



Designation: D 4828 – 94 (Reapproved 2003)^{ε1}

Standard Test Methods for Practical Washability of Organic Coatings¹

This standard is issued under the fixed designation D 4828; 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.

^{ε1} NOTE—Editorial changes were made throughout in October 2003.

1. Scope

1.1 These test methods cover the determination of the relative ease of removal of common soil and stains from interior coatings by manual or mechanical washing with a sponge and a liquid or powder cleanser.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 1193 Specification for Reagent Water²

D 3450 Test Method for Washability Properties of Interior Architectural Coatings³

D 3924 Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquers, and Related Materials⁴

3. Summary of Test Method

3.1 The test material is applied to a plastic panel and allowed to dry for 7 days or as mutually agreed. Soilants or stains, or both, are applied to the film. The film is washed for up to 100 cycles using a sponge and a liquid or powder cleanser. After rinsing and drying, the panel is evaluated for the degree of soil or stain removal, erosion, and any change in gloss/sheen or color between the washed and unwashed area.

4. Significance and Use

4.1 Interior architectural paints are subjected in use to soiling by dirt or other stains. This test method provides a way

to assess relative ease of soil or stain removal from a paint film using materials common to households. This test method includes a way to evaluate the film for washability properties and changes in appearance. Thus, a formulator may evaluate the effects of composition on the washability properties of a paint. Users may also compare the ease of soil removal from different paints that are tested, preferably at the same time.

5. Apparatus

5.1 *Sponge and Holder.*

5.2 *Soil and Stain Applicator* (see Fig. 1).

5.3 *Weight*, 100 g.

5.4 *Balance*, weighing accurately to 0.1 g.

5.5 *Doctor or Bird Film Applicator*, having a 0.18-mm (7-mil) clearance by 150-mm (6-in.) film width.

5.6 *Glass Plate*, 455 by 165 mm by 6.3 mm (17½ by 6½ by ¼ in.).

5.7 *Washability Machine.*

5.8 *Black Plastic Panels.*

5.9 *Masking Tape.*

5.10 *Straightedge*, approximately 430 mm (17 in.) in length.

5.11 *Cotton Tipped Swabs.*

5.12 *Medicine Droppers.*

5.13 *Suction Plate*, for drawdowns.

6. Reagents and Materials

6.1 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type IV of Specification D 1193.

6.2 *Soil and Staining Medium*—Examples found acceptable for use with this test method include, but are not limited to pencil, crayon, mercurochrome, ball-point pen, waterborne felt-tip markers, lipstick and mineral-oil-borne soilant as outlined in Test Method D 3450.

6.3 *Cleaning Media*—Examples found acceptable for use with this test method include, but are not limited to, commercial liquid cleansers, laboratory-standardized liquid cleaners as outlined in Test Method D 3450, and powder cleansers. Powder cleansers containing chlorine may affect the color of the washed portion of the test panel.

¹ These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.42 on Architectural Coatings.

Current edition approved Oct. 1, 2003. Published October 2003. Originally approved in 1988. Last previous edition approved in 1994 as D 4828 – 94 (1999).

² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 06.02.

⁴ *Annual Book of ASTM Standards*, Vol 06.01.

