

**CHANGE NOTICES ARE NOT
CUMULATIVE AND SHALL BE
RETAINED UNTIL SUCH TIME
AS THE STANDARD IS REVISED.**

**FED. TEST METHOD STD. NO.536A/GEN
May 9, 1975
CHANGE NOTICE 1
March 29, 1994**

FEDERAL TEST METHOD STANDARD

**SOAP AND SOAP-PRODUCTS
(INCLUDING SYNTHETIC DETERGENTS),
SAMPLING AND TESTING**

The following changes, which form a part of FED TEST METHOD STD 536A/GEN, dated May 9, 1975, are approved by the Commissioner, Federal Supply Service, General Services Administration, to be used by all federal agencies

REMOVE Standard Test Method 6701 of May 9, 1975

ADD REVISED Standard Test Method 6701 1 of March 29, 1994

ADD PAGE 6a AFTER PAGE 6 OF FED TEST METHOD STD. NO. 536A/GEN

RETAIN THIS CHANGE NOTICE AND INSERT BEFORE THE INFORMATION SHEET ON FEDERAL STANDARDS.

FED. TEST METHOD STD. NO. 536A/GEN
CHANGE NOTICE 1.

NUMERICAL LIST OF TEST METHODS (Cont.)

<u>Title of Method</u>	<u>Fed. Std Test Method No.</u>	<u>STATUS: ACTIVE, CANCELED OR SUPERSEDED BY ASTM Method No.</u>
SOAPS AND SOAP PRODUCTS (CONT.)		
Sudsing test	2001.2	ACTIVE
Sieve tests	2101	ACTIVE
SOAPS AND SOAP PRODUCTS CONTAINING SYNTHETIC DETERGENTS:		
Sampling	5101.1	ACTIVE
Qualitative test for synthetic detergent	5103	CANCELED
Moisture and Volatile matter (oven method)	5201	D460 #11
Free alkali or free acid	5301.2	D820 #7-8
Anhydrous, salt-free, soda soap	5601.1	D820 #9-12
Alcohol-soluble matter	5701.1	D820 #13-14
Matter insoluble in water	5801	D820 #15
Alkaline salts	5901.1	D820 #17
Silica present as alkaline silicates	6001	D820 #18-20
Fatty matter	6101.1	D820 #35-38
Chlorides in alcohol-soluble matter	6201.1	D820 #39-41
Rosin	6301.2	D820 #42-45
Starch	6401	D460 #84-85
Synthetic detergent	6501	D820 #46
Neutral Inorganic Salts	6601	D820 #47
Cleaning efficiency test	6701.1	ACTIVE

Supersedes page 6 of May 9, 1976

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March 29, 1994

CLEANING EFFICIENCY

Definition. This method describes a cleaning efficiency test to determine the cleaning efficiency of a hard surface cleaner.

Scope. This method is applicable to all cleaning compounds including soap products and synthetic detergents.

1. PROCEDURE. This procedure shall be carried out five times for each cleaning solution tested, using five separate test panels.

1.1 Use an official type 18 X 8 inch white vinyl tile (see 3.8) to fit the standard test sample washing tray of the Gardner Washability machine (see 3.1). The vinyl tile shall be scrubbed by hand using a cellulose sponge (see 3.3) saturated with a solution consisting of a 0.5 wt. percent solution of linear alkylaryl sodium sulfonate (85 percent active) (see 3.14) in tap water. Rinse the tile under cool, running tap water and then drain for 10 minutes. Blot the remaining water with a paper towel. Oven dry for 15 minutes at 100° C and then allow to cool at room temperature. Determine the reflectance of the tile (see 2.1) and record.

1.2 Panel soiling.

1.2.1 Preparation of soiling mixture.

<u>Soiling mixture (see 3)</u>	<u>Parts by weight</u>
Metallic brown	20
Odorless Kerosene (VV-K-220)	12
Stoddard Solvent (P-D-680, Type I)	12
White mineral oil (USP)	1
Lubricating oil (SAE 10)	1
Hydrogenated vegetable shortening	1

Combine oils and shortening and heat to 41° C to melt. Add half the kerosene. With a spatula, mix in the metallic brown. Add remaining kerosene and Stoddard solvent, and mix for two hours with a magnetic stirrer.

1.2.2 Soiling procedure.

While the bulk lot of soil is continuously stirred to insure uniformity, a sample of approximately 5g is removed and applied along entire length of the vinyl tile. A film applicator (see 3.4), set at 0.008 inch clearance and 2 inches width, is used to provide an even spread.

