Designation: D4214 – 07 (Reapproved 2015)

Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films[1]

This standard is issued under the fixed designation D4214; 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 These test methods cover the evaluation of the degree of chalking on white or tinted exterior paint films. These test methods describe the procedures recommended for transferring the chalk to a fabric or fingertip, which is then compared to photographic reference standards, or in the case of adhesive tapes, compared to a reflectance table or photographic reference standards, to determine the degree of chalking.

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D662 Test Method for Evaluating Degree of Erosion of Exterior Paints

E1347 Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry

2.2 *Other Document:*

Pictorial Standards of Coating Defects[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *chalking, n*—the formation on a pigmented coating of a friable powder evolved from the film itself at or just beneath the surface.

4. Significance and Use

4.1 The procedures provide a broad range of techniques and photographic references to evaluate chalking of exterior paints.

5. Type of Chalking

5.1 Only one type of chalking is recognized, as defined in Section 3.

6. Use of Photographic Reference Standards

6.1 The photographic reference standards that are part of these test methods are representative of the degrees of chalking on a paint film. The photographs shown in Fig. 1 and Fig. 2 are for illustration purposes only and should not be used for evaluation.

6.2 The use of photographic reference standards illustrated in Fig. 1 and Fig. 2 requires the following precautions:

6.2.1 The degree of chalking will vary over any given area. Therefore, an average portion of the coating should be evaluated. On large surfaces, it is recommended that the rating be made at several locations and the mean and range reported.

6.2.2 It is difficult to make readings on a windy day and making readings at such time should be avoided. It should also be noted that rain, snow, or moisture in any form will remove chalk so that readings should be made after a period of clear weather and when the surface is dry.

6.2.3 Chalking and erosion (Note 1) are closely related. However, the rate of chalking as measured by these test methods, and the rate of erosion may not be comparable because some pigment combinations tend to retain chalk on the surface while other pigment combinations exert a self-cleaning action by natural means.

NOTE 1—For the evaluation of erosion, see Test Method D662.

6.3 Records may be kept on forms[4] such as shown in Fig. 3. Reporting of the results shall include the information given in Section 8.

[1] These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.25 on Evaluation of Weathering Effects.

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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] Copies of the pictorial photographic reference standards applicable to Test Method A are contained in the publication *Pictorial Standards of Coatings Defects* and may be obtained from the Federation of Societies for Coatings Technology, 492 Norristown Rd., Blue Bell, PA 19422.

[4] These record sheets may be obtained from the Federation of Societies for Coatings Technology, 492 Norristown Rd., Blue Bell, PA 19422.