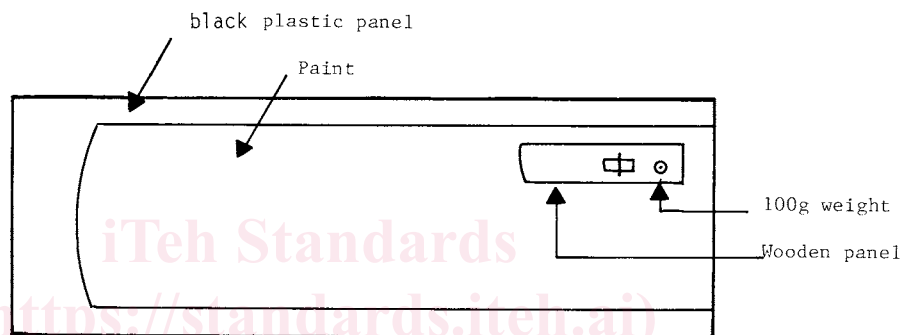
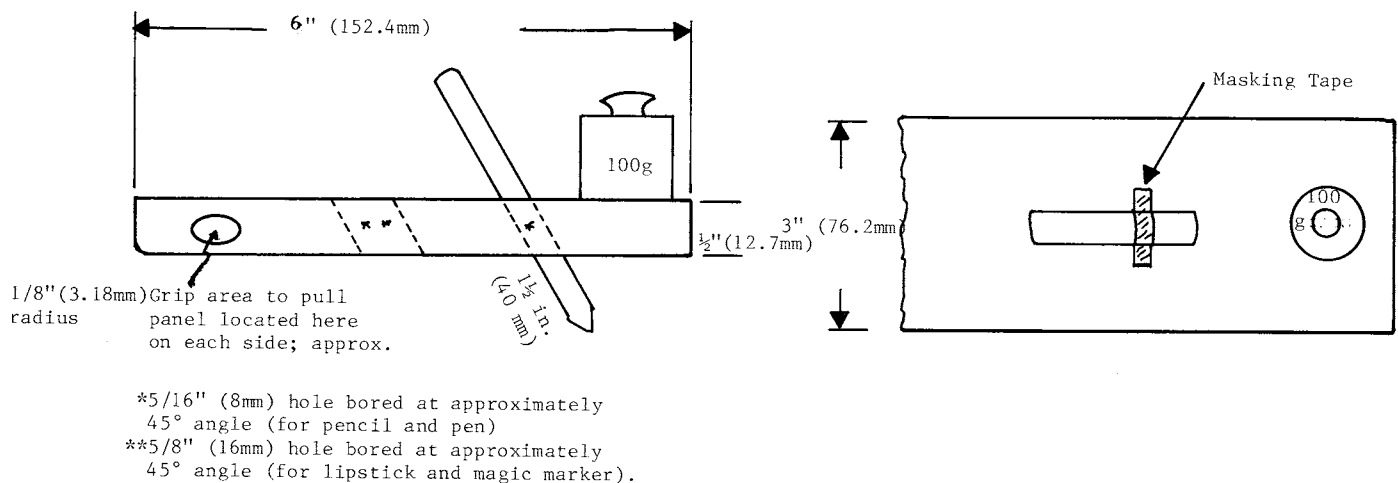


FIG. 1 Solid Soil and Stain Application

7. Preparation of Apparatus

7.1 *Washability Machine*—Level the apparatus before use and operate at 37 ± 1 cpm. (A cycle consists of a complete forward and reverse stroke.)

7.2 *Sponge and Holder*—Add sufficient weight to the holder in the form of metal sheets or other flat weights to give a combined weight of 1000 g, including the dry sponge.

NOTE 1—Check the compression of the damp sponge under the 1000-g weight to ensure that the holder does not drag along the panel and tear the film.

8. Procedure

8.1 Clean the top of the glass plate and both sides of the black plastic panel to be sure they are free of specks. Place the black panel on the glass plate and tape one end to the plate. Smooth the panel along the plate to ensure a close fit.

8.2 Stir the material thoroughly and strain, if necessary, to remove all skins and particles. Draw down the coating on the panel. Apply the coating in 3 to 4 s from end to end to prevent pin holes or holidays in the film. Prepare enough panels with each paint for all the projected tests. Air dry all panels in a horizontal position for 7 days in a room maintained at $23 \pm 2^\circ\text{C}$ ($73 \pm 3.5^\circ\text{F}$) and $50 \pm 5\%$ relative humidity as described in Specification D 3924, or under conditions specifically applicable to the material under test.

NOTE 2—If desired, an extra panel of each paint may be prepared to serve as its unwashed control.

8.3 Application of Soilants and Stains:

8.3.1 At the completion of the drying period, tape the coated panel to the glass plate, as directed in 8.1, to ensure uniform application of the soilants and stains. Apply the selected soilants or stains, or both, to the coating film in straight pairs of lines parallel to the length of the panel for the manual method of cleaning, or perpendicular to the length of the panel for the mechanical method of cleaning.

8.3.2 Apply solid soilants or stains using the apparatus shown in Fig. 1. Insert pencil, crayon, pen, or similar items into the appropriately sized hole and secure its position so it extends 40 mm (1 1/2 in.) beyond the panel (see Fig. 1(a)). Secure the medium in position with a piece of masking tape (see Fig. 1(b)). Put the applicator at one end of the coated plastic panel and place the 100-g weight on the top face of the wooden panel at the end nearest to the marking device, as shown in Fig. 1(b), securing it with a piece of tape. Allow the nonweighted end of the applicator to rest on the surface of the film, then hold it by the outer edges and pull it along the entire length of the film (see Fig. 1(c)).

NOTE 3—Some soils and stains are prone to smearing. It is advisable to apply them last to the film and protect the first lines with materials such as wax paper or onionskin paper when applying the second and subsequent lines.

8.3.3 Apply liquid stains using hand-held cotton-tipped swabs. Immerse one end of a cotton-tipped swab in an appropriate liquid and allow to remain totally immersed until