

L-F-475a
March 11, 1965

SUPERSEDING
Int. Fed. Spec. L-F-00475 (Army-CX)
January 18, 1962

FEDERAL SPECIFICATION

FLOOR COVERING VINYL, SURFACE (TILE AND ROLL), WITH BACKING

This specification was approved by the Commissioner, Federal Supply Services, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers floor covering having a filled vinyl plastic wearing surface on an organic or inorganic backing.

1.2 Classification.

1.2.1 Types and grades. floor covering shall be of the following types and grades, as specified (see 6.2):

Type I - Tile
Type II - Roll

Grade	Thickness, inches, minimum	
	Overall	Wearing surface
A	0.085	0.050
B	0.065	0.030
C	0.055	0.020

2. APPLICABLE SPECIFICATIONS AND STANDARDS

2.1 The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications:

TT-I-735 - Isopropyl Alcohol.
TT-S-735 - Standard Test Fluids; Hydrocarbon.
UU-P-271 - Paper, Wrapping, Waterproofed Kraft.
CCC-C-429 - Cloth, Cotton, Osnaburg.
CCC-C-467 - Cloth, Jute (or Kenaf), Burlap.
PPP-B-636 - Box, Fiberboard.
PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple Wall.
PPP-D-723 - Drums, Fiber.
PPP-P-291 - Paperboard, Wrapping, Cushioning.

Federal Standards:

Fed. Std. No. 102 - Preservation, Packaging, and Packing Levels.
Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal

Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Offices, Washington, D.C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

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Military Standards:

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Material. Material shall be as specified herein. Materials not specified shall be so selected that the finished formulation will conform to the requirements of this specification.

3.2 Wearing surface. The wearing surface shall be a vinyl plastic layer consisting of a blended composition of a binder, fillers, and pigments stabilized against heat and light deterioration. The binder shall consist of one or more vinyl resins and plasticizer and shall consist of one or more vinyl resins and plasticizer and shall be not less than 34 percent by weight of the wearing surface. Each vinyl shall be a polyvinyl chloride or a copolymer of vinyl chloride not less than 85 percent of which is vinyl chloride. The vinyl resin shall be not less than 60 percent by weight of the binder. A clear protective coating not exceeding 0.0005-inch thick may be applied to the floor covering. The protective coating shall not lessen the action of solvents on floor covering when exposed to solvents specified in 3.9.

3.3 Backing. The backing shall be fabricated of organic or inorganic fibers as specified (see 6.2). Organic fibers shall be felt treated with a resin or asphalt saturant. Inorganic fibers shall be saturated with an alkali and moisture-resistant polymeric material. The backing shall be bonded to the wearing surface. When an attempt is made to pull the wearing surface from the backing by hand, the backing shall delaminate the break before the bonding fails. The extended side of the backing shall not mar the wearing surface or cause sticking where they have been in contact.

3.4 Color and pattern. The color and pattern of the wearing surface shall be as specified (see 6.2 and 6.3). The color and pattern shall be worked throughout the full thickness of the wearing surface of grade A, not less than 75 percent of the thickness of grade B, and not less than 50 percent of the thickness of grade C.

3.5 Dimensions.

3.5.1 Size. Type I floor covering shall be of the length and width specified (see 6.2 and 6.5). Tolerance shall be $\pm 1/64$ inch. The width of type II floor covering shall be standard width + 1 inch - 0 inch (see 6.5).

3.5.2 Thickness. The floor covering shall be furnished in the following thicknesses as specified (see 6.2).

Grade	Thickness, inches minimum	
	Overall	Wearing surface
A	0.085	0.050
B	0.065	0.030
C	0.055	0.020

3.5.3 Squareness. The edges of type I floor covering shall be straight and shall not deviate from squareness by more than 0.010 inch.

3.6 Residual indentation. The residual indentation of the floor covering shall be not more than 0.007 inch when tested as specified in 4.6.4.

3.7 Flexibility. The wearing surface of the floor covering shall not crack or break when bent over a 1-1/2-inch-diameter mandrel.

