



Standard Specification for Bonded Rubber Crumb Floor Coverings¹

This standard is issued under the fixed designation F3041; 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 (ϵ) 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 bonded rubber crumb floor coverings.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

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 limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D883 Terminology Relating to Plastics

D1566 Terminology Relating to Rubber

D3389 Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader)

F137 Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus

F141 Terminology Relating to Resilient Floor Coverings

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

F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring

F925 Test Method for Resistance to Chemicals of Resilient Flooring

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

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

2.2 *American National Standard:*³

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

3. Terminology

3.1 *Definitions:*

3.1.1 *crumb rubber, n*—Material derived from reducing rubber material into smaller granules. The granular material shall (1) satisfy the definition of rubber in Terminology D1566, and (2) have been vulcanized, as defined in Terminology D1566 (under vulcanization), such that it becomes thermoset as defined in Terminology D883.

3.1.2 *skive, vt*—to cut thin layers off (leather or rubber, for example); pare.

3.1.3 *skive marks, n*—marks left on the material from the process of skiving; blade marks; striations.

3.2 For additional definitions refer to Terminology F141.

4. Classification

4.1 Bonded rubber crumb floor coverings covered by this specification shall be classified as follows:

4.1.1 Type:

4.1.1.1 Type I – Roll

4.1.1.2 Type II – Tile

4.1.2 Class – Recycled content by weight

4.1.2.1 Class A – Recycled content $\geq 80\%$

4.1.2.2 Class B – Recycled content $\geq 50\%$ and $< 80\%$

4.1.2.3 Class C – Recycled content $\geq 10\%$ and $< 50\%$

4.1.2.4 Class D – Recycled content $< 10\%$

5. Ordering Information

5.1 The 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 and pattern number.

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

¹ 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.

Current edition approved March 1, 2014. Published March 2014. DOI: 10.1520/F3041-14

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.

5.1.3 Quantity, in square feet, lineal feet or as specified.

5.1.4 Roll thickness required (see 8.1.1).

5.1.5 Roll width required (see 8.1.2).

5.1.6 Roll length required (see 8.1.2).

5.1.7 Tile thickness required (see 8.2.1).

5.1.8 Tile size required (see 8.2.2).

5.1.9 Lot information, if other than as specified in ANSI/ASQC Z1.4.

5.1.10 Packing requirements, if other than as specified.

5.1.11 Palletization, if required.

5.1.12 Other requirements.

6. Materials and Manufacture

6.1 The color, finish and wearing surface characteristics shall match the sample mutually agreed upon between the buyer and seller.

NOTE 1—The colors and patterns that are available are indicated in individual manufacturer's current catalogs. As manufactured, and due to the uncontrollable characteristics of the raw material, colors may vary somewhat in hue or shade from the catalog.

NOTE 2—Differences in color and texture can result in shading variation from piece to piece. Color and texture differences or striation is inherent in the manufacturing process and is not considered a defect.

NOTE 3—Where color match is a concern, samples from the manufacturer shall be obtained to verify color or shade acceptability, or both.

6.2 Bonded rubber crumb flooring shall be of uniform structure and composition throughout, consisting of rubber granules thoroughly and uniformly bonded together.

7. Performance Requirements

7.1 *Abrasion Resistance*—Test in accordance with Test Method **D3389** method B and with the abrader equipped with H-18 wheels and a load of 500 g. The flooring shall not lose more than 1 g after 1000 cycles.

7.2 Flexibility:

7.2.1 *Material measuring 0.25 in. (6.35 mm) or thinner*—Test in accordance with Test Method **F137**, both face-in and face-out, using a 0.25 in. (6.35 mm) mandrel. The flooring shall show no tears, flakes, or splitting of the product matrix.

7.2.2 *Material measuring more than 0.25 in. (6.35 mm)*—Test in accordance with Test Method **F137**, both face-in and face-out, using a mandrel of the same diameter as the material thickness. The flooring shall show no tears, flakes or splitting of the product matrix.

7.3 *Static Load Limit*—Test in accordance with Test Method **F970**, with an applied load of 250 lb (113.4 kg).

7.3.1 Bonded rubber crumb flooring shall have a residual indentation of not more than 0.005 in. (0.127 mm).

NOTE 4—Test Method **F970** is suitable only for tiles up to 1 in. thick.

7.4 *Dimensional Stability*—Test in accordance with Test Method **F2199**.

7.4.1 Bonded rubber crumb flooring shall not change in linear dimensions more than nominal 0.050 in. per linear foot ($\pm 0.40\%$).

NOTE 5—Test Method **F2199** is suitable only for tiles up to 1 in. thick.

7.5 *Resistance to Heat*—When tested in accordance with Test Method **F1514**, the flooring shall have an average ΔE of not more than 8.00.

7.6 *Resistance to Short-Term Chemical Exposure*—Test in accordance with Test Method **F925** using the following chemicals, which represent an abbreviated list:

White vinegar (5 % acetic acid)

Rubbing alcohol (70 % isopropyl alcohol)

Sodium hydroxide solution (5 % NaOH)

Hydrochloric acid solution (5 % HCl)

Sulfuric acid solution (5 % H₂SO₄)

Household ammonia solution (5 % NH₄OH)

Disinfectant cleaner (5 % active phenol)

The flooring shall have no more than a slight change in surface dulling, surface attack or color change.

