
* INCH-POUND *

RR-T-650E
February 25, 1994
SUPERSEDING
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FEDERAL SPECIFICATION

TREADS, METALLIC AND NONMETALLIC, SKID-RESISTANT

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers skid-resistant treads made of rubber, vinyl, aluminum alloy, and cast iron.

1.2 Classification. Treads covered by this specification will be of the following compositions and types as specified (see 1.3 and 6.2)

Composition	Base Material
A	Rubber
B	Vinyl
C	Aluminum Alloy Base
D	Cast Iron
Type	Design
1	Smooth
2	Designed
3	Ribbed - Lead-Antimony or Aluminum/Oxide-Silicon Carbide Filled Channels
4	Grooved - Lead-Antimony or Aluminum/Oxide-Silicon Carbide Filled Channels
5	Abrasive Surface

Beneficial comments (recommendations, additions, deletions) and any pertinent
*data which may be of use in improving this document should be addressed to: *

*Commanding Officer (Code 156), Naval Construction Battalion Center, *

*1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization *

*Document Improvement Proposal (DD Form 1426) appearing at the end of this *

*document or by letter. *

AMSC N/A

FSC 5670

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1.3 Combination of classification. Table I shows the available combinations of classifications.

TABLE I. Available combinations.

		Type				
Composition		-----				
		1	2	3	4	5

A		X	X	-	X	-
B		-	X	-	-	-
C		-	-	X	X	X
D		-	-	-	-	X

Note: X designates available combinations.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specification

PPP-B-636 - Boxes, Shipping, Fiberboard

Federal Standard

FED-STD-123 - Marking for Shipment (Civil Agencies)

Military Specification

MIL-P-116 - Preservation, Methods of

Military Standards

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-129 - Marking for Shipment and Storage

MIL-STD-2073-1 - DOD Materiel Procedures for Development and Application of Packaging Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

ASTM:

- ASTM A 48 - Gray Iron Castings
- ASTM B 26 - Aluminum-Alloy Sand Castings
- ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate
- ASTM B 221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- ASTM D 2240 - Rubber Property - Durometer Hardness
- ASTM D 3951 - Commercial Packaging

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When a first article is specified (see 6.2), the contractor shall furnish a skid-resistant tread of the same classification ordered for first article inspection and approval (see 4.2.1 and 6.3).

3.2 Standard commercial product. The skid-resistant tread shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the skid-resistant tread being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.3 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. Unless

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otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.3.1 Composition A - rubber base. Rubber base treads shall be made from synthetic rubber with a mixture of synthetic and reclaimed rubber. When tested in accordance with 4.5, the durometer reading shall be 90 +/-5.

3.3.2 Composition B - vinyl base. Vinyl base treads shall be made from suitably compounded virgin polymer or copolymer of vinyl chloride resin, plasticized with phosphate or phthalate ester plasticizers only. The compound shall be uniform, free from fiber and objectionable odor. 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 manner.

3.3.3 Composition C - aluminum, alloy base. The aluminum alloy tread base shall be either aluminum conforming to ASTM B 221, alloy 6063; ASTM B 209, alloy 3003 F temper; or cast aluminum alloy conforming to ASTM B 26, alloy B443.0-F, alloy 2950-T4, or alloy B514.0-F.

3.3.4 Composition D - cast iron. The tread base shall be gray iron conforming to ASTM A 48.

3.4 Design. All tread designs shall have anti-slip properties.

3.4.1 Rubber base design. The upper surface of tread shall be either type 1 (smooth and flat), or type 2 (designed), as specified (see 6.2).

3.4.1.1 Abrasive strips for design type 1 and 2. When specified (see 6.2), two mineral-coated abrasive grit strips, each strip not less than 3/4 inch (19 millimeters (mm)) nor more than 1 inch (25 mm) wide and not less than 0.030 inch (0.76 mm) thick, shall be recessed into and adhered to the top surface of the tread portion to form a continuous flat surface overall. Each strip shall run the full length of the treads, and shall be parallel to each other. The front edge of the first strip shall be no closer than 3/4 inch (19 mm) to the front of the tread. The second strip shall be approximately 3/4 to 1-1/2 inches (19 to 38 mm) from the first strip.

3.4.1.2 Design for access by the visually impaired type 1 and 2. When specified (see 6.2), one mineral coated abrasive grit strip, not less than 2 inches (51 mm) nor more than 3 inches (76 mm) wide and not less than 0.030 inch (0.76 mm) thick shall be recessed into and adhered to the top surface of a tread portion to form a continuous flat surface overall. Each strip shall run the full length of the treads. The front edge of the strip shall be no closer than 3/4 inch (19 mm) to the front of the tread. The strip shall be of a clearly contrasting color to the color of the rubber stair tread.