3.8 Dimensional stability. When the floor covering is tested as specified in 4.6.6, the linear dimension shall not change more than +/- 0.3 percent.

3.9 Resistance to solvents. After exposure to isopropyl alcohol, beef tallow, mineral oil, and cottonseed oil and testing as specified in 4.6.7, the width of the scratch on the floor covering shall be not more than 0.100 inch. After exposure to a 5 percent solution

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of sodium hydroxide; a 5 percent solution of acetic acid; and a 5 percent solution of sulphuric acid; and testing as specified in 4.6.7, the width of the scratch on the floor covering shall be not more than 0.120 inch. When exposed to any of the above solvents as specified in 4.6.7, the floor covering shall not change color.

3.10 Workmanship. The wearing surface of the floor covering shall be smooth and free from blisters, cracks, protruding particles, and embedded matter. The occurrence of defects shall not exceed the acceptable quality level (AQL) specified herein.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Inspection for acceptance. Except where otherwise specified by civil agencies, inspection shall be in accordance with provisions of MIL-STD-105.

4.2.1 Sampling. Sampling for visual examination shall be in accordance with MIL-STD-105, inspection level S-1 for type I floor covering and inspection level I for type II floor covering. The lot size shall be expressed in units of tiles for type I and in units of lineal feet for type II. The AQL shall be 2.5 defects per hundred units for major defects and 6.5 defects per hundred units for total defects.

4.3 Examination of the end item. The floor covering shall be examined to determine conformance with the requirements of this specification. Defects found during this examination shall be classified in accordance with table I.

TABLE I. Classification of defects

Examine	Defect	Major	Minor
Material, construction and work- manship	Color and pattern not as specified	X	
	Depth of color and pattern not as specified	X	
	Exposed side of backing not as specified		X
	Edges not straight		X
	Not smooth		X
	Blisters		X
	Cracks		X
	Protruding particles		X
	Embedded matter		X

4.3.1 Dimensional examination of end item. The floor covering shall be examined for dimensional defects. The lot size and the sample unit for this examination shall be expressed in units of tiles for type I and in units of linear yards of the width on order for type II. The AQL for this examination shall be 4.0 defects per hundred units, the inspection level shall be level S-1

of MIL-STD-105.

4.4 Examination of preparation for delivery. An examination shall be made to determine that marking requirements of section 5 are complied with. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully prepared for delivery with the exception that it need not be sealed. The inspection level shall be S-2 and the AQL shall be 4.0 defects per 100 units.

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Examine	Defect
Markings (exterior and interior)	Incorrect; incomplete; illegible; omitted; of improper size, location, sequence, or method application.
Materials	Any nonconforming component; component missing, damaged, or otherwise defective.
Workmanship	Inadequate application of components: such as incomplete closure of case liners, container flaps; loose or inadequate sealing, strapping or stapling; bulged or distorted containers.
Weights	Gross or net weight exceeds requirement.

4.5 Testing of the end item. The end item shall be tested for the characteristics listed in table II using the test procedures indicated therein. The sample size shall be determined using level S-1 of MIL-STD-105. The lot size shall be expressed in units of tiles for type I and in units of lineal feet for type II. The sample unit shall be the quantity of material required to perform all the tests in table II one time. Failure of the sample unit in any test may be cause for rejection.

4.6 Tests.

4.6.1 Conditioning. Unless otherwise specified (see 6.2), tests shall be conducted of floor covering conditioned in an atmosphere of 50 percent \pm 4 percent relative humidity \pm 2 deg. F.) for a period of not less than 16 \pm 2 deg. F.) for a period of no less than 16 hours. The tests shall be conducted in the same atmosphere.

4.6.2 Thickness. Measurements shall be made with a micrometer graduated to read to read not less than 0.001 inch. The micrometer shall have a flat-ended pressure foot 0.250 inch \pm 0.002 inch in diameter and an anvil that has an area of not less than 0.5 square inch. The pressure foot shall exert a pressure of 20 p.s.i. \pm 5 p.s.i. on the floor covering. No measurement shall be made nearer than 3/4 inch to a cut edge. A specimen 9 inches wide by 12 inches long shall be taken from the end of the roll. Two measurements (the wearing surface and the overall thickness) shall be made for each tile or specimen from each roll. Variation between readings shall be not more than 0.010 inch.

