Designation: F925 – 13 (Reapproved 2020)

Standard Test Method for Resistance to Chemicals of Resilient Flooring[1]

This standard is issued under the fixed designation F925; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method provides a procedure for determining the resistance of resilient floor covering to surface deterioration when exposed to various chemical reagents. This test method is not intended as a staining test nor as a method to judge surface and appearance restoration of the sample after exposure to the chemical reagent.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazard information is provided in Section 6 of this test method.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

F141 Terminology Relating to Resilient Floor Coverings

F142 Test Method for Indentation of Resilient Floor Tiles (McBurney Test) (Withdrawn 2007)[3]

F386 Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces

F1914 Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering

3. Terminology

3.1 For terminology relating to Resilient Floor Coverings, see Terminology F141.

4. Significance and Use

4.1 Resilient flooring products are designed and formulated to have good resistance to most common chemicals encountered in typical use. High performance wear layers can also be used to enhance cleanability and chemical resistance. Resilient flooring used in residential and commercial environments may be subjected to a variety of chemicals through accidental spillage or as ingredients used for hygienic purposes. Performance is dependent upon the flooring formulation and that of the maintenance products used on the flooring. This test method provides a means of estimating the relative susceptibility of resilient floor covering to change when exposed to chemical reagents.

5. Apparatus

5.1 *Gloves,* impervious vinyl or rubber,

5.2 *Tweezers,* or forceps,

5.3 *Medicine Dropper,* 3 in. straight glass with rubber bulb or pipette having a point opening diameter not less than 1⁄16 in. (1.6 mm) or greater than 5⁄64 in. (1.8 mm),

5.4 *White Facial Tissue.*

5.5 *Watch Glass.*

5.6 *Timer.*

5.7 *Filter Paper.*

5.8 *Small Laboratory Spatula,* approximately ¼ –½ in.-wide blade, rounded bottom, not sharpened,

[1] This test method is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.20 on Test Methods.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

5.9 *Suitable Spectrophotometer or Colorimeter,* with a minimum ¼ in. (6.35 mm) diameter opening having a cool white fluorescent (CWF) or daylight (D-65) light source, or both, that measures color in CIE L*, a*, b* using CIE 10° standard observer and specular included (see Test Method D2244).

5.10 *Indentation Tester,* see Test Methods F142 and F1914.

5.11 *Thickness Tester,* see Test Method F386.

5.12 *Conditioning Room or Cabinet,* equipped with automatic temperature and humidity controls that will maintain 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity.

6. Hazards

6.1 A new medicine dropper or pipette should be used for each test reagent. If the same reagent dispenser apparatus is to be reused, it shall be thoroughly cleaned in hot soapy water and alcohol, or both, prior to applying each different test reagent.

6.2 Check to be sure the colorimeter is properly warmed up and calibrated prior to use.

6.3 Be sure specimens are held flat when measuring color.

6.4 Be sure each specimen is marked in the corner on the back for easy identification.

6.5 Dispose of chemical test reagents properly. Refer to Material Safety Data Sheets (MSDS) or precautions on the label for proper disposal. (**Warning**—Observe all necessary precautions when handling test reagents known to be flammable or potentially hazardous.)

7. Test Specimen

7.1 The specimen shall consist of a portion of the test unit at least 6 by 6 in. (153.4 by 153.4 mm) for each reagent (chemical) to be tested.

7.2 Specimens shall be selected with minimal changes in surface texture.

7.3 Specimens should be of a color to show potential effect of reagent.

8. Procedure

8.1 Unless otherwise specified, condition the specimens and the test reagents (chemicals) for at least 24 h prior to testing. The environment for conditioning and testing is 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity.

8.2 Lay the specimens face up on a firm, flat surface.

8.3 Select a test area on the specimen having the flattest area and color appropriate to show the effect of the reagent and draw a square approximately 1½ by 1½ in. (38 by 38 mm) centered on that desired test location.

8.4 If using test equipment such as an indentation tester, thickness tester or color spectrophotometer to help quantify specimen change, take initial readings on the unexposed specimen and record values as indicated in Fig. 1. All measurements should be taken on a relatively flat spot, corresponding as closely as possible to the center of the test square.

8.5 When evaluating multiple product samples for resistance to chemicals, test in stages to permit sufficient time for cleaning and observing panels. Record results on Fig. 2.

