



Standard Specification for Sheet Linoleum Floor Covering¹

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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:

F 137 Test Methods for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus²

F 141 Terminology Relating to Resilient Floor Coverings²

F 150 Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring²

F 386 Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces²

F 410 Test Method for Wear Layer Thickness of Resilient Floor Covering by Optical Measurement²

F 710 Practice for Preparing Concrete Floors and other Monolithic Floors to Receive Resilient Flooring²

F 925 Test Method for Resistance to Chemicals of Resilient Flooring²

F 970 Test Method for Static Load Limit²

F 1482 Guide to Wood Underlayment and Preparation of the Surface to Receive Resilient Flooring²

F 1514 Test Method for Measuring Heat Stability of Resilient Flooring by Color Change²

F 1515 Test Method for Measuring Light Stability of Resilient Flooring by Color Change²

F 1516 Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method²

2.2 *European Norms:*

EN 670 Identification and Composition of Linoleum—Determination of Cement and Ash Residue³

2.3 *American National Standard:*

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes⁴

3. Terminology

3.1 Definitions:

3.1.1 *drying room film*—yellowish film formed on the surface of the linoleum during the oxidation process, which will disappear when 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.

3.1.2 *linoleum cement*—the binder in linoleum consisting of a mixture of linseed oil, pine rosin, fossil, or other resins or rosins, or an equivalent oxidized oleoresinous binder.

3.1.3 *rosin*—a translucent amber to almost black brittle friable resin that is obtained by chemical means from the oleoresin dead wood of pine trees or from tall oil.

3.1.4 For additional definitions, refer to Terminology F 141.

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).

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² *Annual Book of ASTM Standards*, Vol 15.04.

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

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

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).

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.

TABLE 1 Performance Requirements

Property	Requirement	Test Method	Reference
Thickness	Average overall thickness shall be the nominal thickness with a tolerance of ± 0.006 in. (0.15 mm)	ASTM F 386	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 F 970	11.2
Resistance to chemicals	No more than a slight change in surface dulling, surface attack, or staining	ASTM F 925	11.3
Resistance to heat	ΔE not more than 8.0	ASTM F 1514	11.4
Resistance to light	ΔE not more than 8.0	ASTM F 1515	11.5
Flexibility	The wear surface will not crack or break when bent face out (see Table 2)	ASTM F 137	11.6
Static dissipation (Type II)	Surface to ground resistance in the range of 1.0×10^6 to $1.0 \times 10^9 \Omega$ tested at 100 or 500 V	ASTM F 150	11.7
Wear surface	Wear surface shall be a minimum thickness of 0.04 in. (1 mm)	ASTM F 410	11.8

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 gages 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 Film*—This 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 F 386 except that the presser foot shall exert a total force of 1 ± 0.1 oz (28.3 ± 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 F 970, 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 F 925 when exposed to the following chemicals:

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)

White vinegar (5 % acetic acid)
 Rubbing alcohol (70 % isopropyl alcohol)
 White mineral oil (medicinal grade)
 Hydrochloric acid (5 % HCl)
 Sulfuric acid (5 % H₂SO₄)
 Household ammonia solution (5 % NH₄OH)
 Household bleach (5.25 % NaOCl)
 Disinfectant – phenol type (5 % active phenol)
 Kerosene (K1)
 Olive oil (light)
 Unleaded gasoline (regular grade)

NOTE 1—These chemicals are representative of those likely to be found in domestic, commercial, and institutional use. Many proprietary compounds contain one or more of these 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.

11.4 *Resistance to Heat*—The resistance of the linoleum sheet flooring to color change from exposure to an elevated temperature of 158°F (70°C), over a specified time of 7 days, shall be determined in accordance with Test Method F 1514. Remove drying room film (stove yellowing) by exposing the sample to a Xenon-Arc light source for a minimum of 24 h before measuring initial color.

11.5 *Resistance to Light*—The resistance of the linoleum sheet flooring to color change from exposure to light, simulated by a properly fitted Xenon-Arc radiant energy source, over a specified time of 200 h, shall be determined in accordance with Test Method F 1515. Remove drying room film (stove yellowing) by exposing the sample to a Xenon-Arc light source for a minimum of 24 h before measuring initial color.

11.6 *Flexibility*—The flexibility shall be such that the wear surface will not crack or break when bent face out over the specified diameter mandrel.

11.7 *Static Dissipation*—The static dissipative properties of Type II linoleum sheet flooring shall be determined in accordance with Test Method F 150 when tested at 100 or 500 V, surface to ground.

11.8 *Wear Surface*—The thickness of the wear surface shall be determined in accordance with Test Method F 410. The minimum thickness of the wear surface/topcoat shall be 0.04 in. (1 mm).

12. Inspection

12.1 Sampling for inspection of the sheet linoleum floor covering for defects that would adversely affect performance (9.1) shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4. The inspection level shall be Level 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 shall be specified in 12.2.

12.2 Inspection of the linoleum floor covering for defects that would adversely affect performance (Section 7) shall be agreed upon by the purchaser and the manufacturer as part of the procurement documents or shall be as specified in 5.1.

13. Certification

13.1 When specified in the purchase order or contract, a manufacturer's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, inspected and packaged in accordance with this specification and has been found to meet the requirements.

14. Packaging, Packing and Marking

14.1 The linoleum floor covering shall be packaged and marked in accordance with normal commercial practice and packed to ensure acceptance by common carrier and to provide product protection against damage during normal shipping, handling, and storage.

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

15. Keywords

15.1 drying room film; jute; linoleum; linoleum cement; rosin; sheet flooring; static dissipative

APPENDIX

(Nonmandatory Information)

X1. ADDITIONAL INFORMATION

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

ASTM Standards: Practice F 710, Guide F 1482, and Practice F 1516 (when recommended)

Other Sources: EN 548 Linoleum Floor Coverings

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