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SUPERSEDING
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FEDERAL SPECIFICATION

MATTING, RUBBER AND VINYL

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

1. SCOPE AND CLASSIFICATION

- 1.1 Scope. This specification covers matting, rubber and vinyl.
- 1.2 Classification. The matting covered by this specification shall be of one type, made of rubber composition, rubber composition with one ply cotton sheeting, or vinyl composition (see 3.2).

2. APPLICABLE DOCUMENTS

- 2.1 The following documents, 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 Standards:

FED-STD-123 - Marking for Shipment (Civil Agencies)
FED-STD-191 - Textile Test Methods
FED-STD-501 - Floor Coverings, Resilient, Non-Textile:
Sampling and Testing

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(Federal Government activities may obtain copies of Federal Specification documents, and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-147 - Palletized Unit Loads
MIL-STD-794 - Parts and Equipment, Procedures for Packaging of

(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.)

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.

American Society for Testing and Materials (ASTM):

D3951 - Standard Practice for Commercial Packaging
G21 - Recommended Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

3.1.1 Rubber. The rubber matting shall be made from synthetic rubber or a mixture of synthetic and reclaimed rubber, with or without cotton sheeting, and shall meet the requirements specified in table I when tested as specified in 4.4.

TABLE I. Physical characteristics of rubber matting.

Characteristic	Requirement
Tensile strength, pound-force per square inch (psi)	
Minimum	700
Maximum decrease after air oven aging, percent of original	20
Ultimate elongation of compound, percent	
Original, minimum	250
Maximum decrease after Air oven aging, percent of original	25
Flexibility	Shall not break or crack
Set of compound, maximum percent	25
Friction, minimum, psi	4
Water absorption, percent	2

3.1.1.1 Cotton sheeting. The cotton sheeting, when used in the construction of rubber matting, shall be plain woven from a good quality cotton. When specified (see 6.2), the contractor shall furnish a Certificate of Compliance.

3.1.2 Vinyl. Vinyl matting shall be suitably compounded virgin polymer or copolymer of vinyl chloride resin, plasticized with phosphate or phthalate ester plasticizers only. The compound shall be uniform and free from fiber and objectionable odor. The matting shall meet the requirements of table II when tested as specified in 4.4. Virgin polymer shall be defined as a polymer or copolymer that has not been processed into a finished product prior to use in the specified matting.

TABLE II. Physical requirements of vinyl matting.

	Requirement Thickness of matting		
	1/8	3/16	1/4
Breaking strength, minimum, pound (lb):			
Machine	13	25	39
Transverse	13	25	39
Ultimate elongation of compound, minimum, original, percent:			
Machine	100	100	100
Transverse	100	100	100
Accelerated weathering	1/	1/	1/
Flexibility at 70 degrees Fahrenheit (F)	2/	2/	2/
Flexibility at 3F	2/	2/	2/
Volatile matter, percent, maximum	1	1	1.0

1/ The sample shall not crack or become stiff and brittle or soft and tacky. The sample shall not change color appreciably when compared to the unexposed sample after 100 hours in the weatherometer.

2/ The specimen shall not crack, flake, craze, or show any other indication of failure.

3.2 Design. The matting shall be of rubber composition, rubber composition with one ply cotton sheeting, or vinyl composition, conforming to requirements specified herein, at the supplier's option. The upper (walking) surface of the matting shall be corrugated with either a longitudinal corrugation or a patterned corrugation, at the supplier's option. When vinyl composition is used, the lower surface of the matting shall be finished with a knurled surface.

3.2.1 Longitudinal corrugations. When longitudinal corrugations are used, the upper surface of the matting shall be grooved with 6-1/2 to 8-1/2 grooves per inch. The grooves shall be either rounded or triangular.

3.2.2 Depth of corrugation. The depth of corrugation shall be not greater than 50 percent of the overall thickness of the matting. The depth of corrugation may be as much as 60 percent of the overall thickness of the matting if the tensile strength of the rubber matting is not less than 1,400 psi and the breaking strength of the vinyl matting is not less than 18 pounds for 1/8-inch thickness, 27 lb for 3/16 inch thickness, and 36 lb for 1/4 inch thickness (see 6.3).

3.2.3 Color. The color of the matting shall be as specified (see 6.2).

3.2.4 Resistance to fungi. When specified (see 6.2), the matting shall be tested in accordance with ASTM G21 for resistance to fungi. The acceptable fungi resistance shall be as specified (see 6.2).

