



Standard Guide for Measuring Soil Removal from Artificially Soiled Fabrics¹ (Not Suitable for Detergent Ranking)

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1. Scope

1.1 This is a guide for measuring the ability of detergents to remove artificially applied soils from fabrics. It is intended as a laboratory screening test to aid in the formulation of detergent products, for quality control and as a basis between the purchaser and seller in standardizing specific products' performance.

1.2 The relative ranking of detergent products will vary greatly depending on the type of soiled fabrics used in the test. Therefore, selection of the standard soiled fabric to be used in a test shall be made by agreement between the interested parties on the basis of experience.

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 2960 Test Method of Controlled Laundering Test Using Naturally Soiled Fabrics and Household Appliances³

E 97 Test Method for Directional Reflectance Factor 45-deg 0-deg of Opaque Specimens by Broad-Band Filter Reflectometry⁴

3. Summary of Guide

3.1 Soiled fabric swatches are washed in a laboratory washer using the products being tested and the change in reflectance is measured.

4. Significance and Use

4.1 The guide, as now constituted, is not suitable for ranking of detergent products since no basis is available at this time for correlation of the detergency performance of any particular

soiled cloth or clothes with detergency of naturally soiled articles.

4.2 A suggested procedure for comparing the performance of any two laundry detergents on naturally soiled family items in home laundry equipment under controlled conditions on a paired comparison basis is described in Method D 2960.

5. Apparatus

5.1 *Laboratory Washer*—A laboratory scale agitator-type washing machine.⁵

5.2 *Reflectometer*, calibrated by means of standard vitreous enamel plaques having reflectances in the range of the fabric or swatch samples being measured.

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁶ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean Type IV reagent water conforming to Specification D 1193.

6.3 *Hard Water Stock Solution*—Prepare a hard water stock solution by dissolving 2.940 ± 0.002 g of calcium chloride dihydrate ($\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$) and 2.033 ± 0.002 g of magnesium chloride hexahydrate ($\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$) in about 300 mL of water. Dilute to a volume of 1 L with additional water. This solution contains 3000 ppm hardness (expressed as calcium carbonate) with a Ca:Mg molar ratio of 2:1. Other ratios may be used.

6.4 *Reference Detergent*—A comparison detergent suitable to the fabric and conditions shall be included in each run.

6.5 *Standard Soiled Fabrics*.

¹ This guide is under the jurisdiction of ASTM Committee D-12 on Soaps and Other Detergents and is the responsibility of Subcommittee D12.15 on Physical Testing.

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

³ *Annual Book of ASTM Standards*, Vol 15.04.

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

⁵ The Terg-o-tometer, obtainable from the United States Testing Co., 1415 Park Ave., Hoboken, NJ, or its equivalent, has been found satisfactory for this purpose.

⁶ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.