



Standard Specification for Polyolefin Composition Floor Tile¹

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1. Scope

1.1 This specification covers polyolefin composition tile with either smooth or embossed surfaces flooring application for use in commercial, light commercial or residential surfaces flooring application.

1.2 This specification covers a tile that shall be composed of binder, fillers and pigments. The binder shall consist of one or more resins of polyolefin, polyolefin copolymers or polyolefin ter-polymers (or other suitable), or any desirable combination. Other suitable polymeric resins may be incorporated as part of the binder provided the polyolefin portion of the binder system is greater than 50 %.

1.3 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.

1.4 *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.*

2. Referenced Documents

2.1 The following documents of the issue in effect on the date of material purchase form a part of this specification to the extent referenced herein:

2.2 ASTM Standards:²

D883 Terminology Relating to Plastics

F141 Terminology Relating to Resilient Floor Coverings

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

F925 Test Method for Resistance to Chemicals of Resilient Flooring

F1265 Test Method for Resistance to Impact for Resilient Floor Tile

F1304 Test Method for Deflection of Resilient Floor Tile

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

2.3 Other Standards:³

ANSI/ASQC Z1.4 (most recent version)—Sampling Procedures and Tables for Inspection by Attributes

3. Terminology

3.1 Definitions:

3.1.1 *polyolefin, n*—a polymer prepared by the polymerization of an olefin(s) as essentially the sole monomer(s). (D20)

4. Classification

4.1 The polyolefin composition floor tile covered by this specification shall be non-asbestos formulated and classified as follows: Class 1 for solid tile, Class 2 for through pattern tile, and Class 3 for surface pattern tile. These may have either smooth or embossed wearing surfaces.

5. Ordering Information

5.1 The purchaser shall state whether this specification is to be used, select the preferred options permitted herein, and shall include the following information in the invitation to bid and purchase order:

5.1.1 Title, number, and date of this specification,

5.1.2 Class, color, pattern, and wearing surface (see Section 6),

5.1.3 Quantity in square feet or cartons,

5.1.4 Size required (see 7.1),

5.1.5 Thickness required (see 7.2),

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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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

5.1.6 Lot formation if other than as specified in ANSI/ASQC Z1.4 (see Sections 11 and 13),

5.1.7 Sampling, if other than as specified in ANSI/ASQC Z1.4 (see Sections 11 and 13),

5.1.8 Packing requirements if other than as specified (see 16.1),

5.1.9 Depth of depressed areas, if required,

5.1.10 Palletization, if required (agreed upon between the manufacturer and the purchaser),

5.1.11 Marking, if other than specified (agreed upon between the manufacturer and the purchaser), (see 15.1), and

5.1.12 Other requirements (agreed upon between the manufacturer and the purchaser).

6. Materials and Manufacture

6.1 *Materials*—The tile shall be composed of binder, fillers, and pigments. The binder shall consist of one or more resins of polyolefin, polyolefin copolymers, or polyolefin ter-polymers (or other suitable), or any desirable combination. Other suitable polymeric resins may be incorporated as a part of the binder provided the polyolefin portion of the binder system is greater than 50 %.

6.2 *Color, Pattern, and Wearing Surface*—The color, pattern, and wearing surface, as applicable shall be as specified in the contract or order (see 5.1).

NOTE 1—The colors and patterns that are available are indicated in individual manufacturer's current catalogs. As manufactured, colors vary somewhat in hue and shade.

6.3 *Solid Color Tile*—Solid color tile shall be uniform throughout.

6.4 *Through Pattern Tile*—In through pattern tile, either the pattern and colors on the surface of the tile extend entirely through the thickness of the tile without significant change, or the colors appearing on the surface shall extend throughout the entire thickness of the tile, although the appearance of the pattern created by these colors will change throughout the thickness.

6.5 *Surface Pattern Tile*—The pattern of this tile need not extend through the entire thickness of the tile.

