

INCH-POUND

MIL-P-29596 (NAVY)
15 January 1993

MILITARY SPECIFICATION

PACKAGING MATERIAL, KRAFT PAPER, 3-PLY, FLEXIBLE, GENERAL SPECIFICATION FOR

This specification is approved for use by the Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes requirements for flexible 3-ply kraft paper packaging materials for use in dunnage packaging operations (see 6.1).

1.2 Classification. The packaging materials shall be of the following types as specified.

Type I - General purpose

Type II - Fire retardant

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards 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).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Warfare Center, Aircraft Division, Systems Requirements Department (Code SR32), Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8135

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

MIL-P-29596(NAVY)**SPECIFICATIONS****FEDERAL**

- QQ-A-250/4 - Aluminum Alloy 2024, Plate and Sheet
- UU-P-268 - Paper, Kraft, Wrapping
- PPP-B-601 - Boxes, Wood, Cleated-Plywood

STANDARDS**FEDERAL**

- FED-STD-313 - Material Safety Data, Transportation Data and Disposable Data for Hazardous Materials furnished to Government Activities
- FED-STD-101 - Test Procedures for Packaging Materials

MILITARY

- MIL-STD-129 - Marking for Shipment and Storage.

(Unless otherwise specified, copies of federal and military specifications and standards are available from the DODSSP - Customer Service, Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS

- ASTM E 162 - Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
- ASTM E 662 - Test Method for Specific Optical Density of Smoke Generated by Solid Materials

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

MIL-P-29596(NAVY)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 4.3.1, 6.2, and 6.3), a sample shall be subjected to first article inspection (see 6.7) in accordance with 4.3.

3.2 Raw materials. Packaging materials covered under this specification shall be made from material conforming to UU-P-268, Grade B and shall be processed as to ensure compliance with the requirements of this specification. Recycled materials shall be used to the maximum extent possible.

3.2.1 Construction. Materials described in 3.2 shall be constructed in such a manner to form a 3-ply configuration. The plies shall be plainly layered and shall be non-bonded.

3.2.2 Form. Materials described in 3.2.1 shall be furnished in rolls.

3.2.2.1 Rolls. Unless otherwise specified (see 6.2), the average length shall not be less than 150 yards. The length of any individual roll shall not be less than 145 yards. (If rolls exceeding 150 yards, on average, are specified in 6.2, the individual roll length tolerance shall be minus 5%.) Unless otherwise specified (see 6.2), the width of roll material shall be 30 inches \pm 1/4 inch. (If widths other than 30 inches are specified in 6.2, the tolerance shall be \pm 0.5% for widths less than 30 inches and \pm 2% for widths exceeding 30 inches.) The roll shall be uniformly and smoothly wound on non-returnable cores with a minimum inside diameter of 3 inches with a plus tolerance of 1/8 inch. The length of the core shall be equal to the width of roll material, with a plus tolerance of 1/8 inch. The core shall be of sufficient rigidity to prevent distortion of the roll under normal conditions during transportation, storage and use. Each roll shall be suitably restrained to prevent unwinding.

3.3 Packaging material (conversion). Raw materials described in 3.2 - 3.2.2.1 shall be converted into packaging materials using equipment/process described in 3.3.1.

3.3.1 Equipment/process. Unless otherwise specified, any process and/or system of automated equipment may be utilized to convert the raw materials into packaging materials. The automated equipment shall be of a size and construction that facilitates movement in a packaging operations environment.

3.4 Performance. The performance of the packaging materials shall conform to the requirements specified in Table I, when tested as described in 4.5.

MIL-P-29596 (NAVY)

3.5 Identification sheet. An identification sheet shall accompany each lot or order and shall contain the part or identifying number (PIN) (see 6.2.1), the specification number, manufacturer's name, manufacturer's designation, lot number and date of manufacture.

3.6 Toxicity. The fire retardant treated Type II packaging material shall have no adverse effect on the health of personnel when used for its intended purpose.

3.7 Use of carcinogenic agents. The use of carcinogenic agents in the manufacture/fabrication of the Type II, fire retardant packaging material is prohibited. Carcinogens are defined in 6.4.

