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Standard Specification for Sheet Vinyl Floor Covering with Backing[1]

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1. Scope

1.1 This specification covers floor covering having a vinyl plastic wear layer with backing. Products may also contain non-PVC specialty performance top layer(s) or intermediate layer(s), or both.

1.2 Two types of floor covering based on binder content are covered. The floor covering is intended for use in commercial, light commercial, and residential buildings based on serviceability characteristics. General information and performance characteristics that 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 given in parentheses are 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 determine the applicability of regulatory limitations prior to use.*

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2. Referenced Documents

2.1 *ASTM Standards:* [2]

F 137 Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus
F 141 Terminology Relating to Resilient Floor Coverings
F 386 Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
F 410 Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement
F 710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring
F 925 Test Method for Resistance to Chemicals of Resilient Flooring
F 970 Test Method for Static Load Limit
F 1482 Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
F 1514 Test Method for Measuring Heat Stability of Resilient Vinyl Flooring by Color Change
F 1515 Test Method for Measuring Light Stability of Resilient Vinyl Flooring by Color Change
F 1914 Test Method for Short-Term Indentation and Residual Indentation of Resilient Floor Covering

2.2 *American National Standard:*

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *wear layer*—the portion of a resilient floor covering that contains or protects the pattern effect. The wear layer does not include temporary finishes or maintenance coatings.

3.1.2 For additional definitions refer to Terminology F 141.

4. Classification

4.1 Sheet vinyl floor covering shall conform to the following types, grades, and backing classes.

4.1.1 *Types*—Types shall be classified by the PVC wear layer's binder content (vinyl resins, plasticizers, and stabilizers). Non-PVC compositions (specialty performance layer(s)) used as the top layer are not described by binder limits.

Type	PVC Binder Content, Min, %	PVC Wear Layer Description
I[A]	90	Transparent or translucent layer(s) that may contain opaque, translucent, or transparent chips or particles suspended through all or part of the thickness. This wear layer(s) may be over a decorative print.
II[A]	34	Opaque, translucent, or transparent chips or particles that may be surrounded by a clear or colored grout. The design extends throughout the thickness of the wear layer. The wear layer may be over a decorative print.

[A] All types may have a non-PVC top layer(s) with an average minimum total thickness of 0.0004 (in.). Top layer(s) thinner than 0.0004 (in.) may be used but cannot be counted to classify the grade.

4.1.2 *Grades*—Grades shall be classified by the total wear layer thickness (sum of PVC and non-PVC wear layers). The wear layer system shall consist of a single layer or multiple layers that do not delaminate under normal use.

4.1.3 *Backing Classes*—Backing classes shall be arranged according to composition and use category.

4.1.3.1 Class A backings shall be fibrous (non-asbestos formulated) and suitable for floors above, on, and below-grade.

4.1.3.2 Class B backings shall be nonfoamed plastic and suitable for floors above, on, and below-grade.

4.1.3.3 Class C backings shall be foamed plastic and suitable for floors above, on, and below-grade.

5. Ordering Information

5.1 Sheet vinyl floor covering with backing shall be ordered by type, grade, class, and other characteristics important to the purchaser for the intended use as indicated by Table 1.

6. Materials

6.1 *Wear Layer*:

6.1.1 The wear layer shall have a vinyl plastic binder and may include pigments, fillers, extenders, and other ingredients, and shall be stabilized against heat and light deterioration.

[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*, ~~Vol 15.04.~~ volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

TABLE 1 Sheet Vinyl Floor Covering Use Characteristics

Type	Grade	Wear Layer Thickness, min avg		Intended Use[A]
		in.	(mm)	
I	1	0.020	(0.51)	R/LC/C
	2	0.014	(0.36)	R/LC
	3	0.010	(0.25)	R
II	1	0.050	(1.27)	R/LC/C
	2	0.030	(0.76)	R/LC
	3	0.020	(0.51)	R

[A] Intended Use—The following is a partial list providing generic guidance on typical applications of product use. For specific applications refer to manufacturer's product recommendations,

R = Residential: Individual Home/Multifamily Dwelling Living Areas
LC = Light Commercial: Multifamily Dwelling—Common Areas
Hotel/Motel Guest Rooms
C = Commercial: Educational/Institutional
Hospital/Health Care
Retail/Mercantile
Office
Hospitality

6.1.2 The binder of the wear layer shall consist of one or more vinyl resins, plasticizers, and stabilizers. Each resin shall be polyvinyl chloride or a copolymer of vinyl chloride not less than 85 % of which is vinyl chloride. The vinyl resin(s) shall be not less than 60 % by weight of the binder.

6.1.3 The wear layer may be transparent, translucent, or opaque. A background or pattern under the wear layer may be printed with suitably formulated, color stable inks, or otherwise prepared to create a color stable pattern. The color of the pattern created must be stable against heat and light deterioration. See 11.7 and 11.8.

6.1.4 The surface of the wear layer may be smooth, embossed, or otherwise textured with or without valley (depressed) printing.

6.1.5 *Non-PVC Layer*—The top layer(s) of a Type I or II product can be a non-PVC layer(s), which may constitute part of the total wear layer system up to 49 % and is not removable by normal maintenance procedures.

6.1.6 A background color or pattern under the Type I or II wear layer system may be printed with suitably formulated, color stable materials.

6.2 *Intermediate Layers*—Intermediate layers, such as foam and reinforcing materials, may be included.

6.3 *Backing*—The composition of backings shall be fibrous, nonfoamed plastic, or foamed plastic and may contain other ingredients provided the resultant backing is suitable for the use category specified in 4.1.3.

NOTE 1—Backing classes are specified in order to properly specify the adhesives and installation systems to be used.