NOTE 6—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 need to be resistant to a specific chemical, this additional requirement should become part of the procurement document.

8. Dimensions and Permissible Variations

8.1 Type I material, roll:

8.1.1 *Thickness*—The thickness of the floor covering shall be as specified in the contract or order. The minimum thickness shall be 0.060 in. (1.5 mm). A tolerance of ± 0.020 in. (± 0.50 mm) from the specified thickness shall be permitted, provided the product thickness does not go below the minimum thickness of 0.060 in. (1.5 mm). Thickness is measured in accordance with Test Method **F386**.

8.1.2 *Length and Width*—The length/width shall not be less than as marked on the label, package or as specified in the contract or order.

8.2 Type II material, tile:

8.2.1 *Thickness*—The thickness of the bonded rubber crumb floor covering tile shall be as specified in the contract or order. The minimum thickness shall be 0.060 in. (1.5 mm). A tolerance of ± 0.020 in. (± 0.50 mm) from the specified thickness shall be permitted, provided the product thickness does not go below the minimum thickness of 0.060 in. (1.5 mm). Thickness is measured in accordance with Test Method **F386**.

8.2.2 *Size*—Bonded rubber crumb floor tiles are available in a variety of sizes and shall be as specified. The following tolerances shall be permitted per tile when measured in accordance with Test Method **F2055**.

8.2.2.1 Up to and including 12 by 12 in. = ± 0.032 in. (305 by 305 mm ± 0.8 mm).

8.2.2.2 Larger than 12 by 12 in. = ± 0.060 in. (305 by 35 mm ± 1.5 mm).

8.2.3 *Squareness*—When tested in accordance with Test Method **F2055**, the out of squareness of the bonded rubber crumb floor tile shall not exceed 0.030 in. (0.76 mm).

NOTE 7—Special care must be taken while measuring rubber tiles for squareness, since the elastic nature of the rubber can lead to stretching or skewing of the tiles during measurement.

9. Workmanship, Finish, and Appearance

9.1 The bonded rubber crumb 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 appearance. Such defects include: blemishes, indentations, cracks, blisters, severe skive marks, and flaking of the surface. The product may exhibit some surface texture or striation.

9.2 When crumb rubber based flooring product will be placed next to each other, some differences in appearance could be observed due to variation in surface texture, shading, color, etc. These visual appearance differences shall not result in the tiles not meeting the specifications listed in [Table 1](#).

10. Sampling

10.1 Sampling for testing physical characteristics listed in [Table 1](#) shall be done in accordance with the provisions set forth in the latest revision of ANSI/ASQC Z1.4. 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](#) or as otherwise specified in [10.2](#) herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried item, as defined by the manufacturing process.

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 bonded rubber crumb 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](#) with an acceptable quality level (AQL) of 6.5 defects per hundred as noted in [Table II-A](#) or as otherwise specified in [11.2](#) herein. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried item, as defined by the manufacturing process.

11.2 Inspection of the bonded rubber crumb 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.

12. Product Marking

12.1 Unless otherwise specified in [5.1](#), 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, pattern number, the quantity or length contained therein, and the name of the manufacturer.

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

13. Packaging and Package Marking

13.1 Unless otherwise specified in [5.1](#), the bonded rubber crumb floor covering shall be packaged in accordance with normal commercial practice and packed to ensure acceptance by the common carrier and to provide protection against damage during normal shipping, handling, and storage.

14. Keywords

14.1 flooring; recycled; resilient; rubber

TABLE 1 Characteristics and Tests

Characteristic	Requirement	ASTM Test Method	Reference
Abrasion Resistance	Less than 1 g loss in mass after 1000 cycles	D3389	7.1
Flexibility	Pass 0.25 in. mandrel for 0.25 in. or thinner material. Pass mandrel equal to material thickness for material greater than 0.25 in. thick.	F137	7.2
Static Load Limit	max 0.005 in. at 250 lb	F970	7.3
Dimensional Stability	max nominal 0.050 in. per linear foot ($\pm 0.40\%$)	F2199	7.4
Resistance to Heat	Average $\Delta E \leq 8.00$	F1514	7.5
Chemical Resistance	No more than a slight change in surface dulling, surface attack or staining	F925	7.6
Roll Thickness	As specified, nominal with allowable ± 0.020 in. (0.50 mm) and minimum thickness ≥ 0.060 in. (1.5 mm)	F386	8.1.1
Roll Length and Width	As specified in contract	—	8.1.2
Tile Thickness	As specified, ± 0.020 in. (0.50 mm)	F386	8.2.1
Tile Size	Up to 12 by 12 in., ± 0.032 in. (up to 305 by 305 mm ± 0.8 mm) Larger than 12 by 12 in. ± 0.060 in. (larger than 305 by 305 mm ± 1.5 mm)	F2055	8.2.2
Tile Squareness	max 0.030 in. (0.76 mm)	F2055	8.2.3

APPENDIX

(Nonmandatory Information)

X1. ADDITIONAL INFORMATION

X1.1 Practice **F710** and Guide **F1482** can be consulted for additional information.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).