Designation: D 4002 – 81 (Reapproved 2002)

Standard Practice for Evaluation of Buffable Shoe Polish[1]

This standard is issued under the fixed designation D 4002; 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.

1. Scope

1.1 This practice covers the definition of properties to test and the apparatus to use, in evaluating the performance of buffable shoe polishes.

1.2 *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. Terminology

2.1 *shoe polish*—aids in cleaning, improving the appearance, and protecting leather or other shoe materials from such common damaging effects as scuffs, water, salt water, and other surface deposits, commonly encountered with the use of shoes outdoors or indoors. A buffable shoe polish requires buffing to obtain appearance improvements.

3. Significance and Use

3.1 This practice is intended to define the properties to be tested, the apparatus to use, and the comparisons of product performance. It is recognized that considerable discretion exists among formulators and marketers of shoe polish on what properties or performance characteristics are best for their products. This practice will be flexible to honor this fact within the confines of the shoe polish definition in 2.1.

4. Apparatus and Materials

4.1 *Test Polish.*

4.2 *Control Polish*—The control polish is selected subjectively for comparison to the test polish. It may be a competitive product, a modified formulation of the test polish, etc. The one stipulation is that, the control polish be of the same or similar type as the test polish. For example, if the test polish is an aerosol-emulsion polish, the control should be an aerosol-emulsion polish. It would not be meaningful to select a paste or liquid product as a control for comparison to an aerosol-emulsion test polish.

4.3 *Test Substrates*—The test substrate should be one for which the test polish is intended. Separate tests should be conducted for smooth-grained leather substrates to which the most current leather finishes have been applied at a tannery. The finished leather should be the exact type normally used by the shoe manufacturer to fabricate everyday dress shoes. Test substrates of man-made materials should be obtained in the same manner. The test surface should be in good physical condition, not badly cracked, scratched, or otherwise damaged so as to interfere with evaluation of polish properties. Various colors are required, see Section 9.

4.4 *Applicators*—Several methods of shoe polish application to substrates should be tested. Various types of applicators include brush, cloth, and foam. The same type of applicator should be used to apply the polish for both the control and test polish.

4.5 *Polishing Cloth*—The same type of polishing cloth should be used for each sample. Materials such as washed cheese cloth, rumple cloth, flannel, cotton diaper cloth, and nonwoven fabrics are suitable for this purpose. Felt or paper should not be used.

4.6 *Polishing Brush*—A separate horsehair brush or horsehair composition shoe brush should be used with each sample.

4.7 *Cleaning Solvent*—Aliphatic solvents with kauri-butanol values less than 38.

4.8 *Eye Droppers and Tap Water*.

4.9 *Sharp Metal Knife*.

4.10 *Light-Colored Wool, Polyester/Cotton Pieces,* of trouser or dress clothing.

4.11 *Thermometer*.

4.12 *Humidity Gage*.

5. Precautions

5.1 The temperature and relative humidity of the test runs should be measured and recorded. The temperature should be within 13 to 29°C (55 to 85°F) with a relative humidity of 20 to 80 %.

5.2 The substrate should have the same temperature as the surrounding area.

5.3 Comparisons should not be made between two separate swatches (or leather objects) since leather substrates may vary widely.

5.4 Leather substrates are normally used only one time.

6. Personnel and Instructions

6.1 The application and evaluation of the test and control polishes require four individuals. They should be capable of

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making discriminating judgments of subjective physical and aesthetic properties. Training and orientation to specific product performance characteristics may be required.

6.1.1 The four persons should apply the polishes to one of each of the four test substrates. All persons then rate all properties, except application properties, on the remaining three panels that they did not apply polish to. The persons applying the polishes should rate ease of use and other application properties. This means there will be only four readings on application properties. The three rating the other properties, do not observe the application because they rate properties of each polish "blind."

7. Procedure

7.1 *Cleaning of Test Substrates*—An aliphatic solvent having a kauri-butanol value less than 38 should be used to lightly wipe the test substrate. Soft cotton towels may be used to apply the solvent to the surface and to wipe it clean. New or adequately laundered towels should be used each time.

7.2 *Surface Subdivision*—The precleaned surface of each test substrate should be divided and outlined by tape with uniform squares.