4.6.3 Squareness, type I, tile.

4.6.3.1 Apparatus. The apparatus shall consist of a dial gage and two index strips mounted in a flat-bed plate so as to form an angle of 90 deg. and a reference gage for setting the dial indicator at zero. The dial gage shall be located in the lower left hand corner of the apparatus with the stem extending horizontally so that the foot will contact the edge of the tile held in contact with the two refer-

TABLE II. End item testing

Characteristics	Require- ment reference	Test para. reference	Requirement applicable to:		Results reported as
			Sample	Lot	

			unit	average	
Thickness	3.5.2	4.6.2		X	0.001 inch
Squareness	3.5.3	4.6.3		X	0.001 inch
Residual indentation	3.6	4.6.4		X	0.001 inch
Flexibility	3.7	4.6.5	X		Pass or fail
Dimensional stability	3.8	4.6.6	X		Pass or fail
Resistance to solvents	3.9	4.6.7	X		Pass or fail
Composition of wearing surface	2.2	Certificate of compliance		X	Percent by weight
Type of backing	3.3	Certificate of compliance		X	
Adhesion of backing	3.3	3.3	X		Pass or fail

ence strips. The dial shall be graduated to read to 0.001 inch and shall have a stem travel of approximately 1 inch. The stem of the dial gage shall be adjustable by means of a slide adapter. The contact foot of the indicator stem shall be 0.25 inch \pm 0.01 inch in diameter which exerts a total force of not more than 3.0 ounces on the tile. One of the index strips for holding the tile in position shall be located horizontally along the bottom of the base plate and the other shall be attached on the left side of the plate and at an angle of 90 deg. to the horizontal strip. The lower end of the index strip on the left hand side shall be 1/2 to 3/4 inch above the horizontal strip to permit the stem of the dial indicator to project between the two strips to contact the edge of the tile near the corner. The angle between the two index strips shall be 90 deg. so that the vertical edge of a square tile pressed against the two strips will contact the foot of the stem of the dial indicator at a 90 deg. angle.

4.6.3.2 Procedure. The reference gage shall be placed in the apparatus and pressed firmly against the two index strips. The reference gage shall fit evenly against the strips at all contact surfaces if the index strips are at a 90 deg. angle to each other; if not, the strips shall be adjusted at a 90 deg. angle. The stem of the dial indicator shall be retracted approximately 1/2 inch or one-half of its travel; the stem fastened into position with the foot against the edge of the reference gage; and the indicator dial set at zero. The adjustment of the stem of the indicator is made by releasing the nut on the slide adapter and sliding the indicator along the slotted guide to the desired position and locking in place. Remove the reference gage from the apparatus. Place the tile on the bed plate with the entire length of one of the edges held flush against the horizontal index strip and approximately 1 inch from the vertical index strip. Hold the stem of the dial indicator in the retracted position and move the tile to the left while maintaining contact with the horizontal index strip until the left-hand edge of the tile is in contact with the vertical index strip.

While pressing the tile firmly against the vertical index strip with out distortion of the material, release the dial indicator stem without impact until the foot contacts the edge of the tile. Record the out-of-square from the indicator scale to the nearest 0.001 inch. Measurements shall be made on all four corners of the tile. The maximum value obtained recorded to the nearest 0.001 inch shall be used to determine the out-of-squareness.

4.6.4 Residual indentation.

4.6.4.1 Apparatus. A micrometer gage with 0.001 inch graduations and a flat pressure foot of 0.125 inch \pm 0.002 inch in diameter shall be used. The foot shall exert a pressure of 20 p.s.i. \pm 5 p.s.i. in the measuring range. An indenter consisting of a flat-ended cylindrical steel bar 0.250 inch \pm 0.002 inch in diameter for applying a load of 75 pounds \pm 0.5 pound to the specimen and a steel plate for supporting the specimen shall be used. The bar shall be supported in a frame to insure the face of its foot being parallel to the surface of the steel plate. The edges of the face of the bar in contact with the specimen shall be buffed smooth but not rounded.

