



# Standard Specification for Resilient Stair Treads<sup>1</sup>

This standard is issued under the fixed designation F2169; 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 (ε) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Reference to Test Method F1515 in Table 1 was removed editorially in April 2016.

## 1. Scope

1.1 This specification covers resilient treads made of rubber and vinyl for interior use.

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 *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 requirements prior to use.*

## 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>

- D883 Terminology Relating to Plastics
- D1566 Terminology Relating to Rubber
- D1755 Specification for Poly(Vinyl Chloride) Resins
- D2240 Test Method for Rubber Property—Durometer Hardness
- F386 Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
- F925 Test Method for Resistance to Chemicals of 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

<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, 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.

2.3 *ANSI Standard:*

ANSI/ASQC Z1.4-2003 Sampling Procedures and Tables for Inspection by Attributes<sup>3</sup>

## 3. Terminology

3.1 *Material Definitions:*

3.1.1 *rubber, thermoplastic*—The polymeric binder of this compound shall satisfy the definition of rubber, but remain thermoplastic, as defined in Terminology D883.

3.1.2 *rubber, vulcanized thermoset*—the polymeric binder of this compound shall satisfy the definition of rubber, and have been vulcanized, as defined in Terminology D1566.

3.1.3 *vinyl, thermoplastic*—The polymeric binder of this compound shall satisfy the definition of poly (vinyl chloride) in Terminology D883 and Specification D1755 but remain thermoplastic as defined in Terminology D883.

## 4. Classification

4.1 Treads covered by this specification will be of the following types (compositions), class, groups and grades as specified.

Type TS	Rubber, Vulcanized Thermoset
Type TP	Rubber, Thermoplastic
Type TV	Vinyl, Thermoplastic
Class 1	Smooth (Flat)
Class 2	Pattern: Embossed, Grooved, or Ribbed
Group 1	Abrasive Strips: Embedded
Group 2	Contrasting Color for Visually Impaired
Grade –	Based on Shore A durometer hardness:
	Grade 1 ≥ 85
	Grade 2 ≥ 70 but less than 85

## 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:

- 5.1.1 Title, number, and date of this specification.
- 5.1.2 Type, class, nosing style (see Sections 4 and 6).
- 5.1.3 Color (see 6.4).
- 5.1.4 Quantity, in pieces, linear feet, or cartons.

<sup>3</sup> Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

- 5.1.5 Thickness required (see 8.2).
- 5.1.6 Length required (see 8.3).
- 5.1.7 Lot information, if other than as specified in ANSI/ASQC Z1.4-2003 (see 10.1 and 11.1).
- 5.1.8 Sampling, if other than as specified in ANSI/ASQC Z1.4-2003 (see 10.1).
- 5.1.9 Statement requesting certification, if certification of compliance is required (see Section 12).
- 5.1.10 Packing requirement, if other than as specified (see Section 14).
- 5.1.11 Palletization, if required.
- 5.1.12 Marking required, if other than specified (see Section 13).
- 5.1.13 Other requirements.

**6. Materials and Manufacture**

6.1 *Standard Commercial Product*—A tread of the same classification shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer’s standard commercial product. A standard commercial product is a product that has been sold or is currently being offered for sale on the commercial market through advertisements, manufacturer’s catalogs, or brochures and represents the latest production model.

6.2 *Tread Design*—The upper surface of tread shall have one or a combination of the following:

Class 1	Smooth (Flat)
Class 2	Pattern: Embossed, Grooved, or Ribbed
Group 1	Abrasive Strips: Embedded
Group 2	Contrasting Color for Visually Impaired

6.2.1 *Class 1, Smooth (Flat)*—The tread surface shall be smooth and flat.

6.2.2 *Class 2, Pattern: Embossed, Grooved, or Ribbed*—When the surface is embossed, grooved or ribbed, the depth of the design shall not be greater than 50 % of the overall thickness of the tread.