3.3 Dimensions.

- 3.3.1 Width. The width of the matting shall be either 24 inches + 1/2 inch, 36 inches + 1/2 inch, 40 inches + 3/4 inch, 42 inches + 3/4 inch, or 48 inches + 3/4 inch, as specified (see 6.2).
- 3.3.2 Thickness. The thickness of the matting shall be not less than 1/8 inch, 3/16 inch, or 1/4 inch in overall thickness, as specified (see 6.2), when tested as specified in 4.4.
- 3.3.3 Length of roll. Unless otherwise specified (see 6.2), the matting shall be furnished in rolls of length 25 linear yards +1 linear yard. No roll shall contain more than one piece.
- 3.4 System of measurement. The dimensions used in this specification are not intended to preclude the use of the metric system of measurement in the fabrication and production of the finished product, provided form, fit, and function requirements are satisfied.
- 3.5 Workmanship. The finished matting shall be free from blisters greater than 1/16 inch in diameter and clusters of more than four blisters in any 1 square inch of area. The finished matting shall also be free of fiber, imbedded foreign material, cracks, tears, and objectionable odor. The finished matting shall conform to the quality assurance and grade of product established by this specification.

4. QUALITY ASSURANCE PROVISIONS

- 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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 supplies and services conform to prescribed requirements.
- 4.1.1 Material inspection. The contractor is responsible for insuring that supplies and materials are inspected for compliance with all the requirements specified herein and in applicable referenced documents.
- 4.2 Sampling.
- 4.2.1 Sampling for examination. Sampling and acceptance procedures shall be in accordance with FED-STD-501. The sample unit shall be one completely fabricated roll.

4.2.2 Sampling for tests. Sampling and acceptance procedures shall be in accordance with FED-STD-501. The sample unit shall be 3 yards of matting. Each sample unit shall be selected from a different roll.

4.2.3 Sampling for preparation for delivery inspection. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The sample unit of product shall be one unit prepared for shipment. The inspection level shall be S-2 with an Acceptable Quality Level of 4.0 percent defective.

4.3 Examination.

4.3.1 Visual examination. Each sample selected shall be examined for defects listed in table III. Each attribute within each classification of multiple defects shall constitute one defect.

TABLE III. Classification of defects.

Classification	Defects	Requirement paragraph
Critical		
Major:		
101	Materials not fabricated as specified.	3.1 thru 3.1.2
102	Not specified color.	3.2.3
103	Surface design not formed over the walking surface of the matting to provide antislip properties and to trap dirt.	3.2.2
104	Corrugations deeper than specified.	3.2.2
105	Longitudinal corrugations not as specified, as applicable.	3.2.1
106	Contains blisters greater than 1/16 inch in in diameter, more than 4 blisters in any one square inch of area, cracks, tears, fibers or imbedded foreign material.	3.4
107	Has objectionable odor.	3.4

4.3.2 Dimensional examination. Examination shall be made for defects in dimensions. Any deviation from specified widths shall be considered a defect (see 3.3.2). Any roll length less than specified, or any roll containing more than one piece, shall be considered a defect (see 3.3.3).

4.4 Tests. The sample selected shall be tested for the characteristics listed in tables IV and V, as applicable. The number of determinations per sample unit shall be in accordance with the applicable test method. All requirements are applicable to the sample unit. All test results shall contain the individual values utilized in expressing the final result and shall be expressed as indicated in the applicable test method.

TABLE IV. Rubber matting.

Characteristic	Requirement paragraph	Test method
Tensile strength, initial	3.1.1	4.4.2
Decrease after air oven aging	3.1.1	4.4.4
Elongation, initial	3.1.1	4.4.3
Decrease after air oven aging	3.1.1	4.4.4
Flexibility	3.1.1	4.4.5
Friction	3.1.1	4.4.6
Set of matting	3.1.1	4.4.7
Water absorption	3.1.1	4.4.8

TABLE V. Vinyl matting.

Characteristic	Requirement paragraph	Test method
Breaking strength	3.1.2	4.4.2 1/
Elongation	3.1.2	4.4.3
Accelerated weathering	3.1.2	Method No. 5804 of FED-STD-191
Flexibility:		
70F	3.1.2	4.4.5.2
30F	3.1.2	Method No. 6511 of FED-STD-501 2/
Volatile matter	3.1.2	Method No. 9211 of FED-STD-501 3/

1/ Results shall be expressed in lb rather than psi. Thickness of sample need not be determined. Die II shall be used in lieu of die III.