4.6.4.2 Procedure. By means of the micrometer gage, measure the thickness of a 2-inch-square specimen. The measurement shall be made as near as practicable in the center of the specimen and the value recorded to the nearest 0.001 inch. Support the specimen on the steel plate and apply a load of 75 pounds \pm 0.5 pound to the wearing surface of the specimen by means of the cylindrical steel bar at the same point which the initial thickness was measured. The face of the foot of the bar shall be parallel to the surface of the steel plate. Apply the load until the bar is in full contact with the specimen but not compressed, then apply the full load in a maximum of 2 seconds. The load shall not be dropped on the specimen. Remove the load after 15 minutes. Sixty minutes after removal of the load, determine the thickness of the specimen

at the same point the initial thickness was recorded. A difference of more than

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0.007 inch between the initial thickness and thickness after recovery shall constitute failure of this test.

4.6.5 Flexibility. Two specimens, 2 inches wide and not less than 7 inches long, shall be cut longitudinally and transversely from the sample. Bend the specimen with the backing placed next to the surface of the 1-1/2-inch diameter mandrel through an arc of 130 deg. in not less than 5 seconds at a uniform speed. Examine the specimen for cracks or breaks while in the bent position. Evidence of cracks or breaks in the specimen shall constitute failure of this test.

4.6.6 Dimensional stability.

4.6.6.1 Apparatus. The following apparatus shall be required:

- (a) A circulating air oven equipped with a temperature control that will maintain the required temperature during test and equipped with horizontal rigid steel plates not less than 12 gage steel for supporting the specimen during exposure. The plates shall be not less than 1 inch larger in each linear dimension than the specimen.
- (b) A flat glass or steel plate not less than 1 inch larger in each linear dimension than the specimen.
- (c) A micrometer-comparator, bench micrometer, or equal that will measure the distance between reference marks to 0.001 inch. The micrometer-comparator should consist of an Invar steel bar on which are mounted two low-power microscopes equipped with filar micrometers graduated to not less than 0.001 inch. The microscopes should be clamped on the bar so that corresponding graduations of the two micrometers are 8 inches apart.
- (d) A 7 by 7 by 1/2 inch steel plate.

4.6.6.2 Procedure. Mark two sets of equally spaced reference points in each linear dimension on a sample tile or a 9- by 9-inch specimen from the sample roll in such a manner that a straight line drawn through these points will be perpendicular to the two parallel edges. Set the marks approximately 8 inches apart. Place the specimen on the flat supporting plate and then place the steel plate on top of the specimen. Determine the distance between the marks to the nearest 0.001 inch. Place the specimen--wearing surface up--in the circulating air oven in a horizontal position on the metal plates. Then heat for a period of 20 hours +/- 1/4 hour at a temperature of 70 deg. +/- 2 deg. C. (158 deg. +/- 3.6 deg. F.). At the end of the heating period, remove the specimen from the oven and stabilize at room temperature and place on the flat steel plate. Determine the distance between the reference points to the nearest 0.001 inch. Average the readings. Change in linear dimension exceeding +/- 0.3 percent in either direction shall constitute failure of this test.

4.6.7 Resistance to solvents.

4.6.7.1 Apparatus. The apparatus shall include the following:

- (a) Scratch tester. The scratch tester shall consist of a horizontal projection shaft on which is mounted a pivoted loading beam which rotates in a vertical plane, and a scratch tool mounted on the underside of the loading beam. The table for mounting the specimen shall be approximately 4 inches in diameter and free to rotate by hand in a counter-clockwise direction in a horizontal plane. A specimen holder consisting of a screw clamp with a rigid metal washer for holding the specimen in position during the test shall be located in the center of the table. The loading beam shall be located in the center of the table. The loading beam shall be

mounted on a horizontal shaft on the base of the tester. The shaft shall be located approximately 4 inches from the center of the specimen table and attached to the base by means of an adjustable

