



Designation: D 2247 – 68 (Reapproved 1973)

Standard Method for Testing COATED METAL SPECIMENS AT 100 % RELATIVE HUMIDITY¹

This Standard is issued under the fixed designation D 2247; 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.

This method has been approved for use by agencies of the Department of Defense to replace Method 6071 of Federal Test Method Standard No. 141A and for listing in the DoD Index of Specifications and Standards.

1. Scope

1.1 This method covers the requirements for testing coated metal specimens at 100% relative humidity with condensation on the test specimens at all times.

2. Apparatus

2.1 The apparatus shall be of such design and construction as to satisfy the conditions of the test. The test cabinet shall consist of a chamber which will provide support for the specimens and include the necessary means for control of temperature and relative humidity. Suitable apparatus that may be used to obtain these conditions is described in the Annexes.

2.2 Materials of construction shall be such that they will neither affect nor be affected by the test.

3. Test Specimens

3.1 The type and number of test specimens to be used shall be defined in the specifications covering the material or product being tested or shall be mutually agreed upon by the purchaser and the seller.

4. Preparation of Test Specimens

4.1 The methods of application, film thickness, curing, and conditioning of the test surface shall be agreed upon by the purchaser and the seller.

NOTE 1—Application and film thickness measurement ASTM methods are given as follows:

Methods D 823, Producing Films of Uniform Thickness of Paint, Varnish, Lacquer, and Related Products on Test Panels,²

Method D 1005, Measurement of Dry Film

Thickness of Organic Coatings,²

Method D 1186, Measurement of Dry Film Thickness of Nonmagnetic Organic Coatings Applied on a Magnetic Base,² and

Methods D 1400, Measurement of Dry Film Thickness of Nonmetallic Coatings of Paint, Varnish, Lacquer, and Related Products Applied on a Nonmagnetic Metal Base.²

4.2 Whenever it is desired to determine the development of corrosion or blister creepage from an abraded area in the organic coating, a scratch or scribed line shall be made through the coating with a sharp instrument.

NOTE 2—See ASTM Method D 1654, Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.²

4.3 The backs, cut edges of the plated, coated, or duplex materials, and those areas containing identification marks or in contact with the racks or supports, shall be protected with a suitable coating that is stable under the conditions of the test.

5. Position of Specimens During Test

5.1 The position of the specimens in the test cabinet during the test shall be such that the following conditions are met:

5.1.1 The specimens shall be so placed as to permit condensation to occur on the test surface.

5.1.2 In order to avoid a galvanic couple, the test specimens shall not contact each other or any metallic material.

¹ This method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings and Materials. Current edition accepted Sept. 13, 1968. Originally issued 1964. Replaces D 2247 – 66 T.

² *Annual Book of ASTM Standards*, Part 27.

5.1.3 Drops of water that accumulate on the ceiling or cover of the chamber shall not be permitted to fall on the specimens being tested.

5.1.4 Drops of water from one specimen shall not drop on any other specimens.

6. Conditions in the Humidity Chamber

6.1 The temperature of the saturated air shall be thermostatically maintained at a temperature of $38 \pm 1^\circ\text{C}$ ($100 \pm 2^\circ\text{F}$).

6.2 There must be 100% relative humidity with condensation on the test panels at all times.

7. Continuity of Test

7.1 The test may be used as a continuous humidity test or as part of a cycle test.

7.2 Continuous operation implies that the chamber will be closed and that the conditions described in Section 6 will be met except for the short interruptions necessary to inspect or make necessary changes. These interruptions shall be held to a minimum.

7.3 The required number of hours of exposure to the test as part of a cycle test to one or more other environments shall be designated in the specific test procedure.

8. Examination of Specimens

8.1 When the specimens are ready for examination, they shall carefully be removed and then carefully dried by blowing with air or blotting with absorbent paper or cloth. During the progress of the test, examination for deterioration of the test specimen shall be made immediately. The specimens shall not be allowed to remain out of the chamber in excess of $\frac{1}{2}$ h, unless otherwise specified. At the conclusion of the test, when physical ratings or ratings for degree of recovery of the test

surface are specified, the specimens shall be allowed to stand for 24 h in an atmosphere at $25 \pm 1^\circ\text{C}$ ($77 \pm 2^\circ\text{F}$) having a relative humidity of $50 \pm 5\%$. They then shall be reexamined. The test surface shall be examined for failures specifically agreed upon by the purchaser and the seller.

NOTE 3—The following ASTM methods of evaluating finish degradation in the method are applicable:

Method D 523, of Test for Specular Gloss,²

Method D 610, Evaluating Degree of Rusting on Painted Steel Surfaces,²

Method D 714, Evaluating Degree of Blistering of Paints,²

Methods D 1474, Test for Indentation Hardness of Organic Coatings,²

Method D 1654, Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments,² and

Method D 2197, Test for Adhesion of Organic Coatings.²

9. Period of Test

9.1 The period of test, and the intermediate examination period, shall be as designated by the specification covering the material under test or as mutually agreed upon by the purchaser and the seller.

10. Reports

10.1 The report shall include the following:

10.1.1 Temperature readings within the exposure zone of the cabinet, and

10.1.2 Exposure period.

11. Precision

11.1 This method covers the determination of the effect of high humidity on coated specimens. The diverse methods of rating for failure of the specimens, and their different values, preclude making a statement of precision.

ANNEXES

A1. TEST CABINET

A1.1 Apparatus

A1.1.1 *Cabinet*—The method requires a test cabinet that will cause condensation to occur on the test specimens. This may be accomplished by the introduction of moisture at a temperature above the controlled temperature of the cabinet. A cabinet constructed to require additional heated humid air to produce the desired temperature after the air within

the chamber has reached saturation (100% relative humidity) will cause condensation on the test specimens. Cabinets of the construction described in Section A2 will produce the required conditions.

A1.2 Construction of Cabinet

A1.2.1 The humidity cabinet shall consist of a basic chamber, specimen supports, a water tank,