3.4.2 Vinyl base design. The upper surface of tread shall be type 2.

3.4.3 Aluminum alloy tread design. Base shall be of aluminum conforming to section 3.3.3. Abrasive filler shall be lead-antimony alloy or aluminum oxide-silicon carbide mixture, as specified (see 6.2). Lead-antimony alloy shall be 97.0 to 98.0 percent lead and 2.0 to 3.0 percent antimony. Aluminum oxide-silicon carbide mixture shall be bound together with a waterproof binder. Unless otherwise specified (see 6.2), abrasive filler shall be black.

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3.4.4 Cast iron tread design. The tread shall be sand finish casting with the exposed wearing surface containing an abrasive material embedded in the top metal surface not less than 1/16 inch (1.6 mm). Size of non-slip granules shall range from No. 16 to No. 24. Granules shall be distributed uniformly over the tread surface.

3.4.5 Type 1 - non-designed - smooth top. The tread surface shall be smooth and flat, with good wear, and shall be skid-resistant. Available on rubber base tread only.

3.4.6 Type 2 - designed. When the surface is designed, the upper surface of the tread portion shall be of commercial design. The depth of the design shall be not greater than 50 percent of the overall thickness of the tread. The tread design shall be formed to provide wear surface and skid-resistant properties.

3.4.7 Type 3 - ribbed - filled channels. Channels shall be filled with abrasive filler conforming to 3.4.3. Exposed edges of the ribs shall be leveled.

3.4.8 Type 4 - grooved - filled channels. Channels shall be filled with abrasive filler conforming to 3.4.3. Exposed edges of the ribs shall be leveled. Grooves shall be free of dirt-retaining pits or obstructions which could retain dirt or moisture.

3.4.9 Type 5 - abrasive surface - embedded. The exposed wearing surface shall contain an abrasive material embedded in the top metal surface not less than 1/16 inch (1.6 mm). Size of skid-resistant granules shall range from No. 16 to No. 24. Granules shall be distributed uniformly over the tread surface.

3.5 Nosing style. Nosing style shall be as specified (see 6.2).

3.5.1 Americans with Disabilities Act (ADA) requirements. When specified, (see 6.2), stair tread type 1 and 2 rubber base shall have adjustable noses capable of covering all angles between 60 and 90 degrees.

3.6 Tread backs. Tread backs shall be as specified (see 6.2 and 6.4). Composition A tread backs shall have a minimum of 80 percent of the back sanded by the manufacturer to assure proper adhesion.

3.7 Predrilled. When holes are required (see 6.2), holes for treads shall be drilled either by the receiving activity to meet job conditions, or by the manufacturer, as specified (see 6.2). Unless otherwise specified (see 6.2), holes drilled by the manufacturer shall be of the manufacturer's standard hole pattern and size.

3.8 Anchors. When specified (see 6.2), anchors shall be of the manufacturer's standard design.

3.9 Dimensions.

3.9.1 Dimensions of rubber and vinyl base treads. Rubber and vinyl base tread dimensions shall be as specified (see 6.2). The nominal size shall be the actual width and length of the tread portion.

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3.9.1.1 Thickness for rubber base treads. Unless otherwise specified (see 6.2), rubber base treads shall not be less than 3/16 inch (4.76 mm) thick at the nose and 1/8 inch (3 mm) overall. When determining the minimum thickness, the overall thickness of the material shall be measured. The recessed part of a type 2 stair tread shall not be utilized when determining thickness of the material.

3.9.1.2 Thickness for vinyl base treads. Unless otherwise specified (see 6.2), vinyl base treads shall not be less than 1/8 inch (3 mm) thick at the nose and 3/32 inch (2 mm) overall. When determining the minimum thickness, the overall thickness of the material shall be measured. The recessed part of type 2 stair tread shall not be utilized when determining thickness of the material.

3.9.2 Dimensions of aluminum base treads. Aluminum base tread dimensions shall be as specified (see 6.2). The nominal size shall be the actual width and length of the tread portion.

3.9.2.1 Thickness for aluminum base treads. Unless otherwise specified (see 6.2), aluminum base treads shall be not less than 1/4-inch (6.35 mm) thick. When determining the minimum thickness, the overall thickness of the material shall be measured. The recessed part of the non-skid pattern shall not be utilized when determining minimum thickness of the material.

3.9.3 Tolerances. Tolerances for length and width shall be +1/8 inch (+/-3 mm). Thickness tolerance shall be +/-1/32 inch (+/-0.7 mm). Except for composition A, treads shall not be restricted to a minimum length tolerance. Most composition A treads are intentionally manufactured longer than the required length, allowing for better fitting during installation.

3.10 Interchangeability. All skid-resistant treads of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.11 Workmanship.

3.11.1 Metal fabrication. The metal used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the metal to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to ensure uniformity of size and shape.

3.11.2 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the casting's ability to perform its intended function.