bracket which will permit raising or lowering the shaft as that thickness of the specimen varies. By means of this adjustment, the loading beam shall be maintained parallel to the surface of the specimen. The loading beam shall be mounted on the shaft by means of ball bearings. The loading beam shall be balanced so as to apply a load of 500 grams to the specimen. The scratch tool shall have a sharp tungsten carbide cutting edge 0.189-inch wide, precision ground to a 25-mm radius. The scratch tool shall be held firmly in a clamp located on the underside of the loading beam and in line with the center of the table. The tool shall be held in the clamp at a shear angle of 22 deg. with respect to the surface of the specimen. An assemble shall be used that is similar to Model 203/shear scratch tester or Abraser Model No. 4010 with shear hardness attachment E-3720 equipped with S-20 shear hardness tool, manufactured by the Taber Instrument Corporation.

(b) Solvents. The solvents shall be as follows:

Isopropyl alcohol, TT-I-735, grade A.

Beef tallow.

Cottonseed oil having the following characteristics:

Specific gravity at 77 deg. F., 0.915 to 0.917

Iodine number.....105 to 114

Acid number.....1.0 maximum

Mineral oil, TT-S-735, type IV.

A 5 percent solution of acetic acid.

A 5 percent solution of sodium hydroxide.

A 5 percent solution of sulfuric acid.

4.6.7.2 Procedures.

4.6.7.2.1 Specimens. Twenty-seven specimens from each sample are required for this test. Each specimen shall be 2 inches wide by 3 inches long. Three specimens shall be set aside for predulling or checking the sharpness of the scratch tool and three specimens shall be exposed on the top wearing surface to 10 cc. minimum of each of the solvents listed above for a period of 46 hours +/- 1/4 hour. A watchglass or other suitable device shall be placed over the solvent on the specimen. The exposed specimen shall be maintained at room temperature, 23.0 deg. +/- 1.1 deg. C. (73.4 deg +/- 2.0 deg. F.), except beef tallow specimens which shall be heated to a temperature of 50 deg. to 55 deg. C. (122 deg to 131 deg. F.), and maintained at this temperature for the remainder of the exposure period. At the end of the exposure period, the specimen shall be blotted (not rubbed) with a soft and absorbent tissue and subjected to the scratch test no less than 30 minutes nor more than 60 minutes after exposure to solvents.

4.6.7.2.2 Preparation of scratch tool. The scratch tool used shall produce a scratch on the floor covering before exposure of between 0.050 and 0.055 inch when unexposed specimens are tested.

4.6.7.2.3 Scratch. The projection shaft shall first be adjusted vertically by means of the adjustable bracket, to the thickness of the specimen undergoing test. The specimen shall be clamped firmly on the rotating table. The loading beam with the scratch tool in position shall be lowered until the scratch tool rests on the specimen; the total load shall be 500 grams. The tool shall be not less than 1/8 inch from any edge of the specimen at all times, care being taken to ensure that the scratch obtained is within the area of solvent exposure. The table shall be rotated slowly and steadily by hand in a counterclockwise direction until a scratch 3 inches in length is obtained. The loading beam shall be raised, the specimen removed from the holder, the width of the 3-inch-long scratch measured at three equally spaced places, and the value recorded to the nearest 0.005 inch. No measurement shall be made on the first part of the

scratch where it is evident that the tool has dug

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deeper due to the starting of the test. The order of measurement of specimen shall be an unexposed specimen and an exposed specimen in the order of solvents listed above. The order of measurement shall be repeated until the required number of unexposed and exposed specimens have been tested. The width of the scratch shall be measured with the 139-61 measuring magnifier furnished with the Model 203 shear/scratch tester graduated in 0.005 inch or a Brinell microscope with 20 magnification and fitted with a 7-mm micrometer disc graduated in tenths of a millimeter and equipped with a built-in illuminator. The nine values obtained from the three unexposed specimens and the nine values obtained from each set of three specimens exposed in the respective solvents shall be averaged separately and the results recorded to the nearest 0.005 inch as the scratch width of the unexposed sample and the sample after exposure respectively. An unexposed specimen and an exposed specimen from each set shall be placed on a plane surface beside each other and examined in a north light. A change in color of any exposed specimen from that of an unexposed specimen shall constitute failure of this test.

