



Standard Specification for Solid Vinyl Floor Tile¹

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1. Scope

1.1 This specification covers solid vinyl² floor tiles that are monolithic, surface decorated or printed, and that have binder contents referenced in Table 1.

1.2 This type of floor covering is intended for use in commercial, light commercial, and residential buildings. General information and performance characteristics which determine serviceability and recommended use are included in this specification.

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.*

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

2. Referenced Documents

2.1 ASTM Standards:

- F 137 Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus³
- F 141 Terminology Relating to Resilient Floor Coverings³
- F 373 Test Method for Embossed Depth of Resilient Floor Covering³
- F 386 Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces³
- F 536 Test Method for Size of Resilient Floor Tile by Dial Gage Method³
- F 540 Test Method for Squareness of Resilient Floor Tile by Dial Gage Method³
- F 925 Test Method for Resistance to Chemicals of Resilient Flooring³
- F 1514 Test Method for Measuring Heat Stability of Resilient Vinyl Flooring by Color Change³
- F 1515 Test Method for Measuring Light Stability of Resilient Vinyl Flooring by Color Change³
- F 1914 Test Method for Short-Term Indentation and Re-

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² For solid vinyl definition, refer to Terminology F 141.

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

TABLE 1 Minimum Binder Content

	Class I	Class II	Class III
Each ply or layer	34 %	34 %	...
Clear wear layer	90 %
Intermediate colored layer	34 %
Each base layer	34 %

sidual Indentation of Resilient Floor Covering³

2.2 Other Standards:

- Fed. Std. No. 501a (notice 1) Federal Test Method Standard for Floor Covering, Resilient, Non-Textile, Sampling and Testing Method 6211 Dimensional Stability⁴
- ANSI/ASQC Z1.4–1993 Sampling Procedures and Tables for Inspection by Attributes⁵

3. Classification

3.1 The vinyl floor tiles covered by this specification shall be classified as follows:

3.1.1 Class I—Monolithic Vinyl Tile.

3.1.1.1 Type A—Smooth Surface.

3.1.1.2 Type B—Embossed Surface.

3.1.2 Class II—Surface-Decorated Vinyl Tile.

3.1.2.1 Type A—Smooth Surface.

3.1.2.2 Type B—Embossed Surface.

3.1.3 Class III—Printed Film Vinyl Tile.

3.1.3.1 Type A—Smooth Surface.

3.1.3.2 Type B—Embossed Surface.

3.2 The embossed surfaces may or may not be grouted with ink.

4. Ordering Information

4.1 The purchaser shall state whether this specification is to be used, select the preferred options permitted herein, and include the following contract requirements on the purchase order:

4.1.1 Title, number, and date of this specification,

4.1.2 Class, type, and pattern number (Section 3),

4.1.3 Quantity in square feet, pieces, or cartons,

4.1.4 Size required (Section 6),

⁴ Available from Standardization Documents Order Desk, Bldg. 4, Section D, Robbins Ave., Philadelphia, PA 19111–5094, Attn: NPODS.

⁵ Available from American National Standards Institute, 11 West 42nd St., New York, NY 10036.

4.1.5 Thickness required (Section 6),

4.1.6 Lot formation if other than as specified in Fed. Std. No. 501a, Section 5,

4.1.7 Sampling if other than as specified in Fed. Std. No. 501a, Section 5,

4.1.8 Packing requirement if other than as specified (Section 12),

4.1.9 Palletization if required (agreement between the manufacturer and the purchaser),

4.1.10 Marking required if other than specified (Section 13) (agreement between the manufacturer and the purchaser),

4.1.11 Chemical resistance (see 6.8). The basic chemicals used in the test are those likely to be found in domestic, commercial and institutional use. Many proprietary compounds contain one or more of these basic chemicals. Should the flooring for unusual application need to be resistant to a specific chemical, this additional requirement should become part of the procurement document.

4.1.12 Other requirements (agreement between the manufacturer and the purchaser).

5. Material and Manufacture

5.1 *Material*—The tile shall be composed of binder, filler, and pigments compounded with suitable lubricants and processing aids. The binder consists of one or more polymers or copolymers of vinyl chloride, other modifying resins, plasticizers, and stabilizers which comprise at least the following minimum percent weight: see Table 1. The polymers or copolymers of vinyl chloride comprise at least 60 % of the weight of the binder. Any copolymer of vinyl chloride used shall contain at least 85 % vinyl chloride.

5.2 *Class, Type, and Pattern Number*—The class, type, and pattern number, as applicable shall be as specified in the contract or order (see 4.1).

NOTE 1—The patterns that are available are indicated in individual manufacturer's current catalogs.