2/ Low temperature flexibility shall be tested using a 1 +1/8" mandrel.

3/ The oven should be regulated to insure minimum air velocity.

4.4.1 Specimens for testing. Unless otherwise specified, the specimens for testing shall be dumb-bell shaped, cut by die III shown in figure 4111 of method 4111 of FED-STD-501. The cotton backing or insertion shall be removed from the matting before cutting the specimen.

4.4.2 Tensile strength and breaking strength. Tensile strength of the rubber matting and breaking strength of the vinyl matting shall be determined as described in method 4111 of FED-STD-501.

4.4.3 Ultimate elongation. Ultimate elongation of the matting shall be determined as described in method 4121 of FED-STD-501.

4.4.4 Resistance to air heat aging of rubber matting. Specimens used in tensile strength testing (see 4.4.2) and flexibility testing (see 4.4.5) shall be aged in an air oven as described in FED-STD-501. Tensile strength (see 4.4.2), ultimate elongation (see 4.4.3), and flexibility (see 4.4.5) shall be determined after aging.

4.4.5 Flexibility.

4.4.5.1 Rubber matting. The flexibility of the matting shall be

determined as described in method 3121 of FED-STD-501.

- 4.4.5.2 Flexibility at 70F (vinyl matting). A specimen of matting not less than 4 inches by 4 inches shall be doubled and pressed flat on itself in any direction with the corrugated or grooved surface outside and held in this position for a period of 5 minutes. At the end of the 5 minute period the specimen shall be examined for breaking, cracking, or any other evidence of failure, while in the doubled and pressed flat state. The examination shall be visual and at a normal reading distance of 2 feet. One determination shall be performed for each sample unit and the result shall be expressed as pass or fail.
- 4.4.6 Friction (rubber matting). The adhesion between the rubber matting and fabric backing or fabric insert shall be determined as described in method 7211 of FED-STD-501.
- 4.4.7 Set of matting (rubber matting). The set of the matting shall be determined as described in method 4311 of FED-STD-501 using specimens prepared as specified in 4.4.1.
- 4.4.8 Water absorption (rubber matting). The amount of water absorption shall be determined as described in method 7511 of FED-STD-501.
- 4.4.9 Thickness. The thickness of the matting shall be determined as described in method 2121 of FED-STD-501.
- 4.5 Preparation for delivery inspection. The preservation and packaging, packing, palletization, and marking of matting shall be inspected to verify conformance to the requirements of section 5.

5. PREPARATION FOR DELIVERY

- 5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).
 - 5.1.1 Level A. The matting shall be evenly rolled with the the pattern or design on the outside. The roll of matting shall be wrapped with a double wrap of 60-lb minimum basic weight kraft paper and the wrap secured with waterproof tape.
 - 5.1.2 Level C. Material shall be packaged in accordance with ASTM D3951.
- 5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A, B, and C. Packing shall be accordance with MIL-STD-794 for the applicable level specified. Containers shall be selected from table I of MIL-STD-794. Open crates shall not be used for Level A packing.

5.3 Palletization. Material shall be palletized in accordance with MIL-STD-147 when the following criteria are met:

- a. Load to consist of four or more unskidded containers; and,
- b. Load shall utilize a minimum of 80 percent of the pallet base.

5.4 Marking.

5.4.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.4.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

6.1 Intended use. The matting covered by this specification is intended for use in hospitals, ships, laboratories, buildings, and other general use.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. When certification of compliance is required for cotton sheeting (see 3.1.1.1).
- c. Color required (see 3.2.3).
- d. When fungi resistance is required (see 3.2.4).
- e. Acceptable fungi resistance (see 3.2.4).
- f. Width required (see 3.3.1).
- g. Thickness required (see 3.3.2).
- h. Length of roll required, if other than 25 yards, (see 3.3.3).
- i. Level of preservation and packaging (see 5.1).
- j. Level of packing required (see 5.2).

6.3 Breaking strength. The breaking strengths for vinyl matting, in paragraph 3.2.3.3, are approximately the same as the tensile strength of 1,400 psi.

6.4 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Navy - YD
Air Force - 99

CIVIL AGENCY COORDINATING ACTIVITIES:

COM - NBS
GSA - FSS
HHS
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Review Activities:

Army - MD, GL
Air Force - 84

PREPARING ACTIVITY:

Navy - YD

User Activities:

Navy - MC

DoD Project 7220-0211

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