5. PREPARATION FOR DELIVERY

(For civil agency procurement, the definitions and application of levels of packaging and packing shall be in accordance with Fed. Std. No. 102.)

5.1 Packaging. Unless otherwise specified (see 6.2), commercial packaging will be acceptable.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.2.1 Level A. This type I floor covering in quantities as specified (see 6.2), and unless otherwise specified (see 6.2), each roll of type II floor covering shall be packed in boxes conforming to PPP-B-636, type CF, class weather-resistant, V3c, style RSC, or in boxes conforming to PPP-B-640, class 2. The boxes shall be closed with a waterproof adhesive applied to the entire area of contact between the flaps. The gross weight of each box shall not exceed the weight limitation of the box specification. Each box shall be strapped in accordance with the appendix to the box specification.

5.2.1.1 Type II. When specified (see 6.2), each roll of type II floor covering shall be packed in a drum conforming to PPP-D-723, type II, grade A. Closure and sealing of the drum head shall be in accordance with the drum specification.

5.2.2 Level B. The type I floor covering in quantities as specified (see 6.2), and unless otherwise specified (see 6.2), each roll of type II floor covering shall be packed in boxes conforming to PPP-B-636, type CF, class weather-resistant, with a minimum 200 pounds burst strength, or in boxes conforming to PPP-B-640, class 1. The boxes shall be closed with a waterproof adhesive applied to the entire area of contact between the flaps. The gross weight of each box shall not exceed the weight limitations of the box specification. Strapping shall not be required.

5.2.2.1 Type II. When specified (see 6.2), each roll of type II floor covering shall be packed in a drum conforming to PPP-D-723, type I, grade A. Closure and sealing of the drum shall be in accordance with the drum specification. Alternatively, each roll shall be wrapped in corrugated fiberboard conforming to PPP-P-291, type II. The wrap shall extend not less than 1 inch beyond the ends of the roll, and completely encircle the roll, overlapping 3 inches. The wrap shall be secured on place with tape or by tying with ties of cord or twine, applied twice around the roll, approximately 12 inches from the end and spaced approximately 12 inches apart. The wrapped roll shall be enclosed

in waterproofed paper conforming to UU-P-271, class B-2. All laps and folds shall be sealed with pressure-sensitive tape or a waterproof roll shall be placed in a tube or bag made from osnaburg cloth conforming to

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CCC-C-429, type I, class 2, or burlap conforming to CCC-C-467, class 1. The ends of the tubing or bag shall be closed with ties of galvanized wire not less than 6 inches long by 0.072 inch thick.

5.2.3 Level C. The type I and type II floor covering shall be packed to insure carrier acceptance and safe delivery to destination in containers conforming to the rules and regulations applicable to the mode of transportation.

5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contract or order, the shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to markings required by the contract or order, the shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The floor covering is intended for both dwelling and commercial buildings. Any of the three grades is suitable for dwellings, but grade A should be specified for commercial buildings. For on-grade and below-grade floor, inorganic backing should be specified (see 3.4 and 6.2).

6.2 Ordering data. Purchases should exercise any desired options herein and procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type and grade required (see 1.2.1, 3.5.2, and 6.1).
- (c) Whether backing shall be organic or inorganic (see 3.3 and 6.1).
- (d) Color and pattern required (see 3.4, 6.3, and 6.6).
- (e) Size required (see 3.5.1).
- (f) Atmospheric conditions other than specified (see 4.6.1).
- (g) When other than commercial packaging is required (see 5.1).
- (h) Level of packing required (see 5.2).
- (i) Quantities of type I floor covering to be packed (see 5.2.1 and 5.2.2).
- (j) When alternate packing for type II floor covering is required (see 5.2.1, 5.2.1.1, 5.2.2, and 5.2.2.1).

