



Designation: D 1643 – 60 (Reapproved 1988)

Standard Test Methods for Gas Checking and Draft Test of Varnish Films¹

This standard is issued under the fixed designation D 1643; 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 to replace Methods 4161, 4162, 4171 of Federal Test Method Standard No. 141. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 These test methods cover the determination of the gas checking and draft test of varnish films.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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 Document

2.1 ASTM Standard:

D 1640 Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature²

GAS CHECKING

3. Scope

3.1 This test method³ covers two alternative procedures for detecting nonuniform appearance that may develop while a film of varnish dries in an atmosphere that has been fouled by products of combustion. The nonuniform appearance is generally related to wrinkling, which is sometimes microscopic and which is variously described as checking, crow's-footing, crystallization, or dulling. Appearance non-uniformities that develop on dried films and are described by such terms as orange-peel, haze, silking, flooding, etc., are not within the scope of this test method.

4. Summary of Test Method

4.1 The varnish film under test is exposed to foul gas for various periods before the film has been converted from liquid to substantially solid, since the foul gas is effective, within the scope of these test methods, only before the varnish film has become set-to-touch or dust-free.

PROCEDURE A—BELL JAR TEST

5. Apparatus

5.1 The form and arrangement of the apparatus shall be

designed to provide an even distribution of the products of combustion over the test panels.

5.1.1 *Glass Bell Jar*, approximately 8 in. (203 mm) in diameter and 12 in. (300 mm) in height, inside dimensions, having a ground-glass rim.

5.1.2 *Ground-Glass Base Plate*, of suitable size.

5.1.3 *Metal Frame*, fitted inside the bell jar and provided with a suitable support for holding a tin-plate disk 6 in. (152 mm) in diameter in a horizontal position 2 in. (51 mm) above the wick of the lamp.

5.1.4 *Additional Horizontal Supports*, for holding the various varnished panels under test.

5.1.5 *Small Kerosine Glow Lamp*, without a chimney, or a small alcohol lamp filled with kerosine, using a round wick not over 1/4 in. (6.4 mm) in diameter and adjusted to give a flame of 4/5 in. (20 mm) in height.

5.1.6 *Tin-Plate Panels*, 3 by 5 in. (76 by 127 mm) or smaller, cut from commercial No. 31 gage (0.227 mm) bright tin plate, weighing 0.39 to 0.51 lb/ft² (1.9 to 2.5 kg/m²) and carefully cleaned with toluene and dried before use.

6. Procedure

6.1 Determine the normal set-to-touch or dust-free drying time of the varnish under test in accordance with Test Methods D 1640. Divide this time by five to arrive at the different drying periods at which the material is to be tested. Thus, if a material sets to touch in 1 h, test the specimens for resistance to gas at drying periods of 12, 24, 36, and 48 min, respectively.

6.2 Flow the varnish to be tested on the tin-plate panels at the determined intervals of time. Allow the panels to drain in a nearly vertical position at room temperature 65 to 75°F (18 to 24°C).

6.3 After the required interval of drying time has passed, place the panels in a horizontal position on the upper supports of the frame. Light the lamp and place it on or near the center of the ground-glass base plate. After the bell jar has been placed tightly over the frame and lamp, the flame should extinguish in about 4 min.

6.4 Remove the panels and examine for gas effects after they have remained in the jar for 30 min.

7. Report

7.1 Describe the presence or absence of gas effects on the test panel for each drying interval.

¹ These test methods are under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings and Materials and the direct Responsibility of Subcommittee D 01.33 on Varnish and Resins, Including Shellac.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ See *Paint Testing Manual*, ASTM STP 500, ASTM, 1972.