TABLE I Performance requirements.

Properties	Applicable to types	Requirements	Test paragraph
Vibrational settling	I, II	15%	4.5.1
Contact corrosivity (raw material)	I, II	No corrosion, etching or pitting in contact area	4.5.2
Abrasion	I, II	No rupture, tear, macroscopic scratch on material or on metal surface	4.5.3
Flexibility (low temp)	I, II	Surface shall show no cracks, tears, nor separation when bent over mandrel	4.5.4
Flame spread	II	20 (max)	4.5.5
Smoke density	II	100 (max)	4.5.6

3.7.1 Material Safety Data Sheet (MSDS). The contracting activity shall be provided a MSDS prior to contract award (for Type II packaging material only). The MSDS shall be prepared and submitted in accordance with FED-STD-313. The MSDS shall be included with each shipment of Type II packaging material covered by this specification.

MIL-P-29596 (NAVY)

3.8 Workmanship. Packaging material shall be manufactured in a manner to provide uniform construction, free from imperfections which might impair its usefulness for the purpose intended. The final product shall conform to the levels of quality established herein.

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 inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification 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 specification shall become part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification 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.

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall consist of all the tests specified in Table I and inspections of this specification. The responsibility for the performance of the first article inspection shall be as specified in the contract or purchase order (see 4.3.1, 6.2, 6.3, and 6.7). Approval of the first article inspection sample does not preclude the requirements for performing the quality conformance inspection.

4.3.1 Prior approval. If a contractor has previously delivered an acceptable product meeting the requirements of this specification, first article inspection may be waived at the discretion of the procuring activity for a period of time not to exceed 2 years (see 6.2).

MIL-P-29596(NAVY)

4.3.2 First article sample. Unless otherwise specified by the procuring activity (see 6.2), the contractor shall submit a first article sample of sufficient packaging material to conduct all tests and inspections required by this specification. Failure of the first article sample to meet all the requirements of this specification shall be cause for rejection.

4.3.2.1 Data to be submitted with first article samples. The supplier shall submit two copies of the first article inspection report showing conformance to the test requirements in Table I (see 6.2 and 6.3).

4.3.3 Certified statement. Whether or not first article inspection is required (see 4.3.1), the contractor shall certify in writing that the material meets all the requirements of this specification (see 6.2 and 6.3).

4.4 Quality conformance inspection. Quality conformance inspection shall consist of all the inspections and tests listed in 4.4.2.

4.4.1 Sampling.

4.4.1.1 Lot size. An inspection lot shall consist of all the packaging material manufactured by the same process from the same raw materials during one production run.

4.4.1.2 Sampling for inspection. From each lot, packaging material shall be withdrawn in a random manner to make a representative sample sufficient in size for all inspections and tests.

4.4.2 Quality conformance.

4.4.2.1 Inspection of raw materials for defects.

EXAMINE	DEFECTS
Raw material	Does not conform to UU-P-268, Grade B
Construction	Does not contain 3 plies
Form	Not furnished in rolls
Roll width *	More than 30.25 inches Less than 29.75 inches
Roll length *	Length of roll under 145 yards or average under 150 yards
* If other roll lengths or widths are specified, see tolerances specified in 3.2.2.1.	

MIL-P-29596(NAVY)

4.4.2.2 Inspection of end item for defects.

EXAMINE	DEFECTS
Workmanship	Imperfections which would impair use-fulness for the purpose intended Not uniform
Construction	Type not as specified
Identification	Identification sheet missing
MSDS	MSDS sheet missing for Type II

4.4.2.3 Inspection of packaging for defects.

EXAMINE	DEFECTS
Preservation	Not in accordance with contract requirements
Packing	Not in accordance with contract requirements
Markings	Markings illegible, incorrect, omitted

4.4.2.4 Quality conformance tests.

PROPERTY	REQUIREMENT	TEST PARAGRAPH
Vibrational settling	Table I	4.5.1
Flame spread (Type II only)	Table I	4.5.5
Smoke density (Type II only)	Table I	4.5.6

4.5 Test methods. All tests shall be conducted as specified herein. Tests shall be conducted at a temperature of $72^{\circ} \pm 2^{\circ}\text{F}$ ($22^{\circ} \pm 3^{\circ}\text{C}$) and a relative humidity of $50 \pm 5\%$ unless otherwise specified in the applicable test method.