6.3 Color and pattern. Specific color numbers of the manufacturer should be specified in the invitation for bids to indicate the color and pattern of the floor covering desired (see 3.4).

6.4 Coating. Many vinyl floorings have a factory-applied protective finish, normally a lacquer or other thin surface coating less than 0.0005 inch in thickness. The purpose of this protective finish is to protect the surface of the flooring from soiling and scratching during shipment, display, and installation, and to provide a base for maintenance by the ultimate consumer. As a maintenance base, this coating assists in achieving uniform application and adhesion of the initial coat of floor wax and should not be removed after installation.

6.5 Size availability (type II). Vinyl roll material with backing is commercially available in rolls 6 feet wide.

6.6 Color. Vinyl flooring with backing is commercially available in a wide variety of colors although few manufacturers produce all colors. In normal manufacture, the colors vary somewhat in hue and shade and are subject to minor changes due to age and exposure. A variation in mottling is characteristic of

the material. Where specific color schemes are required for architectural effects, it is recommended that definite color and pattern samples be required.

6.7 Transportation description and minimum weights applicable to this commodity are:

Rail:

Tile or roll, composition, not otherwise indexed by name.

Carload minimum weight 30,000 pounds.

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Motor:

Tile or roll, composition, not otherwise indexed.

Truckload minimum weight 36,000 pounds, subject to rule 115,
National Motor Freight Classification.

MILITARY CUSTODIANS:

Army - MO (ERDL)

Navy - Docks

Air Force - MOA

Review interest:

Army - MO

Navy - YD

Air Force - MOA

User Interest:

Army - GL

Navy - CG, MC

Air Force - None

CIVIL INTEREST:

Department of Commerce

District of Columbia

Department of Interior

Post Office Department

Veterans Administration

Copies of this specification may be purchased for 10 cents each.

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AMENDMENT-1
October 11, 1965

FEDERAL SPECIFICATION

FLOOR COVERING, VINYL, SURFACE (TILE AND
ROLL), WITH BACKING

This amendment, which forms a part of Federal Specification L-F-475a, dated March 11, 1965, was approved by the Commissioner, Federal Supply Surface, General Services Administration, for the use of all Federal agencies.

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Paragraph 4.6.1 -- Delete lines 5 and 6 and following the word "humidity" in line 4 insert the following: "and at a temperature of 23.0 deg. +/- 1.1 C. (73.4 deg. +/- 2 deg. F.) for a period of not less than 16"

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INTERIM AMENDMENT-3
September 24, 1982

SUPERSEDING
Interim Amendment 2
February 9, 1971

INTERIM AMENDMENT

TO

FEDERAL SPECIFICATION

FLOOR COVERING VINYL, SURFACE (TILE AND
ROLL), WITH BACKING

This interim amendment was developed by the Furniture Commodity Center, Office of Personal Property, General Services Administration, Washington, DC, 20406, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

The General Services Administration has authorized the use of this interim amendment as a valid exception to Federal Specification L-F-475A, dated March 11, 1965.

PAGE 1

The approved item name for this document is TILE, VINYL RESIN

Paragraph 1.1, delete in its entirety and substitute:

1.1 Scope. This specification covers floor covering having a vinyl plastic wearing surface on an organic or inorganic or filled fibrous composition (non-abestos formulated) backing.

Paragraph 1.2.1, change the Overall thickness, inches, minimum column to read as follows:

GRADE	OVERALL
A	0.080
B	0.060
C	0.050

Paragraph 2.1, delete in its entirety and substitute:

2.1 The following documents of the issue in effect on the date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

Under Federal Standards, add the following:

"Fed. Test Method Std. 501 - Floor Coverings, Resilient, Nontextile:
Sampling and Testing."

Delete the paragraph beginning "Single copies of this specification, etc." and substitute:

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(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration REgional Offices in Boston, MA; New York, NY; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

Add the following paragraph:

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

National Motor Freight Traffic Association, Incorporated, Agent:

National Motor Freight Classification.

