



Standard Guide for Testing Wood Furniture Lacquers¹

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1. Scope

1.1 This Guide covers the evaluation of gloss or flatted, unpigmented lacquers designed for use on wood substrates. This Guide is to be used in conjunction with Test Methods D 333. Also included are several methods of special relevance to the application of lacquer on wood. The selection of the tests to be used for any given product or system must be governed by experience and by the requirements agreed upon by the producer and user.

1.2 The tests on films apply to those films applied in sufficient quantity to form a continuous film. It is recommended that reports include the thickness of the film under test.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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:

- D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)²
- D 1211 Test Method for Temperature-Change Resistance of Clear Nitrocellulose Lacquer Films Applied to Wood³
- D 1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes³
- D 1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)⁴
- D 1644 Test Methods for Nonvolatile Content of Varnishes⁴
- D 2091 Test Method for Print Resistance of Lacquers³
- D 2199 Test Method for Measurement of Plasticizer Migration from Vinyl Fabrics to Lacquers³
- D 3359 Test Methods for Measuring Adhesion by Tape Test⁴

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² Annual Book of ASTM Standards, Vol 06.04.

³ Annual Book of ASTM Standards, Vol 06.02.

⁴ Annual Book of ASTM Standards, Vol 06.01.

D 3459 Test Method for Humid-Dry Cycling for Coatings on Wood and Wood Products³

G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials⁵

3. Summary of Guide

3.1 This guide lists procedures for evaluating gloss or flatted unpigmented lacquers on production wood panels or wood test substrates.

4. Significance and Use

4.1 This guide is intended to compile as well as provide screening tests in evaluating wood furniture coatings both high gloss and flatted type, as used by the furniture industry.

4.2 Results from these various tests are not necessarily useful in evaluating performance of all different types of furniture finishing systems.

5. Test Panels and Panel Preparation

5.1 Test panels should be regular production finish panels.

5.2 If regular production finish panels are not available, the producer and the user should agree on the substrate to be used and on the complete finishing system.

5.3 Test panels should be aged for seven days unless otherwise designated to ensure complete dry or cure before testing.

6. Nonvolatile Matter

6.1 Test for nonvolatile matter in accordance with Test Methods D 1644, Test Method A.

7. Self-Lifting Properties

7.1 Apply a second coat after the first top-coat has been applied and air dried for 1, 6, and 24 h. Report any tendency of self-lifting.

8. Color

8.1 Test color of the liquid lacquer in accordance with Test Method D 1544.

9. Rubbing Properties

9.1 In the absence of a specified procedure, air dry the lacquer 18 h, sand with No. 320 W/D sandpaper wetted with

⁵ Annual Book of ASTM Standards, Vol 14.02.

mineral spirits, and then rub with 3-F pumice and paraffin oil (white mineral oil, U.S.P. heavy, or other suitable rubbing compound).

9.2 Examine the rubbed surface immediately and after 24 h, or the time agreed upon by the producer and the user, in a standard atmosphere, for example, $73.5 \pm 3.5^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$) and 50 % relative humidity, and report any difference in appearance.

10. Print Test

10.1 Test for resistance to imprinting in accordance with Test Method D 2091.

11. Cold Check Test

11.1 Test for resistance to checking and cracking in accordance with Test Method D 1211 on a substrate agreed upon by the producer and the user. Report any difference in appearance.

12. Resistance to Oils, Greases, Cosmetics, and Other Household Chemicals

12.1 Test for resistance to the agents in 12.2-12.5. For other household chemicals test in accordance with Test Method D 1308.

12.2 *Cosmetic Stain*—Apply to the finished surface a heavy smear of lipstick of indelible type and place the panel in a 125°F (50°C) oven overnight. Remove the lipstick with mineral spirits meeting the requirements of Specification D 235, and evaluate.

12.3 *Alcohol Resistance*—Place several drops (0.5 mL) of 50 % ethanol (by weight) in water on the lacquer film and trap with a 2-in. (50-mm) watch glass. Pure, undiluted ethyl alcohol or denatured alcohol conforming to Formula 2-B of the U.S. Bureau of Internal Revenue are considered equivalent for this test. One hundred proof vodka may be used in place of 50 % ethanol. After at least 6 h, remove the watch glass and allow the alcohol to evaporate. Report whitening or spotting that cannot be removed with light polishing using a dry cotton pad.

12.4 *Boiling Water Resistance*—Pour approximately 1 fl oz (30 mL) of boiling distilled or deionized water on the leveled panel and allow to cool to room temperature. Dry and examine. Report graying, spotting, softening, or other film deterioration.

12.5 *Coffee Stain Resistance*—Prepare coffee by each of the following methods:

12.5.1 Dissolve 1 teaspoon (5 cm^3) of instant coffee, 1 teaspoon of sugar, and 1 teaspoon of powdered cream substitute in 8 fl oz (240 mL) of at least 180°F distilled or deionized water.

12.5.2 Dissolve 1 teaspoon (5 cm^3) of instant coffee and sufficient synthetic sweetener (dry or liquid) to supply 5 mg of saccharin in 8 fl oz (240 mL) of at least 180°F distilled or deionized water.

12.5.3 Place 1 mL of each type of hot coffee on the panel and cover with 2-in. (50-mm) watch glasses. After 2 h, remove the watch glasses, and allow to evaporate. Wash the panel with a rag moistened with water. Report how readily the residue is removed.

13. Light Exposure

13.1 Test for the effect of light exposure in accordance with all methods except 1, 2, and 3 of Practice G 23, but operated without water spray. Report method used and results.

14. Tape Marring

14.1 Press a strip of cellophane tape, on the test panel, rolling it down with a 70 to 80 durometer hardness rubber roller. Allow the tape to remain on the panel for 30 min. Slowly remove the tape. After 30 min recovery, report any visible marring.

15. Tape Adhesion

15.1 Test for tape adhesion in accordance with Test Methods D 3359.

16. Resistance to Plasticizer Migration

16.1 Test and rate plasticizer migration in accordance with Test Method D 2199.

17. Accelerating Aging by Humid-Dry Cycling

17.1 Evaluate and report the accelerated aging in accordance with Test Method D 3459.

18. Report

18.1 The results of all tests should be reported.

19.

20. Keywords

20.1 lacquers; wood furniture

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