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 (examinations and tests) 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

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inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one skid-resistant tread when a first article is required (see 3.1 and 6.2). This inspection shall include the examination of 4.4 and the tests of 4.5. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one skid-resistant tread. All skid-resistant treads offered for delivery at one time shall be considered a lot for the purpose of inspection. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units and resubmit for a complete reinspection. Resubmitted lots shall be reinspected using tightened inspection. If the rejected lot was screened, reinspection shall be limited to the defect causing rejection. If the lot was reprocessed, reinspection shall be performed for all defects. Rejected lots shall be separate from new lots and shall be clearly identified as reinspected lots.

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4.3.1 Sampling for examination and tests. Sampling for examination and tests shall be as specified in contract.

4.4 Examination. Each tread shall be examined for compliance with the requirements specified in section 3 of this document. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirement shall constitute one defect.

TABLE II. Classification of defects.

Classification			Requirement paragraph
Major:			
101	Composition not as specified	3.3.1 thru 3.3.4	
102	Type not as specified	3.4.1 thru 3.4.9	
103	Cracks, underfilled ribs, foreign matter in filler	3.4	
104	Color not as specified	3.4.3	
105	Nosing or tread back not as specified	3.5 & 3.6	
106	Composition A tread backs not sanded	3.6	
107	Dimensions not as specified	3.9	
108	Tread not interchangeable	3.10	
Minor:			
201	Has objectionable odor	3.3.2	
202	Design deeper than specified	3.4.6	
203	Finish not free of scratches or roughness	3.11	

4.5 Hardness test. Treads selected shall be tested with a Type A durometer in accordance with ASTM D 2240 and shall meet the requirement specified in 3.3.1.

4.6 Preparation for delivery inspection. The preservation, packaging, packing, and marking of the item 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 commercial as specified (see 6.2).

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5.1.1 Level A. Treads of similar classification shall be packaged method III in accordance with MIL-P-116 in a box conforming to PPP-B-636, class weather-resistant. Unless otherwise specified (see 6.2), the unit pack quantity shall be in accordance with the contractor's standard quantity.

5.1.2 Commercial. The treads shall be preserved/packaged in accordance with ASTM D 3951.

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

5.2.1 Levels A and B. Packing shall be in accordance with MIL-STD-2073-1. Containers shall be selected from Appendix C, Table VII, for the appropriate level.

5.2.2 Commercial. The treads shall be packed in accordance with ASTM D 3951.

5.3 Marking.

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

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

6. NOTES

(This section contains information of a general of explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Treads come in many styles, therefore it is important to specify the end use, such as:

- a. For the interior or exterior (compositions A and B are for interior use only)
- b. For poured concrete, precast terrazzo, or precast concrete
- c. For steel pan, cement filled stairs
- d. For wood stairs
- e. For renovation of existing stairs
- f. For carpeted or tile covered stairs (compositions A and B shall not be installed over existing carpet or resilient floor covering)
- g. For new construction or modernization of existing building

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in acquisition documents:

- a. Title, number, and date of this specification
- b. Composition and type (see 1.2)
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
- d. If first article is required (see 3.1, 4.2.1, and 6.3)
- e. Rubber base design type required (see 3.4.1)
- f. If abrasive strips for rubber base treads are required (see 3.4.1.1)

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- g. Design for access by the visually impaired, if required (see 3.4.1.2)
- h. Type of abrasive filler and color required, if other than black (see 3.4.3)
- i. Style of nosing required (see 3.5)
- j. Nosing requirements for ADA required (see 3.5.1)
- k. Style of tread back required (see 3.6 and 6.4)
- l. If holes are required (see 3.7)
- m. If holes for treads are to be drilled by the receiving activity to meet job conditions, or by the manufacturer (see 3.7)
- n. If holes are to be drilled by the manufacturer's standard hole pattern and size or as specified (see 3.7)
- o. When anchors are required (see 3.8)
- p. Dimensions and thickness of rubber or vinyl base tread (see 3.9.1, 3.9.1.1, and 3.9.1.2)
- q. Dimension of aluminum base treads (see 3.9.2)
- r. Thickness of aluminum base treads, if other than specified (see 3.9.2.1)
- s. Level of preservation, packaging, and level of packing required (see 5.1 and 5.2)
- t. When unit pack quantity is other than specified (see 5.1.1)
- u. End use of treads (see 6.1)

6.3 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.4. The first article should consist of one complete skid-resistant tread. The contracting officer should include specific instructions in procurement documents regarding arrangement for examination, test, and approval of the first article.

6.4 Tread backs. There are many different configurations for tread backs: some are the same thickness throughout, while others are tapered. Refer to manufacturer's literature for available styles of tread backs.

6.5 Subject term (keyword) listing.

Abrasive
Aluminum
Rubber

MILITARY INTERESTS:

Custodians

Army - ME
Navy - YD1
Air Force - 99

Review Activities

Army - CE
Air Force - 84

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS
HHS - FEC

PREPARING ACTIVITY:

Navy - YD1

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