



Designation: D661 – 93 (Reapproved 2011)

Standard Test Method for Evaluating Degree of Cracking of Exterior Paints¹

This standard is issued under the fixed designation D661; 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 test method covers the evaluation of the degree of cracking of exterior paints by comparison with photographic standards.

2. Referenced Documents

2.1 *ASTM Standards*:²

D660 Test Method for Evaluating Degree of Checking of Exterior Paints

2.2 *Other Standards*:

*Pictorial Standards of Coating Defects Handbook*³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *cracking, n*—that phenomenon manifested in paint films by a break extending through to the surface painted.

3.1.1.1 *Discussion*—Where this is difficult to determine, the break should be called a crack only if the underlying surface is visible. The use of a magnification of 10 diameters is recommended in cases where it is difficult to differentiate between cracking and checking (see Test Method D660).

4. Significance and Use

4.1 Cracking failure of paint films can occur in use. This test method provides a means of evaluating the degree of the failure by comparing the pictorial standards.

5. Types of Cracking

5.1 Three types of cracking are recognized:

5.1.1 *Irregular Pattern Type*—Cracking in which the breaks in the film are in no definite pattern.

5.1.2 *Line Type*—Cracking in which the breaks in the film are generally arranged in parallel lines, usually either horizontally or vertically, over the surface of the film. These breaks often follow the line of brush marks.

5.1.3 *Sigmoid Type*—Cracking in which the breaks in the film form a pattern consisting of curves meeting and intersecting, usually on a relatively large scale.

6. Use of Photographic Reference Standards

6.1 The photographic reference standards that are part of this test method and are provided in the *Pictorial Standards of Coating Defects Handbook* are representative of the degree of cracking of exterior paint films. Fig. 1 is for illustration purposes only and should not be used for evaluation.

6.2 The use of the photographic reference standards³ illustrated in Fig. 1 requires the following precautions:

6.2.1 The accompanying photographic reference standards show line-type cracking only. Irregular and sigmoid-type cracking may also be interpreted from these photographs.

6.2.2 Care must be taken not to confuse various types of failure that may be present on the same surface. This is particularly true in observing cracking and checking. Cracking may very often be an advanced stage of checking and is very often in evidence along with checking and other failures.

6.2.3 It must be realized that the degree of failure will vary over any given area. Therefore, an average portion of the film should be used for comparison. On larger surfaces it is recommended that ratings be made at several locations and the mean and range reported.

6.2.4 Paint films may collect excessive quantities of dirt, which may mask the type and degree of failure. If necessary, dirt should be removed by careful and gentle brushing with a moderately soft brush.

6.2.5 In examining wood panels for cracking failure, the possibility of wood failure should be recognized. This takes the form of a cracking or splitting of the wood itself with a resultant rupture of the paint film. Also, some panels will develop “resin spewing” which will cause early failure by cracking. These points should be taken into consideration in any evaluations.

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 D01.25 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 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. The silver halide-gelatin photographs are intended to be the only primary reference standards for this method. The reproductions of them in this test method are for the purpose of illustration only.