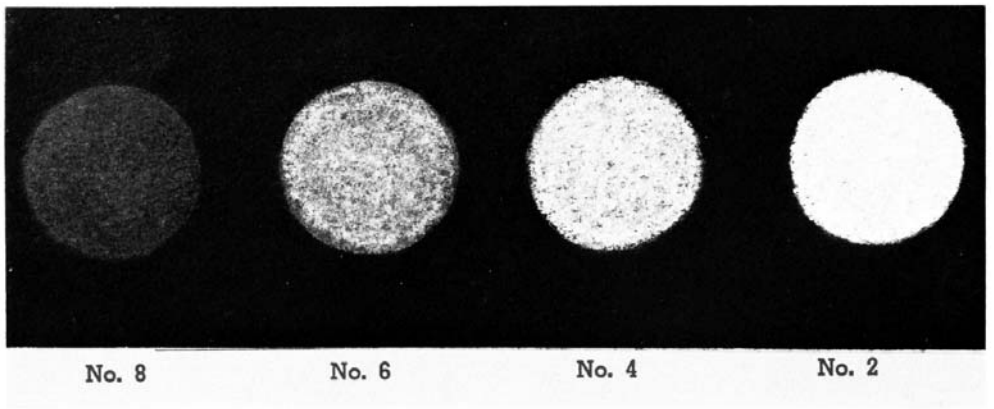

FIG. 1 Photographic Reference Standard No. 1—Test Method D659

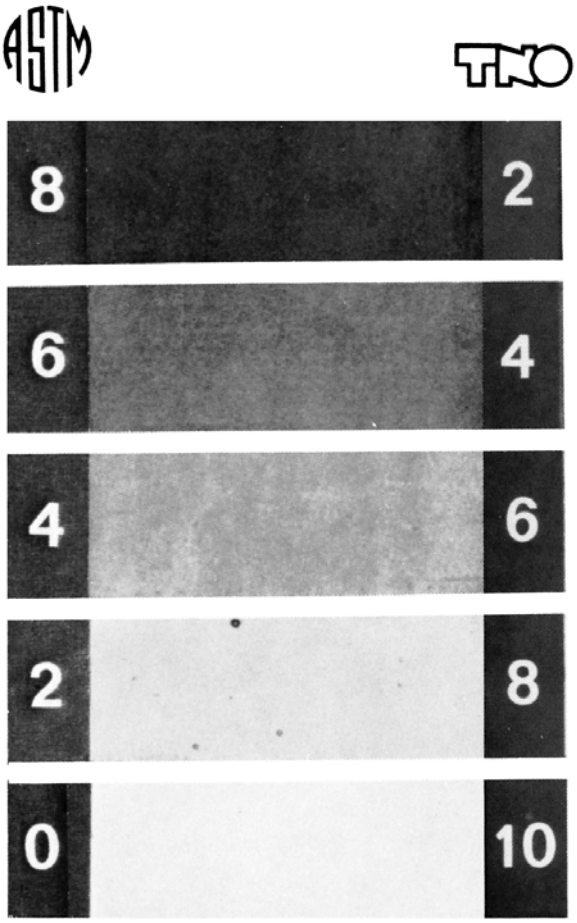

FIG. 2 Photographic Reference Standard No. 2—Verfinstituut TNO

6.4 When these test methods is referenced in specifications for performance, the permissible degree of chalking is established between the producer and the user.

7. Recommended Procedures

7.1 *Test Method A—Cloth Tape Method:*

7.1.1 *Material*—Fabric, as agreed upon between the producer, user, or other interested parties, to rub against the surface being tested. Black (or white for dark coatings) wool felt, velvet, and velveteen have proven particularly effective.

7.1.2 *Procedure*—Wrap the fabric around the index fingertip, then make a 50 to 75-mm (2 to 3-in.) stroke with medium pressure on the coating under observation. Remove the fabric and compare the spot of chalk on it with Photographic Reference Standard No. 1.

NOTE 2—Medium pressure can be quantified by placing the finger on a balance or scale, and pressing downward until 3 to 5-lb pressure is obtained.

7.2 *Test Method B—Wet Finger Method:*

7.2.1 *Procedure*—Moisten a fingertip and with medium pressure make one continuous rub 50 to 65 mm (2 to 2½ in.) in length on the surface under test. The chalk from this test method should be rated as None, Visible, or Severe; however, some may prefer to use an even numbered scale of 10 to zero.

7.3 *Test Method C—Transparent Tape Method:*[5]

7.3.1 *Materials:*

7.3.1.1 *Cellulose Adhesive Tape,* 13-mm (½-in.) wide, pressure-sensitive.

7.3.1.2 *Eraser,* ¾ in. (20 mm), wrapped with cellophane tape.

7.3.1.3 *Masking Tape,* 13-mm (½-in.) wide.

7.3.1.4 *Plastic Sheet Protector,* clear.

7.3.1.5 *Photographic Reference Standard No. 2,* TNO.[6]

7.3.1.6 *Reflectance Standard,* polished black glass.

7.3.1.7 *Reflectance Standard,* white tile.

NOTE 3—The black reference standard is necessary as the background for this measurement, since the reflectance of black paper is too high. Reflectometers (tristimulus colorimeters), with 0 to 45° geometry, use the *Y* value.

7.3.2 *Optional Materials:*

7.3.2.1 *China Marker,* black.

[5] Permission to include this test method is provided as a courtesy of NL Chemicals, Wyckoff Mills Rd., Hightstown, NJ 08520.

[6] The TNO Method and photographic reference standard are provided as a courtesy of Verfinstituut TNO Paint Research Institute TNO, Schoemakerstraat 97, Delft, Nederland. The original source of the photographic reference standard illustrated in Fig. 2 is the Paint Research Institute, TNO. The ASTM numerical rating of chalking shown on the photographic reference standard is opposite to the original TNO scale.