



Designation: D3274 – 09 (Reapproved 2021)

Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation¹

This standard is issued under the fixed designation D3274; 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 U.S. Department of Defense.

1. Scope

1.1 Fungal growth, frequently referred to as mildew in the paint industry, causes defacement of paint film exposed outdoors. The visual rating of paint surface disfigurement due to fungal or algal attack is required in order to compare the performance of different coatings.

1.2 This method of rating mildew evaluation is intended to be used on exterior exposed paint films. This method may be used to rate interior fungal or algal growth, but it should be noted that the growth patterns on interior surfaces are different than exterior due to the lack of weathering influences. It is primarily intended for test specimens, but can also be used for rating mildew growth on larger structures such as entire houses. If this is used for large areas, the project should be broken down into smaller sections.

1.3 This method is intended for field use for the macro rating of surface disfigurement only. The visual scales are meant to be used by the unaided eye to rate algal, fungal, or dirt disfigurement on larger surface areas such as test panels, siding boards, or entire buildings. Techniques are included for the differentiation of soil and dirt.

1.4 Fungi will grow on most paint films exposed outdoors that are located in conditions favorable to growth. Test procedures such as Practices **D1006**, **D3456**, and **G7** are available describing natural exposure tests that can be used to expose paint films, in order to create fungal or algal growth.

1.5 The pictorial references available for use with this test method provide a numerical basis for rating the degree of fungal or algal growth on paint films.

1.6 *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 appro-*

priate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.7 *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

D1006 Practice for Conducting Exterior Exposure Tests of Hand and Factory Applied Paints on Wood and Wood Composite Materials

D3456 Practice for Determining by Exterior Exposure Tests the Susceptibility of Paint Films to Microbiological Attack

D4610 Guide for Determining the Presence of and Removing Microbial (Fungal or Algal) Growth on Paint and Related Coatings

G7 Practice for Natural Weathering of Materials

3. Terminology

3.1 *Types of Fungal Growth*—During examination of a paint film, it may be possible to distinguish between the several types of fungal or algal growth. If required, it may be necessary to note the type of fungal or algal growth found. Under magnification, and with some identification training, it is possible to be able to distinguish growth types. The following definitions are some growth types that may be found.

3.2 *hyphae, n*—thread-like, tubular fungal filaments that compose the mycelium.

3.3 *mildew, n*—a popular term for the conglomerations of fungi that grow on and disfigure paint films.

3.4 *mycelium, n*—vegetative mass of hyphae forming the body of a fungus.

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.

3.5 *spore*—an asexual reproductive cell capable of developing into a mature fungus without fusion with another cell.

3.5.1 *Discussion*—Spores tend to be spherical in morphology and are observed singly or in clusters. Spores may or may not be associated with fungal mycelia and can range in a wide variety of colors. Although primarily gray or black, some spores are green in color and have been mistaken as terrestrial algae.

4. Significance and Use

4.1 The growth of fungi in and on the surface of paint films represents a major cause of discoloration or disfigurement of painted surfaces. Because of their dark pigmentation, it is frequently difficult to distinguish fungi from dirt or soil particles.

4.2 Use of Pictorial Standards:

4.2.1 The pictorial references that are part of this test method are for illustration purposes and may be used for visual comparisons.

4.2.2 The diagrams represent an idealized schematic of various growth levels on paint films. They are intended as a

representation only, but will serve as a useful guideline to establish amount and type of growth.

4.2.3 The diagrams represented in Fig. 1 are not derived from a linear scale. The scale is intended to provide for more discrimination at the earlier stages of fungal or algal growth. It is at these levels that greater discernment is necessary.

4.2.4 Comparisons made on dark colored substrates will be much more difficult, and will therefore require much more care and attention. It must be noted that because it is difficult to distinguish mild fungal or algal growth on the very dark substrates, there may be a tendency to under-rate those specimens.

5. Soil or Dirt Particles

5.1 Fungal or algal ratings can be made more difficult by the presence of dirt and soil particles. The distinction between dirt accumulation and surface mildew is sometimes difficult to distinguish to the naked eye.

5.2 Use visual evaluation under high power binocular magnification to assist in determining whether the particle is soil, dirt, or mildew.

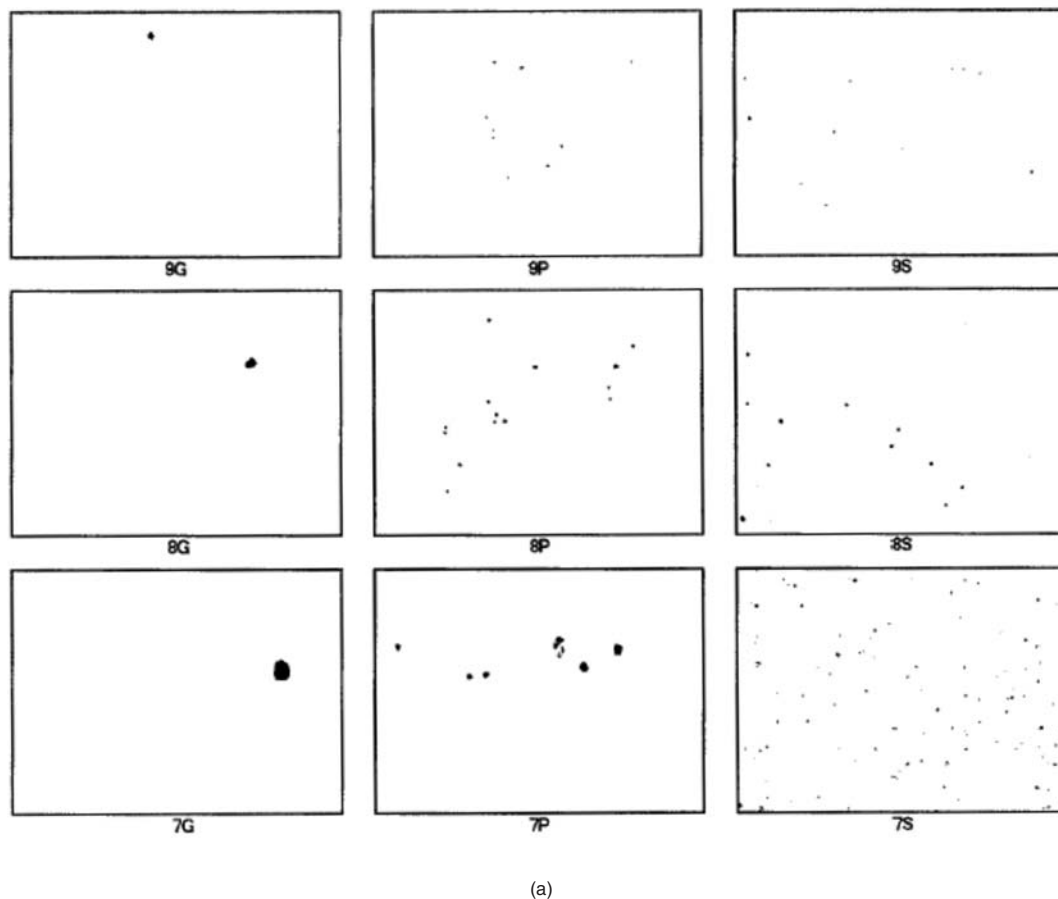


FIG. 1 Early Stages of Fungal Growth