6.2.3 *Group 1, Abrasive Strips (Embedded)*—When specified, one or more mineral-coated abrasive grit strips, each strip not less than 0.030-in. (0.76 mm) thick, shall be recessed into and adhered to the top surface of a smooth surface tread portion to form a continuous flat surface overall. Each strip shall run the full length of the treads and shall be parallel to the nose of the tread. The front edge of the first strip shall be not more than 1 in. (25.4 mm) from the nose of the step or landing. If a second strip is used, it shall be ¾ (19 mm) to 1½ in. (38 mm) from the first strip.

6.2.4 *Group 2, Contrasting Color for Visually Impaired*—The tread shall contain a strip of contrasting color of either the same material or an abrasive material.

6.3 *Nosing Style*—Nosing style shall be as specified (see Figs. 1-3 for some typical styles).

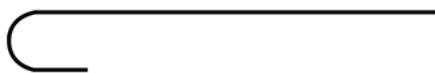


FIG. 1 Round Nose

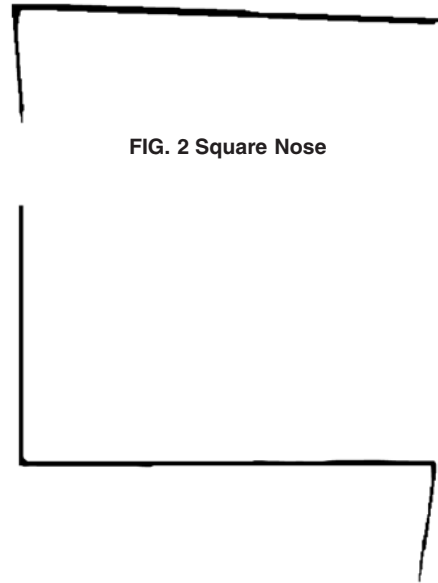


FIG. 2 Square Nose

FIG. 3 With Riser

6.4 *Color*—According to manufacturer’s latest catalogs, and actual samples. Sample color may vary with age and storage conditions.

**7. Performance Requirements**

7.1 *Hardness*—The treads shall have a durometer hardness as follows:

- Grade 1 ≥ 85
- Grade 2 ≥ 70 but less than 85 (Shore, Type A, instantaneous reading) when tested in accordance with Test Method D2240.

7.2 *Molded Stair Treads*—The bonding surface of the tread shall be sanded, roughened, or otherwise modified by the manufacturer to remove substances that may interfere with proper adhesion.

7.3 *Tread Backs*—Unless otherwise specified in the contract or order, the back or bonding surface of the rubber tread shall be sanded, buffed, roughened, ribbed/grooved, or otherwise modified to ensure proper adhesion.

7.4 *Resistance to Chemicals, Short-Term Exposure*—When tested in accordance with Test Method F925, the vinyl and rubber treads shall have no more than a slight change in surface dulling, surface attack, or staining when exposed to the following chemicals:

- White Vinegar (5 % Acetic Acid)
- Rubbing Alcohol (70 % Isopropyl Alcohol)
- Sodium Hydroxide Solution (5 % NaOH)
- Hydrochloric Acid Solution (5 % HCl)
- Sulfuric Acid Solution (5 % H<sub>2</sub>SO<sub>4</sub>)
- Household Ammonia Solution (5 % NH<sub>4</sub>OH)
- Household Bleach Solution (5.25 % NaOCl)

NOTE 1—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 rubber or vinyl tread for an unusual application need to be resistant to a specific chemical, this additional requirement should become part of the procurement document.

7.5 *Resistance to Heat*—When tested in accordance to Test Method **F1514**, the color change of the resilient stair treads shall have an average  $\Delta E$  not greater than 8.0 after 7 days exposure to 158°F (70°C).

7.6 *Resistance to Light*—Existing Q-UV and Xenon-Arc test methods used to test rubber floor tiles, rubber sheets and rubber stair treads resulted in extremely high failure rates which are not typical in everyday use of these products.

## 8. Dimensions and Permissible Variations

8.1 *Dimensions of Rubber and Vinyl Treads*—Rubber and vinyl tread dimensions shall be as specified. The nominal size shall be the actual length and depth of the tread portion (see **Figs. 1-3**).

