



Designation: F2034 – 08

# Standard Specification for Sheet Linoleum Floor Covering<sup>1</sup>

This standard is issued under the fixed designation F2034; 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.

## 1. Scope

1.1 This specification covers sheet linoleum floor covering.

1.2 Three types of linoleum floor covering are covered (see Section 4). These floor coverings are intended for use in commercial, light commercial, and residential buildings based on serviceability characteristics. General information and performance characteristics, which determine serviceability and recommended use, are included in this specification.

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

1.4 The following safety hazards caveat pertains only to the test methods portion, Section 11, of this specification. *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 to determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

- F137 Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus
- F141 Terminology Relating to Resilient Floor Coverings
- F150 Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
- 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
- F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring
- 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 F06.80 on Specifications.

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<sup>2</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.

- F970 Test Method for Static Load Limit
- F1482 Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
- 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
- F1516 Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended)

2.2 *European Norms*:

- EN 670 Identification and Composition of Linoleum—Determination of Cement and Ash Residue<sup>3</sup>

2.3 *American National Standard*:

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

## 3. Terminology

3.1 *Definitions*:

- 3.1.1 For definitions, refer to Terminology F141.

## 4. Classification

4.1 The floor coverings shall be of the following types:

- Type I — Linoleum sheet with backing
- Type II — Static dissipative linoleum sheet with backing
- Type III — Linoleum sheet with special backing

## 5. Ordering Information

5.1 Linoleum sheet shall be ordered by type, class, thickness, and other characteristics important to the purchaser for the intended use.

- 5.1.1 Title, number, and date of this specification.
- 5.1.2 Type, class, and pattern number.
- 5.1.3 Quantity in square yards (square metres).
- 5.1.4 Thickness required (see Section 8).
- 5.1.5 Sampling if other than as specified in ANSI/ASQC Z1.4, level S-1, as noted in Table 1.

5.1.6 Packing requirement if other than specified (see Section 14).

<sup>3</sup> Available from CEN European Committee for Standardization—Central Secretariat: rue de Stassart, 36 B-1050, Brussels.

<sup>4</sup> Available from American National Standards Institute, 11 West 42<sup>nd</sup> St., 13<sup>th</sup> Floor, New York, NY 10036.

**TABLE 1 Performance Requirements**

| Property                     | Requirement   | Test Method | Reference |
|------------------------------|---|-------------|-----------|
| Thickness                    | Average overall thickness shall be the nominal thickness with a tolerance of $\pm 0.006$ in. (0.15 mm)              | ASTM F386   | 11.1      |
| Static load                  | Residual indentation shall not exceed 0.005 in. (0.12 mm), tested with a load of 150 lb (67.5 kg)                   | ASTM F970   | 11.2      |
| Resistance to chemicals      | No more than a slight change in surface dulling, surface attack, or staining  | ASTM F925   | 11.3      |
| Resistance to heat           | $\Delta E$ not more than 8.0  | ASTM F1514  | 11.4      |
| Resistance to light          | $\Delta E$ not more than 8.0  | ASTM F1515  | 11.5      |
| Flexibility                  | The wear surface will not crack or break when bent face out (see Table 2)   | ASTM F137   | 11.6      |
| Static dissipation (Type II) | Surface to ground resistance in the range of $1.0 \times 10^6$ to $1.0 \times 10^9$ $\Omega$ tested at 100 or 500 V | ASTM F150   | 11.7      |
| Wear surface                 | Wear surface shall be a minimum thickness of 0.04 in. (1 mm)  | ASTM F410   | 11.8      |

5.1.7 Marking required if other than specified (see Section 14).

5.1.8 For specific chemical resistance (see 11.3).

5.1.9 Other requirements.

## 6. Material

6.1 *Wear Surface*—The wear surface is the portion above the fibrous or suitable backing/bedding layer or base coat. The wear surface should have a minimum thickness of 0.04 in. (1 mm).

