

MIL-B-003106A (MU)
 19 April 1968
 USED IN LIEU OF
 MIL-B-3106
 22 December 1949

MILITARY SPECIFICATION

BOARD, COMPOSITION, WATER-RESISTANT, SOLID
 (For Filler or Cushioning Pads)

This limited coordination Military Specification has been prepared by the Munitions Command based upon currently available technical information, but it has not been approved for promulgation as a coordinated revision of Military Specification MIL-B-3106. However, pending its promulgation as a coordinated Military Specification, it may be used in procurement.

1. SCOPE AND CLASSIFICATION

1.1 Scope: This specification covers solid water resistant composition boards suitable for uses as filler or cushioning pads.

1.2 Types: This specification covers solid water resistant composition board of the following types:

- Type I -- Low moisture absorption
- Type III -- Medium moisture absorption

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

- QQCS-781 -- Steel Strapping, Flat
- UU-PR-271 -- Paper, Wrapping, Waterproofed, Kraft

MILITARY

- MIL-A-2550 -- Ammunition and Special Weapons, General Specification for

STANDARDS

MILITARY

- MIL-STD-105 -- Sampling Procedures and Tables for Inspection by Attributes (ABC-STD-105)
- MIL-STD-109 -- Quality Assurance Terms and Definitions
- MIL-STD-731 -- Quality of Wood Members for Containers and Pallets
- MIL-STD-1169 -- Packaging, Packing and Marking for Shipment of Inert Ammunition Components

FSC: 8140

FOR FILE

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(Copies of specifications, standards, drawings, and publications required by suppliers 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 otherwise indicated, the issue in effect on date of invitation for bids shall apply.

American Society for Testing and Materials Publications

- D585-62 - Sampling Paper and Paperboard
- D641-69 - Conditioning Paperboard, Fiberboard and Paperboard Containers for Testing
- D646-63T - Basis Weight of Paper and Paperboard
- D2529-66T - Bursting Strength of Paperboard and Linerboard

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

3. REQUIREMENTS

3.1 Material.-Material shall be such as to produce a finished board meeting the requirements specified hereinafter.

3.2 Absorption (see 4.4.2).

3.2.1 Type I.-Type I composition board shall have a maximum water absorption of 15 percent.

3.2.2 Type II.-Type II fiberboard shall have a maximum water absorption of 25 percent.

3.3 Stability.-The board shall not delaminate, ooze, or blister at a temperature of 160 degrees (°) Fahrenheit (F) when tested as specified in 4.4.3.

3.4 Fracture.-The board shall not fracture when tested as specified in 4.4.4.

3.5 Bursting strength.-Bursting strength shall comply with Table I.

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TABLE I
Minimum Average Bursting Strength

Nominal Caliper	Dry		After 24 Hours Immersion	
	Pounds per square inch (p.s.i.)		p.s.i.	
.062	100		75	
.080	130		98	
.100	160		120	
.125	200		150	
.187	300		225	
.250	400		300	

3.6 Weight.-The dry weight of the board shall not be greater than 8 pounds per 100 square feet per 0.010 inch of thickness after conditioning.

3.7 Color.-Any color natural to the component materials shall be permitted.

3.8 Thickness.-The board shall be of the caliper specified in the contract or order.

3.9 Size.-Unless otherwise specified in the contract or order, the water resistant composition board shall be furnished in sheets 4 by 8 feet in size.

3.10 Workmanship.-Workmanship shall be in accordance with the best commercial practice of the industry. Finished board shall be sound and free from imperfections which might impair its usefulness.

4. QUALITY ASSURANCE PROVISIONS

4.1 General quality assurance provisions.-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 supplies and services conform to prescribed requirements. Reference shall be made to Standard MIL-STD-109 in order to define terms used herein. The provisions of Specification MIL-A-2550 shall apply.

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4.1.1 Submission of product.-At the time the completed lot of product is submitted to the Government for acceptance, the contractor shall supply the following information accompanied by a certificate which attests that the information provided is correct and applicable to the product being submitted:

- a. A statement that the lot complies with all of the quality assurance provisions specified within this specification.
- b. Number of units of product inspected.
- c. Results obtained, by defect code, for all inspections performed.
- d. Drawing, specification number and date, together with an identification and date of changes.
- e. Certificates of conformance on all material purchased by the contractor when such material is controlled by Government or commercial specifications referenced in any of the contractual documents.
- f. Number of items in the lot.
- g. Date submitted.

