



Standard Practice for Conducting Exterior Exposure Tests of Paints on Wood¹

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

1. Scope

1.1 This practice deals only with the testing of house paints and trim paints on new, previously unpainted wood.

1.2 This practice describes a test procedure that embodies the principles considered necessary for reliable results. Variations necessitated by circumstances may be introduced by agreement provided they do not violate these principles. One procedure embodying the principles is described in the Annex for use by those who find it convenient.

1.3 *This standard does not purport to address all of the safety problems, 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:

D 358 Specification for Wood to Be Used As Panels in Weathering Tests of Coatings²

2.2 U.S. Federal Standard:

TT-W-571b Federal Specification for Wood-Preservative, Recommended Treating Practice³

3. Significance and Use

3.1 The procedure described in this practice is intended to aid in evaluating the performance of house and trim paints applied to new, previously unpainted wood.

3.2 Since natural environment varies with respect to season, geography, and topography, test results can vary in accordance with location and may not correlate to actual in-service performance (5.1).

4. Extent of Test Program

4.1 The extent of the exterior exposure test program must be governed by the breadth of the conclusions desired. The types of paints to be tested, the range in climatic conditions to be

met, also the types of woods and structures on which the paints are to be used are important factors to be considered in establishing the exposure program.

5. Location of Test Stations

5.1 The climatic conditions of the test sites should be representative of those of the area in which the paints are to be used. The type and rate of failure of a paint film will vary when exposed to different combinations of climatic and atmospheric conditions. For reliable results, exposure sites should be selected that are representative geographically, climatically, and in atmospheric contaminations with those of the locality in which the paint will be used. To obtain conclusions that are valid for paints with national distribution requires exposure at several sites, selected to cover a wide range in climatic conditions.⁴

6. Exposure Positions

6.1 Panels for testing house paints and trim paints should be exposed on vertical test fences facing both south and north. In comparisons where dirt collection and mildew resistance are not pertinent, north vertical exposures may be omitted. There should be no obstructions close enough to shade test panels from the sun more than 2 h after sunrise, or 2 h before sunset.

6.2 In the case where it is desirable to expose coated panels in a sheltered area, such as under eaves, a suitable test fence with a sheltered or eave arrangement can be used (see Annex).

7. Construction of Test Fences

7.1 Test fences should be durable and rigid enough to remain upright under the action of prevailing winds and frost throughout the contemplated period of testing.⁵

7.2 Lower edges of test panels, when mounted on test fences, should be at least 18 in. (460 mm) above ground level to avoid dampness and mud splash. Backs of painted boards or plywood should be protected against direct exposure to the weather by methods such as, (1) having panels on both sides of the fence, (2) mounting the panels on sheathing, (3) closing the opposite side of the fence, and (4) sealing the back of the test panel with aluminum paint.

¹ This practice is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.27 on Accelerated Testing.

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² *Annual Book of ASTM Standards*, Vol 06.02.

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁴ Suggested sites include the Great Lakes region, Florida, extreme southern Louisiana, the southwest region, and northeast region.

⁵ Fences, such as presented by W. A. Southard in the May 1959 issue of the *Official Digest*, are acceptable.

7.3 Fences should have watertight caps to keep water from getting behind test panels.

8. Selection of Woods for Test Panels

8.1 Paint need be tested only on woods on which it is likely to be used in practice. Conclusions drawn from tests made on a limited variety of woods, however, should not be generalized for woods of other kinds.

NOTE 1—See Specification D 358.

8.2 Prior to use, test lumber and panels should be stored under such conditions that the moisture content of the wood will be maintained within the normal range for exterior woodwork in the region in which the tests are made.

9. Construction of Test Panels

9.1 For house paints, unless the pattern of the siding requires some other choice, test panels should be made of one or the other of two patterns of siding, namely, [n\$ or [n[] by 6-in. (13 or 20 by 150-mm) bevel siding or 1 by 6-in. (25 by 150-mm) drop siding.