7.3 *Application of polish or wax*—Assuming the control polish or the test polish is a commercially available product, *follow the directions on the container as far as possible.* When in doubt on the method of use, the directions for similar products may be used. Equal volumes of control and test polish or wax should be used to avoid excessively thin or heavy coats. One or two applications may be used depending on the substrate and the discretion of the tester. The same number of coats must be used for both the test sample and the control.

8. Placement of Polishes or Waxes

8.1 *Method A*—A controlled, randomized method of laying out the test (*X*) and control (*C*) polishes or waxes is represented as follows:

Test Panel	Left	Center	Right
1	C	X	C
2	C	C	X
3	X	C	X
4	X	X	C

8.1.1 These four positionings should be written on tags and drawn randomly by each of the four who apply the polishes.

8.2 *Method B*—A controlled, randomized method of laying out the test (*X*) and control (*C*) polishes is represented as follows:

Test Panel	Left	Right
1	C	X
2	X	C
3	C	X
4	X	C

8.2.1 These four positionings should be written on tags and drawn randomly by each of the four who apply the polishes.

9. Evaluation

9.1 Compare the test polish and the control as follows:

9.1.1 *Application and Buffing Properties* (ease of rub-up to maximum gloss)—During application and buffing of the polishes, note the time and ease with which each product develops maximum gloss.

9.1.2 *Final Properties*—Evaluate any or all of the following properties no sooner than 5 min following application:

9.1.2.1 *Gloss*—Evaluate as depth of gloss and buffing.

9.1.2.2 *Uniformity*—Observe the surface for streaks, unpolished dry spots, and general uniformity.

9.1.2.3 *Film Clarity*—Observe the clearness or sharpness of an object's image in the surface of the polish. Overhead lights, face, hand, or other objects may be used for reflection. This test may be eliminated for low-lustre surfaces that do not possess mirror-like finishes.

9.1.2.4 *Smear and Scuff Resistance*—Smear is the degree of oiliness or greasiness after the polish is rubbed-up to the desired polish appearance. Scuff is the degree of film damage resulting from a glancing blow to the polish substrate. Check smear by making a design such as an "S" with one's finger. A glancing blow with one's knuckles or soft object such as a book or magazine may be used for determining the degree of scuff.

9.1.2.5 *Film Healing*—Observe the length of time required for the smear or scuff in 9.1.2.4 to disappear from the polish film, should it occur.

9.1.2.6 *Rebuffability*—Observe the ease of completeness or repairability when the smears and scuffs are buffed with a polishing cloth. The amount of physical effort and length of time required is noted.

9.1.2.7 *Cleaning*—Observe the ease of removal of old polish films, as well as common soiling materials such as dust, grease, oils, finger marks, beverage stains, etc. This may be done either in the laboratory or observed during actual use trials of the products. In the laboratory, removal of old polish may be determined by applying multiple coats (10 to 20 applications) and determining polish build-up. A polish showing little build-up would be rated a good cleaner for old polish. Other materials, such as grease, oils, etc., should be tested on an individual basis.

9.1.2.8 *Water Spotting*—At least 2 h after application of the polishes, place at random to the polishes surfaces several spots of water, about the size of a penny. Allow the water to remain on the surface for 5, 15, 30 min, and 1 h. At precise intervals, blot the water with a paper towel or other absorbent material. *Do not wipe*! Observe the presence and degree of film damage. Other materials such as milk, coffee, juice, alcoholic beverages, etc., may be used to supplement the water test.

9.1.2.9 *Gloss Retention*—Observe the degree of gloss of a freshly applied and buffed-polish film compared to that of an aged-polish film.

9.1.2.10 *Dust Attraction* is measured by carefully wiping the test surface to remove all dirt and dust. Place the test substrate in the place of your choice to accumulate dust. Check dust build-up on the panel after 24, 48, and 72 h after 1 week.

9.1.2.11 *Flexibility*—Crease the test substrate between two fingers. Turn the substrates and crease in the opposite direction. Note the amount of polish that either falls off, dislodges, whitens, or powders at the crease.