6.1.1 *Type I/Type II/Type III*—For all types, the wear surface of the linoleum shall consist of a homogeneous mixture of linseed oil or vegetable drying oils, or both; rosin, wood flour, or cork flour, or a combination thereof; color pigments; and inorganic filler. For Type II, the linoleum shall have incorporated into the wearing surface additives, which will give the linoleum electrostatic discharge controlling properties.

### 6.2 Backings:

6.2.1 *Jute*—The jute backing shall be firmly bonded to and partially embedded in the linoleum mix.

6.2.2 *Special Backing*—In some cases a special backing is added such as cork, polyolefin, or other suitable backing.

6.3 *Composition*—The minimum amount of linoleum cement shall be 30 % when tested in accordance with European Norm 670.

## 7. Performance Requirements

7.1 Linoleum sheet floor covering shall meet the requirements in Table 1.

## 8. Dimensions

8.1 Linoleum sheet flooring is available in standard widths of 79 in. (2 m) and typical lengths of 65 ft (20 m) to 105 ft (32 m). Other widths and lengths may be available.

8.2 Linoleum sheet is available in standard thicknesses of 0.080 in. (2.0 mm), 0.100 in. (2.5 mm), 0.125 in. (3.2 mm), and 0.160 in. (4.0 mm). Other gauges may be available.

## 9. Workmanship, Finish, and Appearance

9.1 Materials furnished under this specification shall be an acceptable match to an approved sample(s) in pattern, color, and surface appearance. The product shall be free of defects that would adversely affect performance or appearance.

9.2 Drying room yellowing will disappear when the linoleum is exposed to either natural or artificial light to give a stable color in service; it may reappear or not disappear in areas not exposed to light.

## 10. Sampling

10.1 Sampling for testing physical characteristics listed in Table 2 shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4. The inspection level shall be special inspection level S-1 as noted in Table I, and the acceptance quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II-A, or as specified in 10.2.

10.2 Sampling for testing physical characteristics listed shall be done in accordance with provisions set forth in ANSI/ASQC Z1.4. The inspection level shall be special inspection level S-1 as noted in Table I, and the acceptance quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II, or as specified in 10.1.

## 11. Test Methods

11.1 *Overall Thickness*—The overall thickness when measured shall be determined in accordance with Test Method F386 except that the presser foot shall exert a total force of  $1 \pm 0.1$  oz ( $28.3 \pm 2.8$  g) on the specimen. The thickness of the sample should be the average of the measurements on the three specimens taken 12 in. (305 mm) in from each edge and the center of the sample.

11.2 *Static Load*—Residual indentation shall be determined in accordance with Test Method F970, except a load of 150 lb (67.5 kg) shall be applied.

11.3 *Resistance to Chemicals*—The chemical resistance of linoleum sheet flooring shall be determined in accordance with Test Method F925 when exposed to the following chemicals:

- White vinegar (5 % acetic acid)
- Rubbing alcohol (70 % isopropyl alcohol)
- White mineral oil (medicinal grade)
- Hydrochloric acid (5 % HCl)
- Sulfuric acid (5 % H<sub>2</sub>SO<sub>4</sub>)
- Household ammonia solution (5 % NH<sub>4</sub>OH)
- Household bleach (5.25 % NaOCl)
- Disinfectant – phenol type (5 % active phenol)
- Kerosene (K1)
- Olive oil (light)
- Unleaded gasoline (regular grade)

**TABLE 2 Physical Characteristics**

| Material thickness | Mandrel Diameter |
|--------------------|------------------|
| 0.080 in. (2.0 mm) | 1.2 in. (30 mm)  |
| 0.100 in. (2.5 mm) | 1.6 in. (40 mm)  |
| 0.125 in. (3.2 mm) | 2.0 in. (50 mm)  |
| 0.160 in. (4.0 mm) | 2.4 in. (60 mm)  |