7. Physical Requirements

7.1 Type I and Type II sheet vinyl floor covering shall meet the requirements in Table 2.

8. Dimensions

8.1 The floor covering is available in standard 6-ft (1.83-m) or 12-ft (3.66-m) widths (minus 0 in.). Other widths may be available. All widths are not available for all types.

8.2 The overall thickness of floor covering varies depending upon type, grade, and class. The floor covering shall be furnished in a minimum overall thickness of 0.040 in. (1.0 mm) provided that the surfaces to receive them are prepared in accordance with Practice F 710 and Guide F 1482.

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.

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 acceptable quality level (AQL) shall be 6.5 defects per hundred units as noted in Table II-A or as 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 2 shall be agreed upon by the purchaser and the manufacturer as part of the procurement documents.

TABLE 2 Sheet Vinyl Floor Covering Requirements

Characteristic		Requirement		Test Method	Reference
Wear Layer		Composition	min	Manufacturer's certificate of compliance	11.1
Type I		Binder Content	90 %		
Type II		Binder Content	34 %		
			min		
Wear Layer Thickness		in.	(mm)	ASTM F 410	11.2
Type	Grade				
I	1	0.020	(0.51)		
	2	0.014	(0.36)		
	3	0.010	(0.25)		
II	1	0.050	(1.27)		
	2	0.030	(0.76)		
	3	0.020	(0.51)		
			max		
Residual Indentation		in.	(mm)		
Type					
I		0.012	(0.31)	ASTM F 1914, Type I	11.4
II		0.007	(0.18)	ASTM F 1914, Type II	11.4
Static Load Resistance					
Intended Use	Min. Load (lb/in.^{2})	Maximum Residual Indent			
		in.	mm	ASTM F 970	11.9
R (Residential)	75	0.005	0.13		
LC (Light Commercial)	125	0.005	0.13		
C (Commercial)	175	0.005	0.13		
Flexibility				ASTM F 137	11.5
Type	Mandrel Dia in. (mm)				
I	¼ (6.4)	No crack/break			
II	1½ (38)	No crack/break			
Resistance to Chemicals		No more than a slight change in surface dulling, surface attack or staining		ASTM F 925	11.6
Resistance to Heat		max avg. – $\Delta E \leq 8$		ASTM F 1514	11.7
Resistance to Light		max avg. – $\Delta E \leq 8$		ASTM F 1515	11.8

11. Test Methods

11.1 *Wear Layer Binder Content*—The wear layer binder content for either type product shall be determined by statement of formula (Manufacturer's certificate of compliance).

11.2 *Wear Layer Thickness*—The wear layer thickness shall be determined in accordance with Test Method F 410 except the thickness of the sample shall be the average of the measurements on three specimens taken 12 in. (305 mm) in from each edge and the center of the sample.

11.3 *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 three specimens taken 12 in. (305 mm) in from each edge and the center of the sample.

11.4 *Residual Indentation*—The residual indentation shall be determined in accordance with Test Method F 1914.

11.5 *Flexibility*—The flexibility shall be determined in accordance with Test Method F 137. The flexibility shall be such that the wear surface will not crack or break when bent face out over a ¼ in. (6.4 mm) diameter mandrel for Type I flooring and a 1½ in. (38 mm) diameter mandrel for Type II flooring.

11.6 *Resistance to Chemicals*—The chemical resistance of sheet flooring shall be determined in accordance with Test Method F 925 when exposed to the following chemicals:

11.6.1 White vinegar (5 % acetic acid),

11.6.2 Rubbing alcohol (70 % isopropyl alcohol),

11.6.3 White mineral oil (medicinal grade),

11.6.4 NaOH solution (5 %),

11.6.5 HCl solution (5 %),

11.6.6 Household ammonia solution (5 % NH_4OH),

11.6.7 Household bleach—5.25 % NaOCl,

11.6.8 Disinfectant—phenol type—(5.5 % Active Phenol), and

11.6.9 Unleaded gasoline.

NOTE 2—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.

11.7 *Resistance to Heat*—The resistance of sheet vinyl floor covering to color change from exposure to elevated temperature of 158°F (70°C) over a specified time of 7 days shall be determined in accordance with Test Method F 1514.

11.8 *Resistance to Light*—The resistance of sheet vinyl floor covering to color change from exposure to light, simulated by a properly fitted xenon-arc radiant energy source over a time of 300 h, shall be determined in accordance with Test Method F 1515.

11.9 *Static Load Resistance*—The static load resistance shall be determined in accordance with Test Method F 970. The load to be applied depends upon intended use as specified in Table 2. Measure the residual indentation after a maximum recovery time of 24 h. The maximum allowable residual indentation for any use category is 0.005 in. (0.13 mm).

12. Inspection

12.1 Sampling for inspection of the sheet vinyl 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 I 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 shall be as specified in 12.2. The lot size shall be expressed in units. A unit represents a single, manufactured, inventoried, finished roll.

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

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~~Product Marking

~~14.1 The sheet vinyl floor covering~~

14.1 Unless otherwise specified in the purchase order or contract, shipping containers shall be~~ packaged and~~ marked~~ in accordance~~ with the name o~~r~~f the material, the size, the thic~~o~~kness (when the m~~m~~atere~~i~~al~~ p~~ is available in more than one thickness), the pattern number, the quantity contained therein and~~ packed to ensure acceptance by common carrier, and to provide~~ the name of the manufacturer.

14.2 When product~~ protection against damage during normal shipping, handling,~~ sample sets, sample set cover cards, marketing and technical literature reference this specification, the complete product cla~~g~~ssification relative to this specification shall be included.

15. Packaging and Package Marking

15.1 The sheet vinyl 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.

16. Keywords

15~~6~~.1 backing; floor; floor covering; grade; resilient; sheet; type; vinyl