After soil application, air-dry tiles at least 30, but not more than 60 minutes, then cure tiles on a smooth surface in a forced draft oven at 100 ± 3° C for 60 minutes. Remove the tiles from oven and cool to room temperature, using the tiles within 24 hours.

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1.3 Panel washing.

1.3.1 Preparation of test detergent. Synthetic hard water shall be prepared according to the following formula.

0 132 gram $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$ (CP)

0 1475 gram $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (CP)

Accurately weigh the salts and dissolve them in a small portion of distilled or de-ionized water, quantitatively transfer them to a one liter volumetric flask and make up to volume. Dry detergents shall be used in this hard water at 0.5 weight percent concentrations or at a recommended concentration, and liquid products shall be tested at the recommended use concentration.

1.3.2 Washing procedure.

- a) The sponge (see 3.3) is cut to size when dry to fit the sponge box. The thickness of the sponge shall be 1 inch when wet. Total weight of the box and dry sponge shall be 1 pound \pm 1/2 ounce. Soak tile for 60 seconds in wash solution sufficient to cover entire tile. Wet sponge with 25 \pm 3° C tap water and squeeze damp dry.
- b) Add 50 ml of detergent solution to sponge and insert sponge in box. Center test tile in washability pan with two properly sized pieces of vinyl molding.
- c) Start apparatus set at one stroke per second (one cycle back and forth is two strokes), while dripping detergent solution from a pipet onto test tile center at a rate of 12 ml of solution during the wash period of 100 strokes.
- d) Stop apparatus, remove and rinse test tile under a light stream of 25 \pm 3° C tap water. Drain and replace tile in apparatus in the reverse direction. Rinse sponge in 25 \pm 3° C tap water, squeeze damp-dry, add 50 ml of detergent solution to unused side, replace sponge in box and repeat 100 stroke wash cycle as before. Rinse tile and air dry.
- e) Determine the reflectance (see 2.1) of the washed portion of the tile and record.

2 EVALUATION OF SAMPLE CLEANER

2.1 Reflectance measurement. Using a photometer (see 3.2) and search unit equipped with tristimulus green filter, reflectance of the surface of the test panel is measured before soiling and after washing using a vinyl panel template of the dimensions given in figure 1. Four reflectance measurements shall be made of different areas of the soiled and washed portion of each tile examined. The four readings are measured to the nearest 0.5 percent, and averaged. This procedure shall be repeated for each of the five tiles required to test each cleaner. Between tiles, the search unit is rested on a standard white plaque of approximately 80 percent reflectance and the instrument checked before each series of readings.

2.2 Cleaning Efficiency (C.E.).

Percent cleaning efficiency = $R_s/R_i \times 100$

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Where R_1 = average reflectance of unsoiled, precleaned panel.

R_2 = average reflectance of soiled, test washed tile.

Report the cleaning efficiency results as the average of the cleaning efficiencies obtained from the five test tiles. The results shall be reported to the nearest unit percent.

2.3 Cleaning Efficiency Comparison Index (C.I.). If required, the cleaning efficiency of the test detergent can be compared with the cleaning efficiency of the comparison detergent, using the same batch of soiling mixture and vinyl tile from the same batch.

2.3.1 Comparison Detergent. The comparison detergent shall be prepared as described in 1.3.1 and shall have the following composition (see 3):

	<u>Weight percent</u>
Sodium dodecylbenzene sulfonate (85 percent)	23.5
Sodium tripolyphosphate, granular	40.0
Sodium metasilicate pentahydrate (ASTM D537)	7.0
Sodium sulfate, anhydrous (ACS)	29.5

2.3.2 Calculation of cleaning efficiency comparison index. The comparison index (C.I.) shall be calculated as follows:

$$C.I. = \frac{C.E. \text{ of detergent sample}}{C.E. \text{ of comparison detergent}}$$

The comparison index shall be reported to the nearest hundredth of a unit.

3. SPECIAL APPARATUS AND MATERIALS

3.1 Straightline Washability Apparatus (Paul N. Gardner Company, Inc 316 N.E. 1st Street, Pompano Beach, FL 33060)

3.2 Photovolt Model 670 or equal with a 610Y search unit and tristimulus green filter (range 520 to 540 millimicrons) manufactured by Photovolt Corp., 11115 Broadway, New York, NY 10010 has been found suitable

3.3 Cellulose sponge conforming to type II of Federal Specification L-S-626

3.4 Film applicator with 2 inch path and set at, or adjustable to, a clearance of 8 mils (Model AP-M02, Paul N. Gardner Co., Inc., 316 N.E. 1st Street, Pompano Beach, FL 33060, or equal)

3.5 Template of vinyl panel, 2 inches by 4 inches, with four evenly spaced holes for making reflectance readings. See figure 1.