6.5.1 The appearance of the tile, when the wearing layer is removed to a depth of 0.010 in. (0.254 mm), shall compare favorably for decoration with the tile's original appearance. The removal of the wearing layer may be accomplished by any suitable method.

7. Physical Properties

7.1 *Size*—Unless otherwise specified (see 5.1.4), the tile shall be 12 by 12 in. (305 by 305 mm). A tolerance of ± 0.016 in. (0.406 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.

7.2 *Thickness*—Unless otherwise specified (see 5.1.5), the tile shall be furnished in 0.062-in. (1.588-mm), 0.080-in. (2.032-mm), or 0.125-in. (3.175-mm) thickness. A tolerance of ± 0.005 in. (0.127 mm) shall be permitted when measured in accordance with Test Method F386.

7.3 *Squareness*—When tested in accordance with Test Method F2055, the out-of-squareness of the tile shall not exceed 0.010 in. (0.254 mm).

8. Mechanical Properties

8.1 Indentation:

8.1.1 When the tile is tested in accordance with Test Method F1914 at a temperature of 77°F (25°C), the indentation at the end of 1 min shall be not less than 0.007 in. (0.152 mm), and not more than 0.012 in. (0.381 mm).

8.1.2 *Embossed Tile*—When the requirement for flat surface as set forth in Test Method F1914 cannot be met, the test shall be made by the manufacturer on un-embossed stock and the manufacturer shall supply a certificate of compliance.

8.2 *Impact*—When the tile is tested in accordance with Test Method F1265, the tile shall not break or crack beyond the prescribed circle of zinc oxide paste.

8.2.1 For 1/8-in. (3.175-mm) tile the weight shall be dropped from a height of 20 in. (508 mm). For tile gage less than 1/8 in., the weight shall be dropped from a height of 10 in. (254 mm). Test all products with a 0.143-lb (0.065-kg) weight dropped 4 times.

9. Performance Requirements

9.1 *Deflection*—The tile, when tested in accordance with Test Method F1304, shall deflect not less than 1.0 in. (25.4 mm) both across and with the grain, without breaking.

9.2 *Dimensional Stability*—When tested in accordance with Test Method F2199, the linear dimensions shall not change more than 0.024 in. (0.610 mm) per linear foot.

9.3 *Resistance to Chemicals*: The chemical resistance of the tile shall be determined in accordance with Test Method F925. Polyolefin composition floor tile shall have no more than a slight change in surface dulling, surface attack, or staining when exposed to the following chemicals:

9.3.1 White vinegar (5 % acetic acid),

9.3.2 Rubbing alcohol (70 % isopropyl alcohol),

9.3.3 White mineral oil (medicinal grade),

9.3.4 Sodium hydroxide solution (5 % NaOH),

9.3.5 Household ammonia solution (5 % NH₄OH),

9.3.6 Household bleach (5.25 % NaOCl),

9.3.7 Olive oil (light),

9.3.8 Kerosene (K1),

9.3.9 Unleaded gasoline (regular grade),

9.3.10 Phenol (5 % active phenol), and

9.3.11 Povidone Iodine (10 % free Iodine solution).

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.

9.4 *Resistance to Heat*—When tested in accordance with Test Method F1514, the color change of the olefin composition floor tile shall have an average ΔE not greater than 8.0 after 7 days exposure to 158°F (70°C).

9.5 *Light Resistance*—When tested in accordance with Test Method F1515, the color change of the olefin composition floor

tile shall have an average ΔE not greater than 8.0 after 300 h exposure to UV light.

10. Workmanship, Finish, and Appearance

10.1 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 that adversely affect performance or appearance. Such defects include blemishes, spots, indentations, cracks, blisters, and breaks in corners or edges.

11. Sampling

11.1 Sampling for testing physical properties, mechanical properties, and performance requirements listed in **Table A1.1** shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4—(most recent version). 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 of ANSI/ASQC Z1.4 or as otherwise specified in **11.2** herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished tile.