5.3 *Monolithic Vinyl Tile*—The tile shall be uniform, with respect to color, pattern effect, and composition, throughout the thickness of the tile.

5.4 *Surface Decorated*—In surface-decorated tiles, the pattern and color need not extend through the entire thickness of the tile. The composition of each layer shall be according to Table 1.

5.4.1 The appearance of the tile, when the wearing layer is removed by any suitable means, to a depth of 0.010 in. (0.25 mm) shall compare favorably for decoration with the tile's original appearance.

5.5 *Printed Film Vinyl Tile*—The structure of printed solid vinyl tiles is formed of vinyl wear layer which may be transparent or translucent. The pattern and colors are created by a print between the wear layer and the intermediate colored layer or base layer. Other base layers may be added. Each ply or layer will comply with Table 1 for binder content.

5.5.1 For commercial applications, the wear layer shall be a minimum of 0.020 in. (0.50 mm) thick.

6. Physical Requirements

6.1 *Binder Content*—The binder content of each ply or layer shall be determined by statement of formula (Manufacturer

Certificate of Compliance).

6.2 *Size*⁶—Unless otherwise specified (see 4.1.4), the tile shall be 12 by 12 in. (305 by 305 mm). A tolerance of ± 0.016 in. (0.4 mm) per linear ft (305 mm) shall be permitted when measured in accordance with Test Method F 536. Certain specialty items are available in other sizes.

6.3 *Thickness*—Unless otherwise specified (see 4.1.5), the tile shall be furnished in 0.0625-in. (1.6-mm), 0.080-in. (2-mm), 0.100-in. (2.5-mm), and 0.125-in. (3-mm) thicknesses. A tolerance of ± 0.005 in. (0.13 mm) shall be permitted when tested in accordance with Test Method F 386.

6.4 *Squareness*⁶—When tested in accordance with Test Method F 540, the out-of-squareness of the tile shall not exceed 0.010 in. (0.25 mm).

6.5 *Residual Indentation*—When tested in accordance with Test Method F 1914 under 140-lb (63.5-kg) load, 0.178-in. (4.5-mm) diameter flat foot and 10 min indentation, the average residual indentation at the end of 60-min recovery shall not exceed 8 %, and the maximum residual indentation of any single specimen shall not exceed 10 %.

6.6 *Flexibility*—When tested in accordance with Test Method F 137 and a mandrel size of 1-in. (25.4 mm), the tile shall show no cracks or breaks.

6.7 *Dimensional Stability*—When tested in accordance with Fed. Std. No. 501a, Method 6211, the tile shall not change in linear dimensions more than 0.020 in. (0.5 mm) per linear ft.

6.8 *Resistance to Chemicals*—The chemical resistance of solid vinyl tile shall be determined in accordance with Test Method F 925. The tile shall have no more than a slight change in surface dulling, surface attack, or staining when exposed to the following chemicals:

- 6.8.1 White vinegar (5 % acetic acid),
- 6.8.2 Rubbing alcohol (70 % isopropyl alcohol),
- 6.8.3 White mineral oil (medicinal grade),
- 6.8.4 Sodium hydroxide solution (5 % NaOH),
- 6.8.5 Hydrochloric acid solution (5 % HCl),
- 6.8.6 Sulfuric acid solution (5 % H₂SO₄),
- 6.8.7 Household ammonia solution (5 % NH₄OH),
- 6.8.8 Household bleach (5.25 % NaOCl),
- 6.8.9 Olive oil (light),
- 6.8.10 Kerosene (K1),
- 6.8.11 Unleaded gasoline (regular grade), and
- 6.8.12 Phenol (5 % active phenol).

NOTE 2—The basic chemicals are representative of those likely to be found in residential, commercial, and institutional use. Many proprietary compounds contain one or more of these basic chemicals. Should the flooring for an unusual application need to be resistant to a specific chemical, this additional requirement should become part of the procurement document.

6.9 *Resistance to Heat*—When tested in accordance to Test Method F 1514, the color change of the solid vinyl tile shall have an average ΔE not greater than 8.0 after 7 days exposure to 158°F (70°C).

6.10 *Resistance to Light*—When tested in accordance to Test Method F 1515, the color change of the solid vinyl tile

⁶ For size, squareness, and tolerances, work is proceeding for tiles over 12 by 12 in. (305 by 305 mm).

shall have an average ΔE not greater than 8.0 after a 300–h exposure.

7. Workmanship, Finish, and Appearance

7.1 The floor tile furnished in accordance with this specification shall be an acceptable match to approved samples in pattern, color, and surface appearance. The product shall be free of defects which adversely affect performance or appearance. Such defects include blemishes, breaks in corners or edges, and delamination of the plies.

