidity of $\geq 85\%$, and having a constant full spectrum (see [Note 3](#)) light source.

5.3 *Refrigerator*.

5.4 *Petri Dishes*, 100 by 15 mm (3.9 by 0.6 in.).