



Designation: F1859 – 21a

# Standard Specification for Rubber Sheet Floor Covering Without Backing<sup>1</sup>

This standard is issued under the fixed designation F1859; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This specification covers the requirements for the compound and physical characteristics of rubber sheet floor covering without backing.

1.2 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.

1.3 The following precautionary statement pertains only to the test method portion, Section 10, 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

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

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

[D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension](#)

[D883 Terminology Relating to Plastics](#)

[D1566 Terminology Relating to Rubber](#)

[D2240 Test Method for Rubber Property—Durometer Hardness](#)

[D3389 Test Method for Coated Fabrics Abrasion Resistance \(Rotary Platform Abrader\)](#)

[F141 Terminology Relating to 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](#)

[F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring](#)

[F925 Test Method for Resistance to Chemicals of Resilient Flooring](#)

[F970 Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading](#)

[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](#)

2.3 *ANSI Standard*:

[ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes](#)<sup>3</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of other terms used in this standard, see Terminology [F141.2/astm-f1859-21a](#)

## 4. Classification

4.1 Rubber sheet floor covering covered by this specification shall conform to the following types:

4.1.1 *Type I*—Homogeneous rubber sheet floor covering,

4.1.2 *Type II*—Heterogeneous (Layered) rubber sheet floor covering.

4.2 The above may have either smooth, embossed, or molded pattern surfaces.

4.3 These products shall not contain asbestos.

## 5. Ordering Information

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

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<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 referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- 5.1.1 Title, number, and date of this specification,
- 5.1.2 Type, color, and surface (see Section 4 and 6),
- 5.1.3 Quantity, in square feet, square yards, or square meters,
- 5.1.4 Thickness required (see Section 8),
- 5.1.5 Overall thickness, if molded pattern sheet flooring is specified (see 8.1),
- 5.1.6 Width required (see 8.4),
- 5.1.7 Length required (see 8.5),
- 5.1.8 Resistance to chemicals, (see 7.4),
- 5.1.9 Lot information, if other than as specified in ANSI/ASQC Z1.4 (see 10.1 and 11.1),
- 5.1.10 Sampling, if other than as specified in ANSI/ASQC Z1.4 (see 10.1 and 11.1),
- 5.1.11 Statement requesting certification, if certification of compliance is required (see 12.1),
- 5.1.12 Packaging and packing requirements, if other than as specified (see 14.1),
- 5.1.13 Palletization, if required,
- 5.1.14 Marking required, if other than specified (see 13.1), and
- 5.1.15 Other requirements.

## 6. Materials and Manufacture

6.1 *Material*—The polymeric binder of the rubber sheet floor covering shall satisfy the definition of rubber in Terminology D1566, and have been vulcanized, as defined in Terminology D1566 (under vulcanization), such that it becomes thermoset as defined in Terminology D883. The rubber sheet flooring made from this compound shall be resistant to neutral pH cleaners.

6.2 *Color, Pattern, and Wear Layer Surface*—The color, pattern, and wear layer 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 may vary somewhat in hue or shade from the catalog.

NOTE 2—Where color match is a concern, samples from the manufacturer shall be obtained to verify color acceptability.

6.3 *Homogeneous Rubber Sheet Floor Covering*—The surface coloring or mottling shall be uniform throughout the entire thickness of the rubber sheet floor covering.

6.4 *Heterogeneous (Layered) Rubber Sheet Floor Covering*—The surface coloring or mottling need not extend through the entire thickness of the rubber sheet floor covering, but must extend throughout the entire thickness of the wear layer.

6.4.1 The wear layer must have a minimum thickness of 0.040 in. (1.0 mm) when measured in accordance with Test Method F410.

6.4.2 The appearance of the rubber sheet floor covering, after removing 0.020 in. (0.51 mm) of the wear layer thickness, shall compare favorably in appearance with the rubber sheet flooring's original appearance. The removal of the wear layer may be accomplished by any suitable method.

## 7. Performance Requirements

7.1 *Hardness*—The rubber sheet floor covering shall have a durometer hardness of not less than 85 (Shore, Type A) when tested in accordance with Test Method D2240.

7.2 *Modulus at 10 % Elongation*—When tested in accordance with Test Method D412 at a rate of 6 in. (152.4 mm)/min, using a 1 in. (25.4 mm) by 5 in. (127 mm) gage length rectangular specimen, the modulus shall not be less than 300 psi (2.07 MPa). For molded pattern rubber sheet floor covering, the raised pattern shall be removed by any suitable method.

7.3 *Static Loading*—When tested in accordance with Test Method F970, with an applied load of 250 lb (113.4 kg), the residual indentation shall not be greater than 0.005 in. (0.127 mm).

7.4 *Resistance to Chemicals*—When tested in accordance with Test Method F925, the rubber sheet floor covering shall have no more than a slight change in surface dulling, color change or surface attack, when exposed to the following chemicals:

- 7.4.1 White vinegar (5 % acetic acid),
- 7.4.2 Rubbing alcohol (70 % isopropyl alcohol),
- 7.4.3 Sodium hydroxide solution (5 % NaOH),
- 7.4.4 Hydrochloric acid solution (5 % HCl),
- 7.4.5 Sulfuric acid solution (5 % H<sub>2</sub>SO<sub>4</sub>),
- 7.4.6 Household ammonia solution (5 % NH<sub>4</sub>OH), and
- 7.4.7 Household bleach (5.25 % NaOCl).

NOTE 3—These basic chemicals are representative of 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 an unusual application need to be resistant to a specific chemical, this additional requirement should become part of the procurement document (see 5.1.8).