8. Sampling for Test

8.1 Sampling for testing physical properties, mechanical properties, and performance requirements listed in Table 2 shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4–1993. The inspection level shall be special inspection level S-1, as noted in Table I, and the acceptable quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II-A or as otherwise specified in 8.2 herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished tile.

8.2 Sampling for testing physical properties, mechanical properties, and performance requirements listed in Table 2 shall be agreed upon by the purchaser and the manufacturer as part of the procurement document.

9. Conditioning

9.1 *Conditioning in Air*—Condition the specimens for physical tests in air maintained at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity for not less than 3 h before testing.

9.2 *Conditioning in Water*—Maintain the water temperature at 77 ± 0.9°F (25 ± 0.5°C) unless otherwise specified. Immerse the specimen for not less than 15 min or more than 30 min before testing in either air or water.

10. Inspection

10.1 Inspection of the vinyl composition floor tile for defects that would adversely affect performance shall be done in accordance with the provisions set forth in ANSI/ASQC

Z1.4–1993. The inspection level shall be level L-1, as noted in Table I, and the acceptable quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II-A or as otherwise specified in 10.2 herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished tile.

10.2 Inspection of the vinyl composition floor tile for defects that would adversely affect performance shall be agreed upon by the purchaser and the manufacturer as part of the procurement document.

11. Certification

11.1 When specified in the purchase order or contract, a manufacturer’s certification and any other documents required to substantiate certification shall be furnished to the purchaser, that the material meets this specification.

12. Packaging, Packing, and Marking

12.1 Unless otherwise specified in the purchase order or contract, shipping containers shall be marked with the name of the material as defined by the contract or order under which the shipment is made, the size, thickness, the pattern number, the quantity contained therein, and the name of the manufacturer.

12.2 The vinyl floor tile shall be packaged in accordance with normal commercial practice and packed to ensure acceptance by common carrier and to provide protection against damage during normal shipping, handling, and storage or shall be as specified in 4.1.8.

13. Special U. S. Government Requirements

13.1 The depressed areas of embossed tile shall involve no more than one third of the original, flat tile surface area prior to embossing as measured on a full tile. On embossed tile, there shall be no depressed area into which a 0.625-in. (16-mm) diameter circle can be placed, except that this shall not apply to tile that has an overall embossed surface, such as brick, slate, or other textures.

14. Keywords

14.1 laminate; monolithic; print; resilient flooring; solid vinyl; specification; tile

TABLE 2 Characteristics and Tests

Characteristic	Requirement	Test Method	Reference
Composition of material	see Table 1	Certificate of compliance	6.1
Size, tolerance ^A	±0.016 in./lin. ft (0.4 mm/305 mm)	F 536	6.2
Thickness	as specified ±0.005 in. (0.13 mm)	F 386	6.3
Squareness ^A	maximum 0.010 in. (0.25 mm)	F 540	6.4
Residual indentation	average less than 8 %, maximum single reading 10 %	F 1914	6.5
Flexibility	1-in. (25.4-mm) mandrel, no crack or break	F 137	6.6
Dimensional stability	0.020 in./lin. ft (0.51 mm/305 mm) maximum	Fed. Std. No. 501a, Method 6211	6.7
Resistance to chemicals	No more than a slight change in surface dulling, surface attack, or staining	F 925	6.8
Resistance to light	ΔE < 8 ave., max	F 1515	6.10
Resistance to heat	ΔE < 8 ave., max	F 1514	6.9

^A For size, squareness, and tolerances, work is proceeding for tiles over 12 by 12 in. (305 by 305 mm).

APPENDIX

(Nonmandatory Information)

X1. ADDITIONAL INFORMATION

X1.1 The following sources can be consulted for additional information:

X1.1.1 *ASTM Standards:*

D 3564 Practice for Application of Floor Polishes to Maintain Vinyl Composition Tile or Flooring³

F 511 Test Method for Quality of Cut (Joint Tightness) of Resilient Floor Tile³

F 710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring³

F 1482 Guide to Wood Underlayment Products Available for Use Under Resilient Flooring³

X1.1.2 *Other Sources:*

Recommended Work Procedures for Resilient Floor Covering⁷

National Motor Freight Classification⁸

Uniform Freight Classification⁹

⁷ Available from Resilient Floor Covering Institute, Hungerford Drive, Suite 12B, Rockville, MD 20850.

⁸ Available from American Trucking Association Inc., Tariff Order Section, 1616 P Street N.W., Washington, DC 20036.

⁹ Available from Uniform Classification Committee, Tariff Publishing Officers, Room 1106, 222 South Riverside Plaza, Chicago, IL 60666.

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