



Designation: F1700 – 13

## Standard Specification for Solid Vinyl Floor Tile<sup>1</sup>

This standard is issued under the fixed designation F1700; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

### 1. Scope

1.1 This specification covers solid vinyl<sup>2</sup> floor tiles that are monolithic, surface decorated or printed, and protected by a clear wear layer.

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 standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>3</sup>

**F137** Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus

**F141** Terminology Relating to Resilient Floor Coverings

**F373** Test Method for Embossed Depth of Resilient Floor Coverings

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

**F410** Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement

**F925** Test Method for Resistance to Chemicals of Resilient Flooring

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.80 on Specifications.

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<sup>2</sup> For solid vinyl definition, refer to Terminology **F141**.

<sup>3</sup> 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.

**F1514** Test Method for Measuring Heat Stability of Resilient Flooring by Color Change

**F1515** Test Method for Measuring Light Stability of Resilient Flooring by Color Change

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

**F2055** Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method

**F2199** Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat

2.2 *Other Standards:*

**ANSI/ASQC Z1.4–1993** Sampling Procedures and Tables for Inspection by Attributes<sup>4</sup>

### 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),

4.1.5 Thickness required (Section 6),

<sup>4</sup> Available from American National Standards Institute, 11 West 42nd St., New York, NY 10036.

4.1.6 Lot formation if other than as specified in ANSI/ASQC Z1.4–1993 (see Sections 8 and 10),

4.1.7 Sampling if other than as specified in ANSI/ASQC Z1.4–1993 (see Sections 8 and 10),

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 surface decorated 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*<sup>5</sup>—Unless otherwise specified (see 4.1.4), the tile shall be 12 by 12 in. (305 by 305 mm). A tolerance of  $\pm 0.016$  in. (0.4 mm) per linear ft (305 mm) shall be permitted when measured in accordance with Test Method F2055. Certain specialty items are available in other sizes.

6.3 *Thickness*:

6.3.1 *Product*—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  $\pm 0.005$  in. (0.13 mm) shall be permitted when tested in accordance with Test Method F386.

6.3.2 *Wear Layer*—For Class III products, the thickness shall be measured in five (5) unembossed locations to determine thickness average. See Test Method F410.

6.4 *Squareness*<sup>5</sup>—When tested in accordance with Test Method F2055, 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 F1914 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 F137 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 Test Method F2199, 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 F925. 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 % H<sub>2</sub>SO<sub>4</sub>),
- 6.8.7 Household ammonia solution (5 % NH<sub>4</sub>OH),
- 6.8.8 Household bleach (5.25 % NaOCl),
- 6.8.9 Olive oil (light),
- 6.8.10 Kerosene (K1),

<sup>5</sup> For size, squareness, and tolerances, work is proceeding for tiles over 12 by 12 in. (305 by 305 mm).

**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 %