The certificate shall be signed by a responsible agent of the certifying organization. The initial certificate submitted shall be substantiated by evidence of the agent's authority to bind his principal. Substantiation of the agent's authority will not be required with subsequent certificates unless, during the course of the contract, this authority is vested in another agent of the certifying organization.

4.2 Inspection provisions.

4.2.1 Inspection provisions.-The composition board shall be visually or dimensionally inspected, as applicable, for compliance with applicable requirements.

4.3 Testing

4.3.1 Sampling.-The sampling plans for each of the following tests shall be in accordance with Standard MIL-STD-105 Table IIA using Code Letter D and an AQL of 0.40 for major defects and an AQL of 0.65 for each minor defect.

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Absorption (see 3.2)	Major Defect	Code No. 01001
Stability (see 3.3)	Minor Defect	Code No. 01002
Fracture (see 3.4)	Minor Defect	Code No. 01003
Color (see 3.7)	Minor Defect	Code No. 01004
Thickness (see 3.8)	Minor Defect	Code No. 01005
Size (see 3.9)	Minor Defect	Code No. 01006
Workmanship (see 3.10)	Minor Defect	Code No. 01009

4.3.2. Bursting strength (see 3.5), Minor Defect, Code No. 01007.-Ten representative test specimens shall be selected at random from each lot for this test in accordance with the provisions of ASTM D2529-66T. Failure of one or more specimens to meet the applicable requirement when tested as specified in 4.4.1 shall be cause for rejection of the lot.

4.3.2.1 Conditioning for dry and wet tests.

4.3.2.1.1 All specimens shall be brought to substantial equilibrium in a circulating atmosphere maintained at a relative humidity and a temperature specified in ASTM D641-49 (1965).

4.3.3 Weight (see 3.6), Minor Defect, Code No. 01008.-Samples to be tested shall be obtained in accordance with the provisions of ASTM D646-63T. Failure of any sample to meet the applicable requirement when tested as specified in 4.4.5 shall be cause for rejection of the lot.

4.4 Test methods and procedures.

4.4.1 Bursting strength.-Bursting strength shall be determined in accordance with ASTM D2529-66T. The test specimens shall be cut from individual sheets. If the board fails to pass the test as specified, a retest may be made using four additional specimens. A total of 24 punctures (12 from each side of the board) shall be made. If the average of these tests falls below the strength requirements listed in Table I, the board shall then be rejected.

4.4.2 Absorption.-To determine water absorption, specimens shall be conditioned for 24 hours at 80 degrees F. and 60 percent relative humidity and then weighed. Immediately thereafter, the specimens shall be immersed in water at room temperature for 48 hours, surface dried, and reweighed. The moisture gain shall then be computed as a percentage of the pre-immersion weight.

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4.4.3 Stability test.

4.4.3.1 Following conditioning for a minimum of 5 hours at a temperature of 73.4 plus or minus 3.6 degrees F. and a relative humidity of 50 plus or minus 2 percent, one thoroughly conditioned specimen of composition board 6 by 10 inches shall be placed in an oven (without ingress or egress of air) at 160 plus or minus 2 degrees F., and a relative humidity of 10 percent or less, for 1 hour. The specimen shall then be removed from the oven and allowed to stand for 1 hour at a temperature of 73.4 plus or minus 3.6 degrees F. and a relative humidity of 50 plus or minus 2 percent. Examine for visible evidence of delamination, oozing, or blistering.

4.4.3.2 Retest.-A retest using double the number of samples used in the original test may be made if requested by the contractor if the specimen fails to pass the test. There shall be no failures in the retest.

4.4.4 Fracture.-The board shall be conditioned to a temperature of minus (-) 20 degrees F. Upon completion of conditioning, the board specimen shall be bent around a mandrel 180 degrees with a radius equal to 96 times the thickness of the specimen. Failure of one or more specimens to meet the applicable requirements shall be cause for the lot to be rejected.

4.4.5 Weight.-The weight of the specimen shall be determined in accordance with ASTM D646-63T. The test specimens shall be cut from individual sheets.