3.6 Standard white plaque (reflectance approximately 80 percent)

3.7 Forced draft oven having $\pm 2^\circ\text{C}$ tolerance

3.8 White Vinyl Tiles. "Official Test Vinyl Tile (OTVT)", available from Chemical Specialties Manufacturer's Association, 1913 I St., N.W., Washington, DC 20006

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3.9 Hydrogenated Vegetable Shortening

Supplier: Several Sources
Example: "Crisco" - Procter and Gamble

3.10 Mineral Spirits, Odorless

Specification: ASTM D 235, Type III

3.11 Lubricating Oil (SAE 10-ML)

3.12 Metallic Brown

Supplier: Pfizer Pigments, Inc.
2800 Ayers Avenue
Los Angeles (Vernon), CA 90023

Product: Metallic Brown P/N B-2093F (or equal)

3.13 Sulframin 85^(R) Linear dodecylbenzene sodium sulfonate (85 percent active)

Supplier: Witco Chemical Co., Inc.
520 Madison Ave.
New York, NY 10022-4236

Product: Commercial Linear alkylaryl sodium sulfonate, 85 percent ingredient

3.14 Sodium Metasilicate, Pentahydrate, Type I

Supplier: Spectrum Chemical Mfg. Corp.
14422 San Pedro Street
Gardena, CA 90428

Johnson Matthey
Alpha Products
P.O. Box 8247
Ward Hill, MA 01835-0747

Specification: ASTM D 537

3.15 Sodium Sulfate, Anhydrous

Supplier: Fisher Scientific Co.
2170 Martin Ave
Santa Clara, CA 95050

Product: Anhydrous Na_2SO_4
Catalog No. S-420 or S-421 for ACS grade

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3 16 Sodium Tripolyphosphate, Granular

Supplier:	Monsanto Company 800 N Lindbergh Blvd St. Louis, MO 63167
	Aldrich Chemical Co., Inc. 1001 West Saint Paul Ave. Milwaukee, WI 53233

Product:	$\text{Na}_3\text{P}_3\text{O}_{10}$
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3 17 Stoddard Solvent

Supplier:	Miscellaneous
Product:	Drycleaning solvent
Specification:	P-D-680, Type I

3 18 White Mineral Oil (USP)

Supplier:	Miscellaneous
Specification:	USP

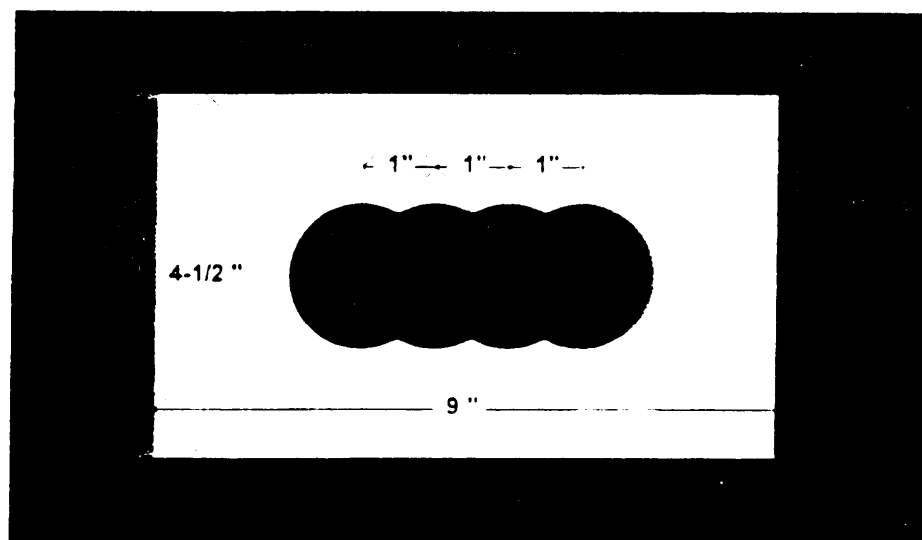


Figure 1 Template Dimensions