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Standard Specification for General-Purpose Synthetic Detergent Liquid¹



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1. Scope

1.1 This specification covers general maintenance liquid cleaning compounds containing synthetic detergents.

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

2. Referenced Documents

2.1 ASTM Standards:

D 460 Test Methods for Sampling and Chemical Analysis of Soaps and Soap Products²

D 523 Test Method for Specular Gloss³

D 538 Specification for Trisodium Phosphate²

D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and Related Coating Products³

D 820 Test Methods for Chemical Analysis of Soaps Containing Synthetic Detergents²

D 823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels³

D 1172 Test Method for pH of Aqueous Solutions of Soaps and Detergents²

D 2834 Test Method for Nonvolatile Matter (Total Solids) in Water-Emulsion Floor Polishes, Solvent-Based Floor Polishes, and Polymer-Emulsion Floor Polishes²

2.2 Federal Standards:⁴

TT-E508 Enamel; Interior Semigloss; Tints and White

TT-E543

3. Basis of Purchase

3.1 Material shall be purchased by net volume as received.

4. General Requirements

4.1 The product shall be a stable, uniform solution of synthetic detergents, with or without sequestering agents or other builders, or both. It shall be satisfactory for use in floor and wall maintenance cleaning operations in soft or hard water.⁵ It shall be free-rinsing and have no deleterious effect on painted surfaces or flooring materials such as rubber, asphalt, vinyl, or linoleum. It shall be free from objectionable

odor. It shall have no adverse stability effect on the containers when stored at $25 \pm 2^\circ\text{C}$ ($77 \pm 3.6^\circ\text{F}$) for 1 year.

5. Chemical Requirements

5.1 The chemical composition shall conform to the requirements prescribed in Table 1.

6. Sampling

6.1 The material shall be sampled in accordance with Test Methods D 460.

7. Rinsing Properties

7.1 Make a solution of the material at the most concentrated recommended dilution, following the manufacturer's directions, in enough synthetic hard water, 300 ppm hardness, to give 100 mL of total solution. Pour the resultant solution into a clean, dry 250-mL Erlenmeyer flask. Stopper the flask and shake vigorously for 1 min. Pour out the solution and rinse the flask three times with 75 mL-portions of synthetic hard water alone. Invert the flask and allow to dry. Examine for any residue. The flask shall contain no more residue than a flask allowed to dry after rinsing with synthetic hard water alone.

NOTE 1—Synthetic hard water contains:

0.246 g/L of $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$

0.295 g/L of $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$

8. Deleterious Action on Painted Surfaces

8.1 Test panels measuring 3 by 6 in. and made of steel shall be prepared in accordance with Practice D 609. After preparation the panels shall be coated in accordance with Practices D 823.

8.1.1 The first coat shall consist of enamel undercoat, white (Federal Specifications TT-E-543). The final coat shall be enamel, semigloss white (Federal Specifications TT-E-508). A drying time of not less than 24 h between coats, and a minimum of 24 h and a maximum of 4 days, after the final coat shall be allowed.

8.2 *Measurement of Specular Gloss*—Gloss shall be measured in accordance with Test Method D 523.

8.3 *Procedure*—Prepare sufficient 0.2 % solution of trisodium phosphate (Specification D 538) and the detergent at the most concentrated recommended dilution. Measure the specular gloss of two panels as prepared in 8.1. Immerse one panel in each solution at room temperature ($25 \pm 2^\circ\text{C}$) for 1 h. Remove the panels, rinse in distilled water, and dry for at least 1 h. Again measure the specular gloss. The change in gloss of the panel immersed in the same solution shall be no more than that of the one in trisodium phosphate.

¹ This specification is under the jurisdiction of ASTM Committee D-12 on Soaps and Other Detergents and is the direct responsibility of Subcommittee D 12.22 on Specifications for Soaps and Synthetic Detergents.

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² Annual Book of ASTM Standards, Vol 15.04.

³ Annual Book of ASTM Standards, Vol 06.01.

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁵ This product is not intended primarily for wax stripping.

9. Deleterious Action on Floor Tiles

9.1 Test panels shall measure 2 by 4 in. (50 by 101 mm) and be made of the following: Linoleum—official test linoleum (CSMA), Asphalt—official test asphalt tile (CSMA), Vinyl Asbestos-Tentative Official Test Vinyl, Asbestos (CSMF) and Vinyl Tile-Kentile Plain Black R40.

9.2 *Procedure*—Prepare a solution of the detergent at the most concentrated dilution recommended by the manufacturer. Pour 150 mL of the solution into each of three beakers. Immerse one of each type of panel in the beakers. Allow the panels to remain in the solution at room temperature ($25 \pm 2^\circ\text{C}$) for 16 h. Remove the panels, rinse in distilled water, and dry for at least 1 h. Examine the panels for softening, swelling, cracking, bleaching, and discoloration.

10. Cleaning

10.1 Apparatus:

10.1.1 *Test Panels*, may be any one of the following as agreed between the purchaser and the seller: white vinyl asbestos tiles, white homogeneous vinyl tiles, or white asphalt tiles.⁶

10.1.2 *Cheesecloth*, double thickness, double folded into 4-in. squares.

10.1.3 *China Marking Pencil*,⁷ red.

10.1.4 *Washability Apparatus*.⁸

10.2 *Soiling Procedure*—Lay a square of four panels by four panels on a sheet of metal. They can be held in place with double gummed masking tape. Place the entire panel in a well-trafficked area. Turn the panel 90° every 2 days. Continue this procedure until all tiles are uniformly soiled.

10.3 *Cleaning Procedure*—In the center of the tiles to be

TABLE 1 Chemical Requirements^A

	min	max	ASTM Reference Method
pH at most concentrated recommended dilution	9.0	11.5	D 1172
pH as received	9.0	13.0	D 1172
Nonvolatile matter (total solids), %	10.0	...	D 2834
Alcohol-soluble matter, %	5.0	...	D 820
Chlorides	...	trace	...
Sulfates	...	trace	...

^A Use a 1-g sample, and dry to constant weight.

cleaned, mark an "X" with the china marking pencil. Place a cheesecloth square over the mark. Pour 30 mL of the detergent solution (manufacturer's recommended dilution) on the cheesecloth. Allow to stand 5 min. Scrub the tile with the wet cheesecloth in a circular motion, covering as much of the tile as possible, for 30 s. Allow the cheesecloth to remain in place for 1 min longer. Remove and dry the tiles. Examine the tile for removal of soil and marking pencil. Use as a standard a 5 % solution of the following cleaner:

Triton X-100	5.0 %
Na ₂ SiO ₃ ·5H ₂ O	5.0 %
H ₂ O	QS 100.0 %

10.4 *Alternative Cleaning Procedure*—Cut the soiled tiles to fit the tray of the washability machine. Place in center of tray with a dummy tile at each end. Pour 75 mL of the test solution (at the manufacturer's recommended dilution) on the soiled tile. Using the washability apparatus brushes run the machine for 50 strokes. Remove the panel, rinse and dry. Compare with a-soiled tile that has been cleaned similarly using the standard solution as in 10.3.

11. Keywords

11.1 alkaline liquid detergent; hard surface cleaner; liquid detergent; synthetic detergent liquid

⁶ For referee purposes, official vinyl asbestos tile, CSMA shall be used.

⁷ A Blaisdell Color No. 365 T marker has been found satisfactory.

⁸ The Gardner Straight/Line Washability Machine obtainable from Gardner Laboratory, Inc., P. O. Box 5758, Bethesda, Md. 20014, has been found satisfactory.

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