5. PREPARATION FOR DELIVERY

5.1 Packing.-Packing shall be Level A, B or C, as specified.

5.1.1 Level A.

5.1.1.1.-Composition board sheets shall be packed on a pallet constructed as specified in 5.1.1.1.1. The unit load of composition board shall be built up within the following limitations:

a. Overall height of the pallet and stack of composition board sheets shall not exceed 54 inches.

b. Net weight shall not exceed 2000 pounds.

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5.1.1.1.1 Construction of pallet.-The pallet shall have an overall length and width dimension $1\frac{1}{2}$ inches greater than the dimensions of the composition board being packed. The pallet shall be constructed of soft wood No. 2 common or equal. The pallet shall consist of load bearing top deck boards, stringer boards, posts and bottom deck boards. The quality, with respect to moisture content, defects, etc., shall conform to Class 2 of MIL-STD-731. All boards shall be surfaced top and bottom to a uniform thickness. The dimensions of the pallet components and construction shall be in accordance with Figure 1. The posts shall be surfaced on two sides to provide a uniform thickness between the lower deck boards and the stringers. The row of intermediate posts in the longer direction of the pallet shall be equidistant one from the other on not more than 25 inch centers. In the shorter dimension, there shall be three rows of posts with the center row of posts positioned equidistant from the outside row of posts. Nails used in the pallet construction shall be either flathead steel, cement-coated, or twist shank drive with spiral flutes having a minimum of four (4) flutes per nail (helical angle of flute to nail axis shall be approximately 30 degrees.) Each bottom deck board shall be nailed to each pallet post with not less than three 6-penny or two (2) inches by 0.135 inch diameter twist drive nails. Each top deck board joining stringer boards and pallet posts shall be nailed, at each joint, with three (3) 12-penny or $3\frac{1}{4}$ inches by 0.135 inch diameter twist drive nails, except when board covers strap slot. Nailing of top deck boards to stringer boards at other than post locations shall require a minimum of three clinched common nails not less than two (2) inches in length at each joint, except where a board covers a strap slot. Where a board covers a strap slot, only two nails shall be used, one on each side of the slot at each joint.

5.1.1.1.2 Method of placing, shrouding and strapping.-The stack of composition board sheets shall be positioned on the pallet allowing the pallet to extend $\frac{3}{4}$ inch beyond the load on all four sides. A waterproof shroud shall cover the stacked composition board on top, both sides and both ends. The shroud shall meet the requirements of Class H-1 material of Specification UU-P-271. The shrouded load shall be secured to the pallet with steel strapping conforming to QQ-S-781, Type I, Class A, and B size not less than $\frac{5}{8}$ inch of 0.023 inch or $\frac{3}{4}$ inch by 0.020 inch, properly tensioned and sealed. A piece of lumber of the same material as the pallet deck boards, nominal one (1) inch thick by four (4) inches wide and of a length equal to the height of the load of composition board sheets, shall be positioned under each strap on all sides of the load to afford protection to the sheets from the tensioned steel straps.

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The straps shall be centered on the lumber and secured with staples spaced not more than 12 inches apart nor more than 12 inches from the edge of the load. Figure II illustrates a Level B pallet load of composition board sheets size 96 inches by 48 inches, without a shroud. Not less than three (3) straps shall be used to encircle the load girthwise for a load of sheets up to 96 inches in length. Two straps shall be near the ends of the load and positioned under the second top deck board from each end. Intermediate strap shall be spaced approximately midway between end straps and positioned under top deck boards. (See Figure 1). Three straps shall encircle the load lengthwise; two straps shall be positioned adjacent to the inside surfaces of the outside posts and one strap shall be positioned adjacent to and at either side of the center posts.

5.1.2 Level B

5.1.2.1 The composition board sheets shall be packed in conformance with 5.1.1 except that shrouding is not required.

5.1.3 Level C

5.1.3.1 The composition board sheets shall be packed in conformance with 5.1.2 unless otherwise specified in the contract or order. (see 6.2).

5.2 Marking

5.2.1 Marking shall be in accordance with MIL-STD-1169.

6. NOTES

6.1 Intended use.-Solid water-resistant composition board is designed for cutting into filler and cushioning pads for use where water-resistant material is required and where resistance to dimensional change under compression rather than resiliency is important. The composition board is, for example, intended for use in exterior shipping containers for ammunition other than small-arms ammunition. It is not intended for use in container construction.