NOTE 4—Since standard SBR rubber flooring is not recommended for installation where the product will be exposed to animal fats, vegetable oils, and petroleum-based reagents, mineral oil, olive oil, kerosene, and gasoline have been removed from the standard chemical list to eliminate any confusion regarding product selection.

7.5 *Resistance to Heat*—When tested in accordance to Test Method F1514, the color change of the rubber sheet floor covering shall have an average  $\Delta E$  not greater than 8.0 after seven days exposure to 158 °F (70 °C). The specimen surface shall be wiped with a clean, white cotton cloth prior to taking the initial and post test conditioned period color readings to remove any wax bloom or other contaminants which may affect the accuracy of the color readings.

7.6 *Abrasion Resistance*—When tested in accordance with Test Method D3389 and with the abrader equipped with H-18 wheels and a load of 500 gf (gram-force) per wheel, the maximum material loss shall not exceed 1 g after 1000 cycles.

## 8. Dimensions, Mass, and Permissible Variations

8.1 *Overall Thickness*—Molded pattern rubber sheet floor covering shall be measured for overall thickness at the thickest cross-sectional area of the flooring. The thickness of the molded pattern shall be uniform throughout the flooring.

8.2 *Base Thickness*—Molded pattern rubber sheet floor covering base thickness shall be measured at the thinnest cross-sectional area of the flooring. The thinnest cross-sectional area shall be uniform throughout the flooring.

8.3 *Thickness*—The thickness of the rubber sheet floor covering shall be as specified in the contract or order (see 5.1.4). An average tolerance, obtained from five individual measurements, of  $\pm 0.006$  in. ( $\pm 0.15$  mm) from the specified thickness shall be permitted in the base thickness alone or in combination with the overall thickness, when measured in accordance with Test Method F386. The difference between the five individual measurements cannot be greater than 0.008 in. (0.2 mm). In the case of molded pattern rubber sheet floor covering, overall thickness and base thickness shall be reported.

8.4 *Width*—The width shall be as specified in the contract or order (see 5.1.6). The net width (gross width less selvages) shall not be less than as marked on the label or package when measured in accordance with 8.6.

8.5 *Length*—The length of the roll shall be as specified in the contract or order (see 5.1.7). The sheet length shall not be less than as marked on the label or package when measured in accordance with 8.6. Each roll shall be in one piece, except that less than 20 % of the rolls in any one shipment may consist of not more than two pieces, the shortest length shall not be less than 5 linear yards (4.57 m), or as agreed upon by the purchaser and seller. Such rolls shall be clearly marked.

8.6 *Length and Width Measurements*—Measurements shall be made with a calibrated 100 ft (30 m) steel tape graduated at intervals of  $\frac{1}{16}$  in. or 1 mm. The roll shall be extended to its full length on a flat surface and all creases and buckles removed, insofar as practical, without applying stresses that cause any significant stretching. Measurements of length shall be rounded to the nearest inch or 10 mm. Net width shall be measured to the nearest  $\frac{1}{16}$  in. or 1 mm at not less than ten locations uniformly distributed along the length of each roll, and the results averaged.

## 9. Workmanship, Finish, and Appearance

9.1 The rubber sheet floor covering furnished in accordance with this specification shall be an acceptable match to approved samples in color, pattern, and appearance. The product shall be free of defects, which adversely affect performance or appear-

ance. Such defects include: blemishes, spots, lines, cracks, indentations, blisters, and delamination.

9.2 Unless otherwise specified in the contract or order (see 5.1), the back or bonding surface of the rubber sheet floor covering shall be buffed, roughened, ribbed, grooved, or otherwise modified to improve the adhesive bond of the rubber sheet floor covering, but in no case shall the thickness of the flooring be decreased to the extent that any depression or groove on the bonding surface be perceptible, under any circumstances, on the exposed surface.

## 10. Sampling for Test

10.1 Sampling for testing physical characteristics listed in Table 1 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 of ANSI/ASQC Z1.4, 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 10.2. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished roll.

10.1.1 Samples shall be obtained in the required length from the outside end of the roll and shall encompass the total width of the material.

10.2 Sampling for testing physical characteristics listed in Table 1 shall be agreed upon by the purchaser and the manufacturer as part of the procurement document.

## 11. Inspection

11.1 Sampling for inspection of the rubber sheet floor covering for defects that would adversely affect performance (see 9.1) shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4. The inspection level shall be Level I as noted in Table I of ANSI/ASQC Z1.4 with an acceptable quality level (AQL) of 6.5 defects per hundred as noted in Table II-(A) of ANSI/ASQC Z1.4 or as otherwise specified in 11.2. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished roll.

11.2 Inspection of the rubber sheet floor covering for defects that would adversely affect performance (see 9.1) shall be agreed upon by the purchaser and the manufacturer as part of the procurement documents.

**TABLE 1 Characteristics and Tests**

Characteristic	Requirement	ASTM Test Method	Reference
Abrasion Resistance	Less than 1 g loss after 1000 cycles	D3389	7.6
Composition of Material	Certificate of Compliance		6.1
Wear Layer Thickness	min 0.040 in. (1.0 mm)	F410	6.4.1
Hardness	min 85 Shore A	D2240	7.1
Modulus at 10 % Elongation	min 300 psi (2.07 MPa)	D412	7.2
Static Loading	$\leq 0.005$ in. (0.127 mm) at 250 lb (113.4 kg) load	F970	7.3
Resistance to Chemicals	No more than a slight change in surface dulling, color change or surface attack	F925	7.4
Resistance to Heat	avg $\Delta E$ not greater than 8.0	F1514	7.5
Average Thickness	$\pm 0.006$ in. ( $\pm 0.15$ mm)	F386	8.3
Width	Not less than as specified	Section 8	8.4
Length	Not less than as specified	Section 8	8.5