MIL-P-29596(NAVY)

4.5.1 Vibrational Settling.4.5.1.1 Apparatus.

4.5.1.1.1 Cleated plywood box. A cleated plywood box (Style A, PPP-B-601, except as specified herein) shall be fabricated. The box shall have interior dimensions of 10 X 10 X 10 inches with a tolerance of + 1/16 inch. The plywood panels shall be 0.5 inch thick material. The lumber for cleats shall be nominal 1 X 2 inch material. No cover is necessary (see Figure 1).

4.5.1.1.2 Prototype load. A rigid prototype test load shall be fabricated of wood, steel, aluminum or other rigid materials having length and width dimensions of 10 X 10 inches (-1/16 inch) so as to provide an approximate 100 square inch bearing area on the packaging material. The prototype shall be constructed in such a manner that the load bearing surface will be flat. The prototype load shall be designed so that its weight provides a bearing stress of 0.10 ± 0.01 pounds per square inch (psi). In addition, an accelerometer shall be mounted to the prototype load.

4.5.1.2 Pack assembly. The inside bottom surface of the cleated plywood box shall be covered with 100 ± 5 grams of the packaging material to be tested. This shall be accomplished in such a manner to simulate the actual way the packaging material is intended to be used.

4.5.1.3 Test procedure. Place the completed pack upon a vibration table in the configuration shown in Figure 2. Place load on test specimen and immediately vibrate the entire test fixture at 0.5 Gs and sweep from 5 Hz to 100 Hz (vertical linear) at a rate of 2 octaves/minute. Note the frequency at which resonance occurs (natural frequency). Record the material initial thickness immediately following frequency sweep (allow load to remain on material). Run at the natural frequency for 30 ± 0.5 minutes. Check every 10 ± 0.5 minutes to ensure that the natural frequency has remained the same. Adjust frequency, if necessary. Terminate vibration after 30 ± 0.5 minutes and record final material thickness. Three samples shall be tested. The thickness decrease of these three samples shall not exceed the Table I requirement, on average, and any one sample shall not exceed 20% (see 4.5.1.4 for calculations).

4.5.1.4 Calculations. Calculate percent thickness decrease utilizing the following formula:

$$\left| \frac{I_r - I_i}{I_i} \right| \times 100$$

4.5.2 Contact corrosivity. Test in accordance with FED-STD-101, Method 3005.

MIL-P-29596(NAVY)

4.5.3 Abrasion. A specimen of the packaging material of any convenient size shall be placed on the surface of a polished 2024-T2 aluminum panel conforming to QQ-A-250/4. The aluminum panel shall be wider than the packaging material and long enough to permit the packaging material to be pulled along the panel for 6 inches. A weight which will exert a force of 1.0 ± 0.1 psi shall be placed on top of the packaging material, then the weighted packaging material shall be horizontally pulled 6.0 ± 0.5 inches back and forth along the panel for 30 cycles at an approximate speed of 1 foot (1 cycle) per second. The weight shall then be removed and this procedure shall be repeated using the other side of the specimen in direct contact with the same plate.

4.5.4 Flexibility (low temperature).

4.5.4.1 Conditioning. Cut four specimens, 4 X 12 inches, and condition for 3 hours at $-20^{\circ} \pm 2^{\circ}\text{F}$ ($-29^{\circ} \pm 1.1^{\circ}\text{C}$). The specimens shall be arranged in the low temperature chamber so that the air can circulate against all surfaces of the specimens. A round steel 0.25 inch diameter mandrel and the test specimens shall be placed in the low temperature chamber simultaneously.

4.5.4.2 Test procedure. After low temperature conditioning, immediately bend each specimen over the mandrel so that the specimen is subjected to a 180° bend. Bending shall be accomplished at the conditioning temperature. The flexing operation over the mandrel shall take 2 to 3 seconds. Each specimen shall be bent over the mandrel 3 times with one face against the mandrel and then turned over so that the opposite face of the specimen is toward the mandrel; the bending procedure is then repeated as above.