9.1.2.12 *Hiding*—Scuff the leather substrate with a sharp knife until the thin top layer has broken to expose a ¼-in. (6.3-mm) path of rough area, usually of a light color. Apply or re-apply dark colored polish, in accordance with container

directions. Observe degree of hiding.

9.1.2.13 *Staining Power*—Using a single color for substrate and polish, apply multiple coats (10 to 20 applications) of dark polish on only half of each light-colored leather substrate. Observe the degree of darkening of the polished half (staining) versus the unpolished half for each sample.

9.1.2.14 *Dry Crock*—Rub polish substrate gently with light colored pieces of wool, polyester/cotton pieces of trouser, or dress clothing to determine degree of rub off onto clothing.

10. Report

10.1 *Method A*—Using 8.1, all properties are rated 0 to 5. A value of 5 equals excellent and 0 equals complete failure. Values in between are various degrees between these extremes. This is a monadic value system for each test surface evaluated based on each individual raters own reference scale. Since the three individuals rating the final properties do not know the placement sequence, each polished area is rated "blind" with no possibility for bias.

10.1.1 Form 1 should be used to record the raw data. Form 2 should be used to summarize and compare the raw data. The following calculation provides a rating factor for each property tested:

F	=	rating factor for test polish,
F_c	=	rating factor for control polish,
X property	=	sum of all readings of a specific property for the test polish,
C property	=	sum of all readings of a specific property for the control polish,
N	=	number of observations,
F	=	X property/N, and
F_c	=	C property/N.

10.2 *Method B*—Using 8.2, all properties are rated 1 to 5, with the control surface always given a rating of 3, regardless of how good or bad it really is. The scale has the following adjectival ratings:

1 = significantly poorer than control,
2 = slightly poorer than control,
3 = no difference from control,
4 = slightly better than control, and

Properties	Test Swatch Application No. 1			Test Swatch Application No. 2		
	Left	Center	Right	Left	Center	Right

Properties	Test Swatch Application No. 3			Test Swatch Application No. 4		
	Left	Center	Right	Left	Center	Right

Rating Scale: 0 to 5
5 = excellent 2 = fair
4 = very good 1 = poor
3 = good 0 = complete failure

NOTE 1—Designate the position of the product (X or C) in the box designating the position on the test panel; for example: *left*, *center*, or *right*.

FORM 1 Buffable Shoe Polish Evaluation—Individual Ratings for 10.1.1.

Products Compared

Surfaces Used for Testing

Date_____Evaluator_____

Summary of Product (X) Properties			Summary of Control (C) Properties		

FORM 2 Buffable Shoe Polish Evaluation—Individual Ratings for 10.1.1.

5 = significantly better than control.

This value system is a paired comparison with the control surface always acting as the point of reference. Since the three individuals rating the final properties need the control surface to be identified, the identification of the control product must not be revealed to prevent bias.

10.2.1 Form 3 should be used to record the raw data. Form 4 should be used to summarize and compare the raw data. The following calculation provides a rating factor for each property tested.

F = rating factor for test polish,
X property = sum of all readings for a specific property for the test polish,
N = number of observations, and
F = X property/N.

Specific properties of the control are assigned a value of 3.0.

11. Precision and Bias

11.1 *Method A*—Due to the subjective nature of this test method, no precision and bias can be established.

11.2 *Method B*—(Same as A.) However, since all the rating factors are in relation to the control, the values can be analyzed statistically to determine if the differences observed are significant.

12. Keywords

12.1 buffable; buffing; dry crock; film; healing; leather applicator; polish; rebuffability; resistance; scuff; shoe; smear; substrate

Properties	Test Swatch Application No. 1		Test Swatch Application No. 2	
	Control	Test	Test	Control

Properties	Test Swatch Application No. 3		Test Swatch Application No. 4	
	Control	Test	Test	Control

Rating Scale: 1 to 5
5 = significantly better than control
4 = slightly better than control
3 = no difference from control
2 = slightly poorer than control
1 = significantly poorer than control

FORM 3 Buffable Shoe Polish Evaluation—Individual Ratings for 10.2.1.

Products Compared

Surfaces Used for Testing

Date _____Evaluator_____

Summary of Test Product Properties			Summary of Control Product Properties		

FORM 4 Buffable Shoe Polish Evaluation—Individual Ratings for 10.2.1.