8.2 *Thickness*—The thickness of resilient stair treads shall be the manufacturer’s standard or as specified. Thickness tolerances shall be  $\pm 1/32$  in. (0.8 mm) when tested in accordance with Test Method **F386**.

NOTE 2—When butting stair treads together on one stair, there should be no more than  $1/16$  in. (1.6 mm) thickness difference between the two adjoining treads.

8.3 *Length*—The length of resilient stair treads shall be the manufacturer’s standard, or as specified, and can be longer to be trimmed to fit. Length shall be measured in accordance with 8.5.

8.4 *Depth*—The depth of resilient stair treads shall be the manufacturer’s standard or as specified. Depth tolerances shall be  $\pm 1/8$  in. (3.2 mm) when measured in accordance with 8.5.

8.5 *Length and Depth Measurements*—Measurements shall be made with a calibrated 100 ft (30 m) steel tape graduated at intervals of  $1/16$  in. or 1 mm. The tread shall be extended to its full length on a flat surface and all creases and buckles removed, without applying stresses that cause any significant stretching. Measurements of length shall be rounded to the nearest inch (10 mm). Net depth shall be measured to the nearest  $1/16$  in. (1 mm) at not less than two locations uniformly distributed along the length of each tread and the results averaged.

## 9. Workmanship, Finish, and Appearance

9.1 The tread base furnished in accordance with this specification shall be free of defects, which adversely affect performance or appearance. Such defects include blemishes, spots, lines, indentations, blisters, and delamination.

## 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 Z1.4-2003. The inspection level shall be special inspection level S-I, as noted in Table I of ANSI/ASQC Z1.4-2003, and acceptable quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II-A of ANSI/ASQC Z1.4-2003 or as otherwise specified in **10.2**. The lot shall be expressed in units. A unit represents a single, manufactured, inventoried, finished carton or piece.

10.2 Sampling for testing physical characteristics listed in Table I of ANSI/ASQC Z1.4-2003 shall be agreed upon by the purchaser and manufacturer as part of the procurement document.

## 11. Inspection

11.1 Sampling for inspection of the tread for defects that would adversely affect performance (see **9.1**) shall be done in accordance with the provisions set forth in ANSI/ASQC Z1.4-2003. The inspection level shall be Level I as noted in Table I of ANSI/ASQC Z1.4-2003 with an acceptable quality level (AQL) of 6.5 defects per hundred as noted in Table II-A of ANSI/ASQC Z1.4-2003 or as otherwise specified in **11.2**. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried carton or piece.

11.2 Inspection of the tread 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 document.

## 12. Certification

12.1 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 product was manufactured to meet this specification.

## 13. Product Marking

13.1 Unless otherwise specified, the carton of staitread shall be marked with the name of the material as defined by the contract or purchase order under which the shipment is made, the length, thickness, composition, type, color, the quantity contained therein, and the name of the manufacturer.

13.2 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.

## 14. Packaging and Packing

14.1 Unless otherwise specified, the staitread shall be packaged in accordance with normal commercial practice and

**TABLE 1 Characteristics and Tests**

Characteristic	Requirement	Test Method	Reference
Composition of Material		Certificate of Compliance	<b>3.1</b>
Resistance to Chemicals	No more than a slight change in surface dulling, surface attack, or staining.	ASTM <b>F925</b>	<b>7.4</b>
Hardness	$\geq 85$ Shore A Durometer	ASTM <b>D2240</b>	<b>7.1</b>
Resistance to Heat	Average $\Delta E$ not greater than 8.0	ASTM <b>F1514</b>	<b>7.5</b>
Thickness	$\pm 1/32$ in. (0.8 mm)	ASTM <b>F386</b>	<b>8.2</b>
Length	As specified, not less than nominal value.		<b>8.5</b>
Depth	As specified, $\pm 1/8$ in. (3.2 mm)		<b>8.5</b>

packed to ensure acceptance by the common carrier and to provide protection against damage during normal shipping, handling, and storage. The manufacturer should include in each package installation instructions and any special requirements for installation.

## 15. Keywords

15.1 nosing; resilient; rubber; thermoplastic; treads; vinyl

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