4.5.5 Flame spread. Test in accordance with ASTM E 162.

4.5.6 Smoke density. Test in accordance with ASTM E 662.

5. PACKAGING

5.1 Packaging. The packaging requirements for the desired levels of protection shall be as specified by the procuring activity (see 6.2).

5.2 Marking. Marking shall be in accordance with MIL-STD-129.

6. NOTES

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

6.1 Intended use. The packaging materials covered by this specification are intended for use primarily as dunnage in packing or shipping applications where a flexible, non-plastic material is desirable. In addition, the Type II material provides fire retardant protection.

MIL-P-29596(NAVY)

6.1.1 General. In certain instances, at the discretion of the procuring activity, these packaging materials may be used in cushioning applications. It is recommended that in those instances, testing be conducted to determine the adequacy of the material to perform as a cushioning material. These materials may be oriented in such a manner so to enhance its ability to provide primary cushioning protection. The manufacturer may be able to furnish information as to the particular material orientations that may yield the desired results.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Issue of the DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. Type required (see 1.2 and 6.1).
- d. Number of rolls (see 3.2.2.1).
- e. Length of rolls (if other than 150 yards) (see 3.2.2.1).
- f. Width of rolls (if other than 30 inches) (see 3.2.2.1).
- g. Details for first article inspections/testing see 4.3-4.3.3 and 6.7).
- h. Packaging requirements and levels of protection (see 5.1)
- i. Addresses for submission of MSDSs (for Type II only) (see 6.6).

6.2.1 Part of identifying number (PIN). Part numbers should be assigned in accordance with applicable specification sheets to identify items fabricated from synthetic rubber in accordance with this specification. When an item furnished under this specification is not covered by a specification sheet, the manufacturers part number should identify the item. Military part numbers should be coded in accordance with the following example:

EXAMPLE:

M29596 - X

1 digit dash number describing the material type.
(Use "1" for Type I material or "2" for Type II material.)

Denotes basic specification MIL-P-29596(Navy)

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Description (DID) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/ provided and that the DID is tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

MIL-P-29596 (NAVY)

<u>Reference Para.</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
4.3.2.1	DI-NDTI-80809A	TEST/INSPECTION REPORTS	---
4.3.3	"	"	10.2.7.2

The above DID was cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the DD Form 1423.

6.4 Carcinogen. A carcinogen is defined as a chemical appearing on one or more of the following sources: Occupational Safety and Health Administration regulated carcinogens list, National Toxicology Program list, or the International Agency for Research on Cancer list.

6.5 Metric conversion factors. The following conversion factors are referenced in FED-STD-376.

6.5.1 Length.

- a. To convert inches (in.) to millimeters (mm), multiply by 25.4.
- b. To convert yards (yd) to meters (m), multiply by 0.9144.

6.5.2 Weight. To convert pounds (lbs) to kilograms (kgs), multiply by 0.4536.

6.5.3 Pressure. To convert pounds per square inch (psi) to kilopascals (kPa), multiply by 6.895.

6.5.4 Area. To convert inches squared (in²) to millimeters squared (mm²), multiply by 645.16.

6.6 Material Safety Data Sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313.

6.7 First article. The contracting officer should provide specific guidance to offerors whether the first article samples should be a preproduction item, a first production item, a sample selected from the first production items or a standard production item from the contractor's current inventory (see 3.1 and 4.3). The contracting officer should also include specific instructions in acquisition documents regarding arrangements for submission of Material Safety Data Sheets (MSDS) prior to contract award, testing, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive requirements for first article inspection to those bidders offering a product which has been previously acquired or tested by the

MIL-P-29596(NAVY)

Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.8 Subject term (keyword) listing.