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6.2 Ordering data.-Invitations for bids and contracts or orders should specify the following:

- a. Title, number and date of this specification.
- b. Type required (see 1.2).
- c. Thickness required (see 3.8).
- d. Level of pack (Level C - Type of pack).

6.3 Inspection code numbers.-The five-digit code numbers assigned to the inspections herein are to facilitate future data collection and analysis by the Government.

CUSTODIAN:
ARMY-MU

PREPARING ACTIVITY:
ARMY-MU

Project Number: 8140-A051

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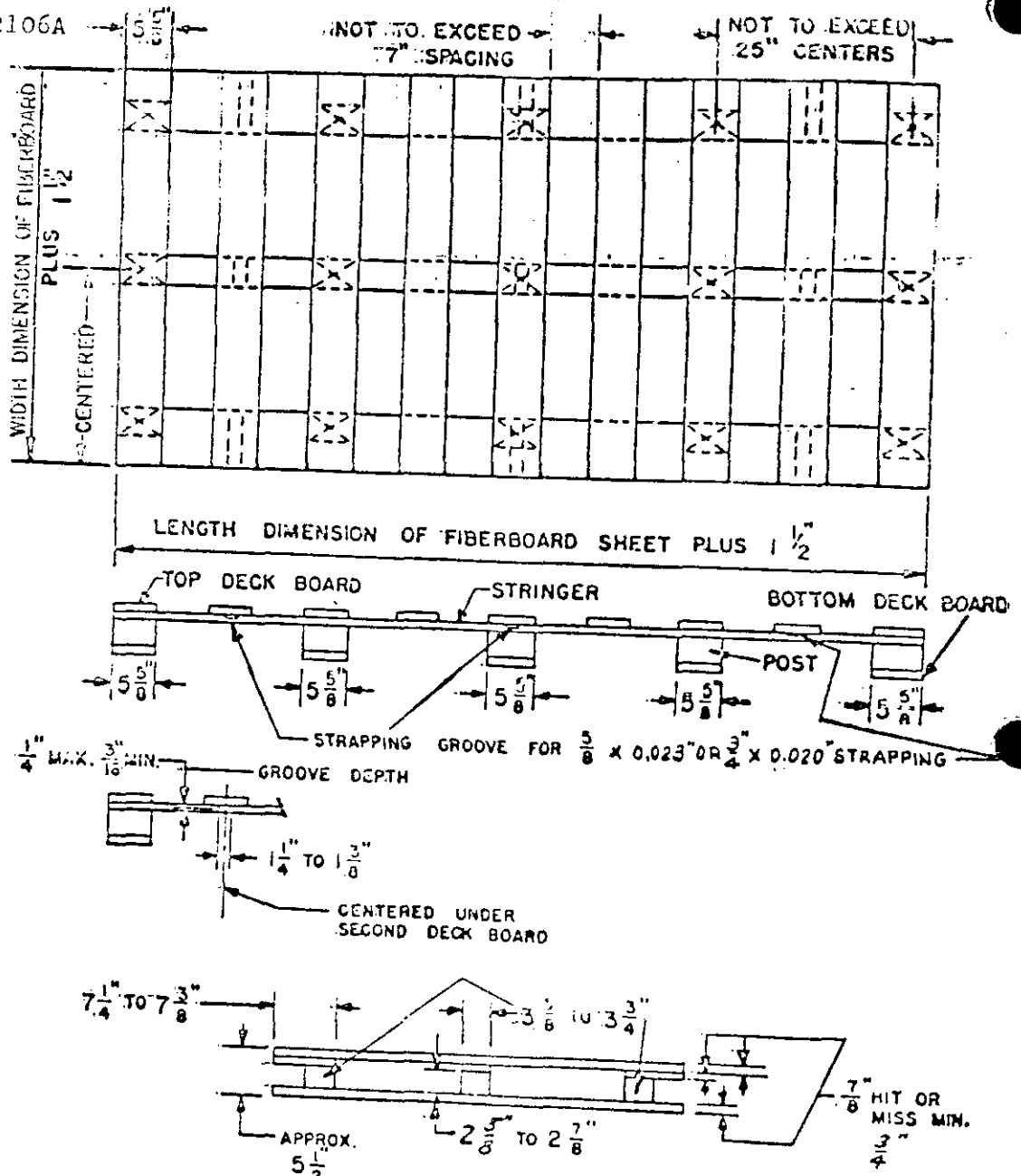


FIGURE 1. Pallet construction.