(Application for copies shall be addressed to the National Motor Freight Traffic Association, Inc., Agent, 1616 P Street, N.W., Washington, D.C. 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Traffic Publishing Officer, Room 202 Union Station, 516 W. Jackson Blvd., Chicago, Illinois 60606.)

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Paragraph 3.2, delete the first sentence and substitute:

"The wearing surface shall be a vinyl plastic wear layer consisting of a binder and, if included, fillers and pigments, stabilized against heat and light deterioration."

Paragraph 3.3, delete in its entirety and substitute:

Paragraph 3.3 Backing. The backing shall be fabricated of organic fibers, inorganic fibers or filled fibrous composition (non-asbestos formulated) as specified (see 6.2). Organic fibers shall be felt treated with a resin or asphalt saturant. Inorganic fibers shall be saturated with an alkali and moisture-resistant polymeric material. Filled fibrous compositions (non-asbestos formulated) shall be saturated with an alkali and moisture-resistant polymeric material. The backing shall be bonded to the wearing surface. When an attempt is made to pull the wearing surface from the back by hand the backing shall delaminate or break before the bonding fails. The exposed side of the backing shall not mar the wearing surface or cause sticking where they have been in contact."

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Paragraph 3.4, delete in its entirety and substitute:

3.4 Color and pattern. The color and pattern of the wearing surface shall be as specified (see 6.2 and 6.3). In through-surface patterns the color and patterns the color and pattern shall extend throughout the thickness of the wearing surface. In surface pattern products the color and pattern need not extend throughout the entire thickness of the wearing surface (see 6.2).

Paragraph 3.5.2, change the Overall thickness, inches, minimum column to read as follows:

Grade	Overall
A	0.080
B	0.060
C	0.050

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Paragraph 3.9, line 12, insert this sentence before the last sentence:

"The scratch width requirement shall not apply to embossed areas nor to textured surfaces."

Paragraph 3.10, line 2, delete "smooth and".

Table I, under the column titled "Defect" delete "Not smooth" and the "X" under "Minor".

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Paragraph 4.5, add the following sentences:

"The sample unit for Type II shall be taken from the end of the roll; only one sample unit shall be taken from any given roll. The rolls for the tests on Type II material shall be determined at random as required in MIL-STD-105."

Paragraph 4.6.1, delete lines 5 and 6 and following the work "humidity" in line 4 insert the following: "and at a temperature of 23.0 deg. +/- 1.1 deg. C. (73.4 deg. +/- 2 deg. F.) for a period of not less than 16 hours.

Paragraph 4.6.2, line 10, delete the last three sentences and substitute:

"The wearlayer thickness and overall thickness of embossed or textured patterns may be determined by the above method if the pattern consists of substantially flat areas larger than the micrometer foot. For patterns that do not contain suitable flat areas, thickness of the wearlayer should be determined by Method 2151 of Fed. Test Method Std. 501, at randomly selected points in the specimen. At least 5 points should be measured and averaged.

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The thickness of the backing should be measured by Method 2151 and added to the average obtained for the wearlayer to obtain overall thickness. In cases of dispute the thickness of the wearlayer should be determined by measuring the volume of 6" x 6" section of the specimen and dividing by the area of the specimen to obtain the average overall thickness. Thickness of the backing shall be determined by using Method 2151 and this value subtracted from the overall thickness to obtain the average wearlayer thickness."

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Paragraph 4.6.7.2.3, line 24, insert this sentence after "of the test.":

"The scratch shall be made in smooth areas only. Embossed and textured areas shall be avoided."

Paragraph 6.1, delete the last sentence and substitute:

"For on-grade and below-grade floors, inorganic backing or filled fibrous composition (non-asbestos formulated) backing should be specified (see 3.3 and 6.2)."

Paragraph 6.2(c), delete in its entirety and substitute:

6.2(c) Whether backing shall be organic, inorganic, or filled fibrous composition (non-asbestos formulated) (see 3.3 and 6.1)

Paragraph 6.2, change 6.2(e) to read: "Through-surface pattern required (see 3.4, 6.3, and 6.6)." Reletter the present 6.2(e) and the following items under 6.2 accordingly.