Dunnage
Flexible
Kraft paper
Packaging material

Custodian:
Navy - AS

Preparing Activity:
Navy - AS
(Project 8135-N653)

Review Activity:
Navy - SA

MIL-P-29596(NAVY)

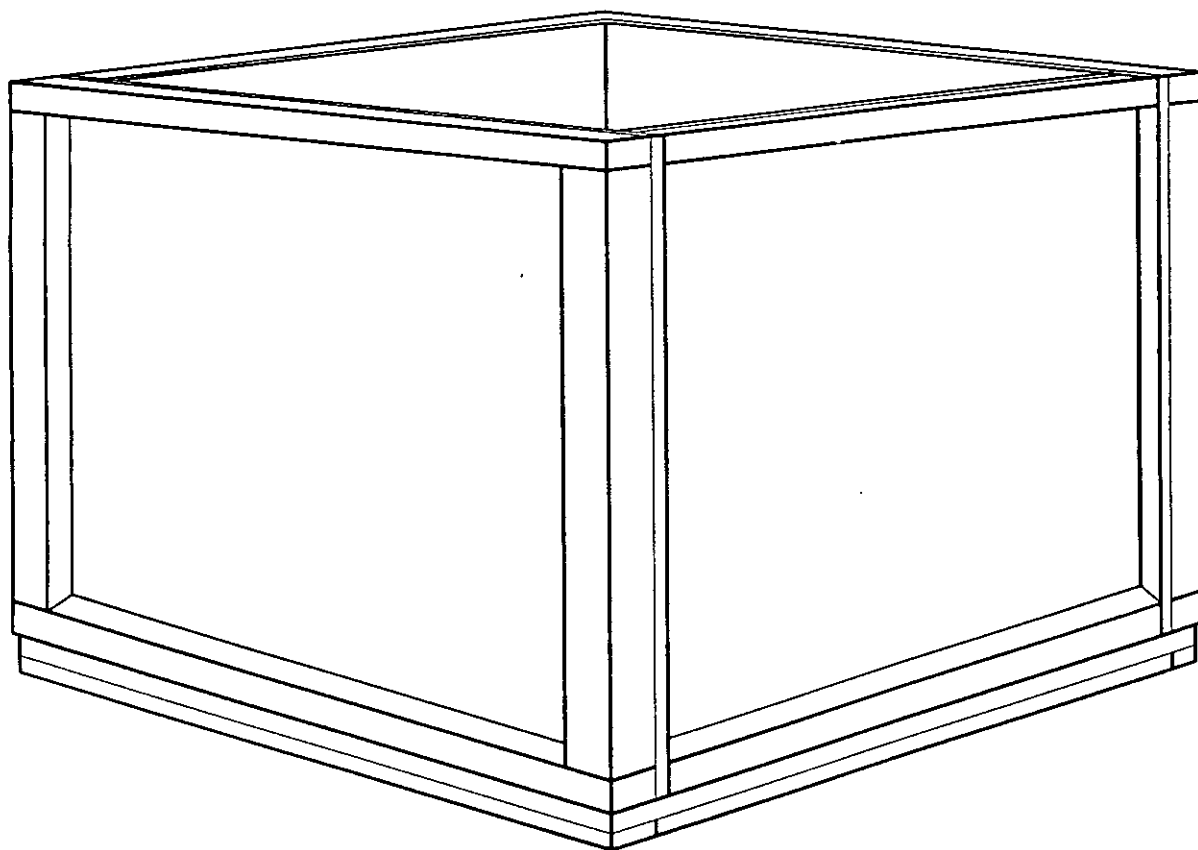
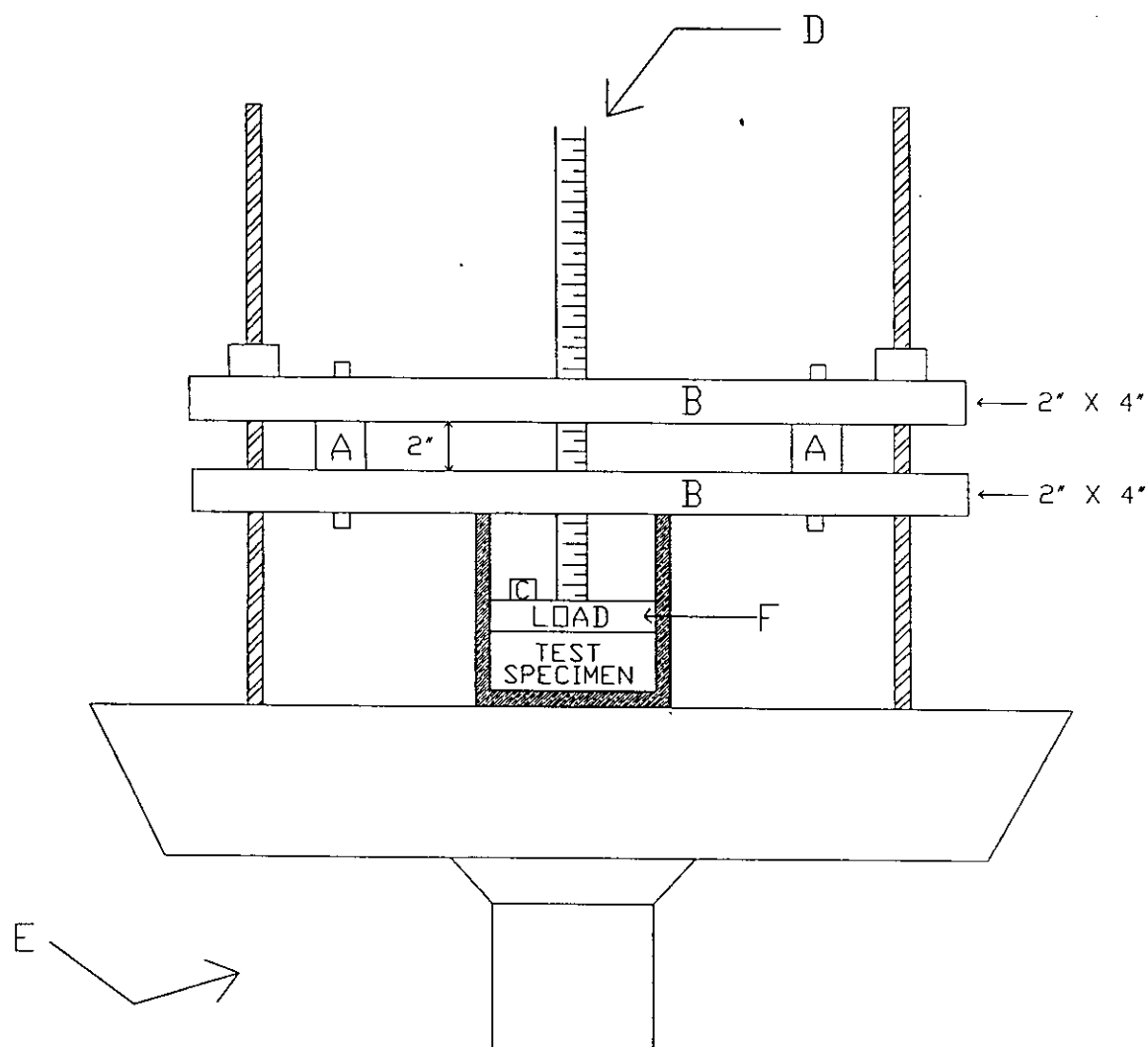


FIGURE 1. Cleated plywood box.

MIL-P-29596 (NAVY)



- A - Spacer (2 inch cylindrical)
- B - 22 inch guide
- C - Accelerometer
- D - Graduated cylindrical guide bar
- E - Hydraulic actuator and table components
- F - 10 X 10 inch prototype load

FIGURE 2. Test fixture configuration.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MIL-P-29596 (NAVY)	2. DOCUMENT DATE (YYMMDD) 15 January 1993
3. DOCUMENT TITLE PACKAGING MATERIAL, KRAFT PAPER, 3-PLY, FLEXIBLE, GENERAL SPECIFICATION FOR			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (if applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME COMMANDING OFFICER, NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION LAKEHURST SYSTEMS REQUIREMENTS DEPARTMENT		b. TELEPHONE (Include Area Code) (1) Commercial (908) 323-7488	(2) AUTOVON 624-7488
c. ADDRESS (Include Zip Code) CODE SR3 LAKEHURST, NJ 08733-5100		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	