



Designation: **D3273 – 16** **D3273 – 21**

## Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber<sup>1</sup>

This standard is issued under the fixed designation D3273; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

### 1. Scope

1.1 This test method describes ~~a small the use of an environmental chamber and the operating conditions of operation to evaluate reproducibly in a 4-week period the relative resistance of paint films interior coatings to surface mold fungi, mildew fungal growth in a severe interior environment. The apparatus is designed so it can be easily built or obtained environment during by any interested party and will duplicate results obtained in a large tropical chamber a 4-week period.~~

1.2 This test method can be used to evaluate the comparative resistance of interior ~~coating coatings~~ to accelerated ~~mildew mold~~ growth. Performance at a certain rating does not imply any specific period of time for a fungal free coating. However, a better rated coating nearly always performs better in actual end use.

NOTE 1—This test method is intended for the accelerated evaluation of an interior coatings' resistance to fungal defacement. Use of this test method for evaluating exterior coatings' performance has not been validated, nor have the limitations for such use been determined. If this test method is to be used for the testing of an exterior coating system, a precautionary statement regarding interpretation of results as being outside of the scope of this test method must be ~~included~~ included in the test report. Any accelerated weathering (leaching, weathering machine exposure, etc.) should be reported and should also bear reference to the fact that it is beyond the current scope of this test method.

1.3 Temperature and humidity must be effectively controlled within the relatively narrow limits specified in order for the chamber to function reproducibly during the short test period. Severity and rate of mold growth on a film is a function of the moisture content of both the film and the substrate. A relative humidity of  $95 \pm 3\%$   $>93\%$  at a temperature of  $32.5 \pm 1^\circ\text{C}$  ( $90 \pm 2^\circ\text{F}$ ) is necessary to initiate and maintain mold growth and for test panels to develop rapidly and maintain an adequate moisture level to support mold growth.

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

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 ~~health~~ environmental practices and determine the applicability of regulatory limitations prior to use.*

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.*

<sup>1</sup> 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. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

## 3. Significance and Use

3.1 An accelerated test for determining the resistance of interior coatings to mold growth is useful in estimating the performance of coatings designed for use in interior environments that promote mold growth and in evaluating compounds that may inhibit such growth and the aggregate levels for their use (see also **Note 1**).

3.2 This test method should preferably be used by persons who have had basic microbiological training.

## 4. Apparatus

4.1 *Environmental Chamber*, capable of maintaining a relative humidity of  $>93\%$  at a temperature of  $32.5 \pm 1^\circ\text{C}$  ( $90 \pm 2^\circ\text{F}$ ) while providing a continuous inoculation of the surface of the exposed test panels with mold spores. The chamber could be a stand-alone unit<sup>3</sup> that maintains the specified temperature and humidity and can accommodate the sample holding tank (**Fig. 1**) or an environmental room that fits one or multiple sample holding tanks.

capable of maintaining a relative humidity of  $95 \pm 3\%$  at a temperature of  $32.5 \pm 1^\circ\text{C}$  ( $90 \pm 2^\circ\text{F}$ ) while providing a continuous inoculation of the surface of exposed panels with mold spores. Alternatively, a self-contained environmental cabinet that generates the prescribed humidity and temperature conditions can be constructed as described by Weathering Direct / New Jersey Industrial Controls, LLC (Rockaway, NJ) at <https://www.weathering-direct.com/D3273.html>. The self-contained environmental cabinet can generate the prescribed temperature and humidity as per this method and can also hold the test panels (**Fig. 2** mold(A) and **Fig. 2** spores. The chamber (B)). The self-contained environmental cabinet should be kept in a room controlled to no less than  $21^\circ\text{C}$  ( $75^\circ\text{F}$ )  $21^\circ\text{C}$  ( $75^\circ\text{F}$ ) so that heat loss from the cabinet is insignificant and that  $92$  to  $98\%$   $>93\%$  relative humidity is readily obtained at the test temperature. Alternatively, the cabinet must be insulated with suitable materials to minimize heat loss.

4.2 *Sample Holding Tank* used to hold the test panels and the inoculating soil tray (**Fig. 1**). The tank can be made of polypropylene, polyethylene, acrylic, or glass, with an offset shoulder at the top rim or holes for suspending rods. The minimum recommended tank size is  $46 \times 46 \times 61$  cm ( $18 \times 18 \times 24$  in.). This typically holds a minimum of twenty-five  $75$  by  $100$  mm ( $3$  by  $4$ -in.) panels.

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4.3 *Soil Tray*, stainless steel, aluminum or plastic, approximately  $25$  mm ( $1$  in.) smaller than the inside dimensions of the sample



FIG. 1 Environmental-Cabinet Assembly Sample Holding Tank with Test Samples

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.