9.2 If the panels in the house paint test are not subdivided, one 3-ft (900-mm) length of 6-in. (150-mm) siding will be acceptable. If the panels are subdivided, two 18-in. (460-mm) lengths are sufficient. Exposures on wood panels should preferably be carried out on three panels to allow for variations in the wood.

9.3 For trim paints, the test panel should carry 1 by 4-in. (25 by 100-mm) pieces of trim lumber at each end.

9.4 A test panel of 1.5 ft² (1400 cm²) or more in area, as provided in 9.2, may be subdivided into two or more test areas each not less than 12 in. (300 mm) long and 0.50 ft² (470 cm²) in area. Each test area is for painting with a different paint. Paints placed on the test areas of one panel furnish a comparison as to behavior.

9.5 When it will not interfere with the properties to be tested, all panels should be coated on the back to prevent warping.

10. Control or Comparison Paint for Extending the Comparisons

10.1 When several paints are to be compared, one paint should be selected as a standard of comparison or “control.” The control paint should then be applied on one test area of each test panel. Variations caused by wood differences are revealed in the behavior of the control paint, and can be used to adjust the ratings of the other paints to a common basis. For best results there should be two controls—one known to perform well and one known to perform poorly.

11. Application of Paints

11.1 All tests that are to be compared closely with one another should be placed on exposure as nearly simultaneously as possible. When a group of tests is too extensive for completion within a month, use a control paint or duplicate of at least 5 % of the test areas at successive exposure periods.

11.2 It is best in theory and practice to do the painting out-of-doors in proper weather for painting; however, indoor

painting is permissible provided no more than 1 week⁶ elapses between successive coats and between applying the last coat and exposing on the test fence; and provided, further, that all painting is done under essentially the same drying conditions. It is necessary to allow each coat to cure sufficiently before top coating.

11.3 Preferred procedure is to apply paints with the test panel in a vertical position and kept vertical until the paint has set. If paint is spread on horizontal panels, the panels should be placed vertically immediately thereafter.

11.4 Records should be kept of the spreading rates at which paints are applied. When the purpose of the tests is to compare commercial paints, it may be appropriate to let the painter apply them at what seems to be their natural spreading rates. When the purpose is to study variation in paint composition, application should usually be at suitable predetermined spreading rates that can be controlled by applying a given weight or volume of coating to a measured area.

12. Inspections and Records

12.1 After panels have been exposed to the weather, inspections should be made after not more than 1 month, at 3 months, and at intervals of 3 months during the first 2 years, and every 6 months thereafter. Midwinter inspections, however, may be omitted in northern latitudes.⁷ Inspections may be made more frequently if desired. Usually the exposures should be continued for a considerable length of time after deterioration has reached the point at which best practice calls for repainting.

12.2 Records should be kept on report forms agreed upon between the purchaser and seller.

13. Report Section

13.1 Complete the inspection report covering the various failure modes agreed upon between the purchaser and the seller. The report shall clearly show a record of the type and identification of the product tested, the ratings of the various criteria, reference standard(s) used, and other pertinent information.

13.2 The pertinent information covering outdoor weathering tests shall include the following:

- 13.2.1 Date of inspection,
- 13.2.2 Date of exposure start,
- 13.2.3 Reporting testing facility’s order number,
- 13.2.4 Client’s (purchaser’s) name, address,
- 13.2.5 Name of principal contact,
- 13.2.6 Duration expressed in time,
- 13.2.7 Radiation data to date in terms of MJ/m² of UV, radiation (295nm to 385nm), total solar radiation expressed in MJ/m²,
- 13.2.8 Type of exposure,
- 13.2.9 Notation as to ASTM Test Method used,
- 13.2.10 Orientation of the samples,
- 13.2.11 Site location comments section to more completely describe the failures noted on panels,

⁶ Seventy-two hours is the preferred maximum.

⁷ Inspection should be made to ensure that exposed panels are not covered by accumulated snow banks.