8.6 For testing liquid reagents, center a piece of filter paper within the test square, using a medicine dropper or pipette, deposit 6–8 drops of test reagent or a sufficient amount to thoroughly wet the filter paper.

8.7 If the test reagent is a paste, apply a thin layer (approximately 1⁄16 in. (1.6 mm) thick) directly to the test area. Use a spatula or other convenient means.

8.8 Place a watch glass cover over the reagent and allow the test reagent to remain in contact with the test area for 60 ± 1 min.

8.9 Remove filter paper with tweezers. Blot (do not rub) residual liquid with a dry facial tissue. For paste reagents, lightly scrape surface with the spatula to remove reagent and wipe area with dry facial tissue. Particular care must be taken during scraping and blotting so as not to disturb the exposed surface more than necessary.

8.10 If residual reagent remains on the surface, lightly clean the exposed area with water or mild solvent, such as isopropanol or odorless mineral spirits, then blot dry with facial tissue.

NOTE 1—Some solvents are flammable and can soften the surface layer, or both. If a question arises as to which are suitable, direct them to the manufacturer.

8.11 When thickness, indentation, and colorimetric data are to be measured readings, they should be taken within 15 min after removing test reagents and recorded as indicated in Fig. 1.

		Overall thickness, mils			Indentation, mils			Color; L, a, b							Sample:
								Initial			After exposure				
	Reagent	Initial	Difference after exposure	Difference 24 h after exposure	Initial	Difference after exposure	Difference 24 h after exposure	L	a	b	L	a	b	ΔE	Comments
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
	Average														

FIG. 1 Resistance to Chemicals Measurement Form

		0–3 Ratings					Sample:
	Reagent	Surface Attack	Color Change	Surface Dulling		Average	Comments
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
	Average						

FIG. 2 Subjective Resistance to Chemicals Evaluation Form

9. Interpretation of Results

9.1 Within 5 min after removing test reagents, visually examine the exposed test area as compared to the adjacent, untested area of similar color and texture.

9.2 Subjective category ratings will all utilize the same scale of 0–3 with 0 = no change; 1 = slight change; 2 = moderate change; and 3 = severe change. The following categories should be rated:

9.2.1 *Surface Dulling*—Indicating that the specimen suffered from a loss of gloss,

9.2.2 *Color Change*—Indicating that the specimen suffered discoloration or bleaching, or both, and

9.2.3 *Surface Attack*—Indicating that the specimen suffered surface damage such as softening, warping, swelling, blistering, peeling, raised or rough area.

9.3 If more than a slight change is noted, reevaluate sample in 24 h. If the sample is still rated as more than a slight change, apply two coats of high quality crosslinked acrylic polish per manufacturer's recommendations and rate again 1 h after applying final coat of polish. The 24 h rating is optional but can be useful in determining if the affected area shows a temporary or permanent change as a result of the reagent exposure.

9.4 This test method recognizes that there are methods to potentially help quantify chemical attack on tile and noncushioned products. One can consider using change in thickness to measure product swell or indentation to indicate softening, in addition to the visual rating system. However, these methods and results can be misleading where there is only small change due to reagent exposure and there is danger that repeated results could well be within the reporting error of the test method.

9.5 For this reason we include the methodology for reporting results, but advise attempting to quantify only when changes are considered to be more than a slight change.

9.6 *Thickness Change*—Report percentage change from initial thickness (positive for swell, negative for shrinkage). Use an average of three tests utilizing Test Method F386.

9.7 *Indentation*—Report indentation value of test area versus unexposed test area. Use an average of three tests using the 1 min time test interval utilizing Test Method F142.

9.8 *Color Change*—Report as ΔE using Test Method D2244.

10. Precision and Bias

10.1 This test method is subjective and test results are nonnumeric. No statement is made about either the precision or the bias since the results are to be used for comparative testing.

11. Keywords

11.1 chemicals; flooring; resilient; resistance

APPENDIX

(Nonmandatory Information)

X1. TEST REAGENTS

X1.1 Suggested Test Reagents X1.1

White vinegar (5 % acetic acid)
Rubbing alcohol (70 % isopropyl alcohol base)
White mineral oil (medicinal grade)
NaOH solution (5 %)
HCl (hydrochloric acid) solution (5 %)
H_2SO_4 (sulfuric acid) solution (5 %)
Household ammonia solution (5 % NH_4OH)
Household bleach (5.25 % NaOCl)
Disinfectant—phenol type (5 % active phenol)
Kerosene
Olive oil
Unleaded gasoline