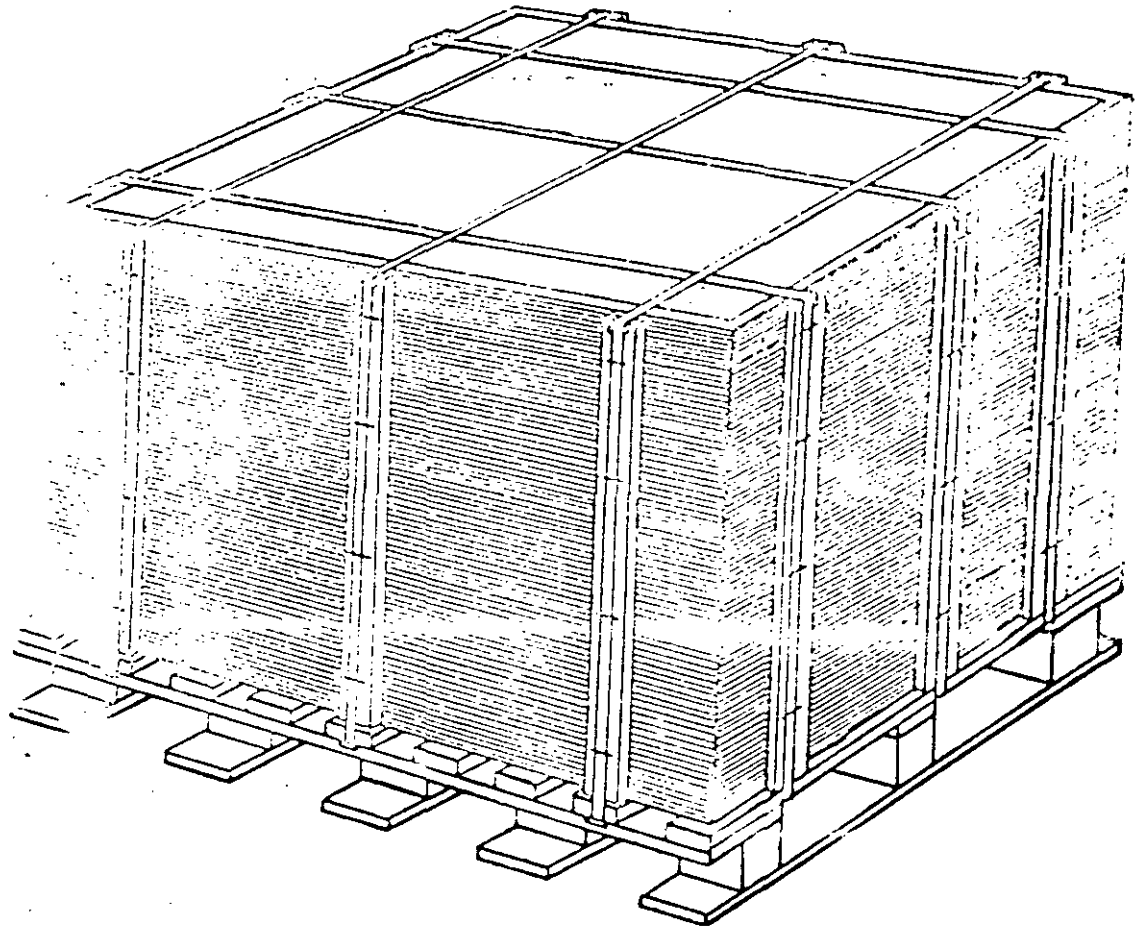


Figure 2.-Pallet load of board sheets, size 96" by 48".

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
INSTRUCTIONS		
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.		
SPECIFICATION		
ORGANIZATION		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		5
MATERIAL PROCURED UNDER A		
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT		<input type="checkbox"/> SUBCONTRACT
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?		
A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE?		
<input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE

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