11.2 Sampling for testing physical properties, mechanical properties, and performance requirements listed in Table A1.1 shall be agreed upon by the purchaser and the manufacturer as part of the procurement document.

12. Conditioning

12.1 *Conditioning in Air*—Condition the specimens for physical tests in air maintained at $73.4 \pm 3.6^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$) and $50 \pm 5\%$ relative humidity for not less than 3 h before testing.

13. Inspection

13.1 Inspection of the polyolefin 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—(most recent version). 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 of ANSI/ASQC Z1.4 or as otherwise specified in **11.2** herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished tile.

13.2 Inspection of the polyolefin 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.

14. Certification

14.1 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 was manufactured to meet this specification.

15. Product Marking

15.1 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 or shall be as specified in **5.1**.

15.2 When product sample sets, sample set cover cards, marketing and technical literature reference this specification, the complete products classification information relative to this specification shall be included.

16. Packaging and Package Marking

16.1 The polyolefin composition 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 **5.1.8**.

17. Special Government Requirements

17.1 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 tiles, there shall be no depressed area into which a $\frac{5}{8}$ -in. (15.875-mm) diameter circle can be placed; except that this shall not apply to tile that have an overall embossed surface, such as brick, slate, or other textures.

18. Keywords

18.1 polyolefin composition floor tile; polyolefin tile; resilient flooring

ANNEX

(Mandatory Information)

A1. CHARACTERISTICS AND TESTS

A1.1 See **Table A1.1**

TABLE A1.1 Characteristics and Tests

Characteristic	Requirement	Test Method	Reference
Composition of wearing surface		Certificate of Compliance	6.1 – 6.5
Size, tolerance	±0.016 in. (0.406 mm) per linear foot	F2055	7.1
Thickness	±0.005 in. (0.127 mm), as specified	F386	7.2
Resistance to heat	ΔE not greater than 8.0	F1514	9.4
Resistance to light	ΔE not greater than 8.0	F1515	9.5
Indentation (flat surface) 77°F (25°C) – 1 min	0.007 to 0.012 in. (0.178 to 0.305 mm)	F1914	8.1.1
Indentation (embossed surface)	same as flat surface	F1914 or Certificate of Compliance ⁴	8.1.2
Impact	No cracks beyond limit after 4 drops	F1265	8.2
Deflection (MD and AMD)	1 in. (25.4 mm), min	F1304	9.1
Dimensional stability	0.024 in. (0.610 mm) per linear foot	F2199	9.2
Resistance to chemicals	no more than a slight change in surface dulling, surface attack, or staining	F925	9.3
Squareness	0.010 in. (0.254 mm), max	F2055	7.3

⁴Test Method F1914 cannot be used; the manufacturer will submit a certificate of compliance.

APPENDIX

(Nonmandatory Information)

X1. ADDITIONAL INFORMATION

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

X1.1.1 *ASTM Standards*:²

F141 Terminology Relating to Resilient Floor Coverings

F373 Test Method for Embossed Depth of Resilient Floor Coverings

F510 Test Method for Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method

F511 Test Method for Quality of Cut (Joint Tightness) of Resilient Floor Tile

F710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring

F1037 Test Method for Visual Rating of Appearance of Resilient Floors after In Service Exposure to Foot Traffic

F1482 Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

F1869 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

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

F2170 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

F2420 Test Method for Determining Relative Humidity on the Surface of Concrete Floor Slabs Using Relative Humidity Probe Measurement and Insulated Hood

X1.1.2 *Other Sources*:

Recommended Work Practices for the Removal of Resilient Floor Coverings⁴

National Motor Freight Classification⁵

Uniform Freight Classification⁶

⁴ Available from Resilient Floor Covering Institute, 966 Hungerford Dr., Suite 12B, Rockville, MD 20850.

⁵ Available from American Trucking Assoc., Inc., Tariff Order Section, 1616 P St., N.W., Washington, DC 20036.

⁶ Available from Uniform Classification Committee, Tariff Publishing Officers, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60666.

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