MIL-R-21252B(SH)
8 September 1987
SUPERSEDING
MIL-R-21252A(SHIPS)
8 February 1965
(See 6.3)

MILITARY SPECIFICATION

RUBBER SHEET, SOLID, SYNTHETIC, SHIPBOARD WATER EVAPORATOR GASKETING

This specification is approved for use within the Naval Sea Systems Command, 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 covers gasket material for use in shipboard water stills.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

PPP-B-576 - Boxes, Wood, Cleated, Veneer, Paper Overlaid.
PPP-B-585 - Boxes, Wood, Wirebound.
PPP-B-591 - Boxes, Shipping, Fiberboard, Wood-Cleated.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-T-76 - Tape, Packaging, Paper (For Carton Sealing).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5330

MILITARY

MIL-P-116 - Preservation, Methods of.
MIL-L-10547 - Liners, Case, and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible.
MIL-I-17433 - Inhibitor, Hydrochloric Acid Descaling and Pickling Solutions.

STANDARDS

FEDERAL

FED-STD-601 - Rubber: Sampling and Testing.

MILITARY

MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-289 - Visual Inspection Guide for Rubber Sheet Material.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Nongovernment 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.

3. REQUIREMENTS

3.1 Form. The synthetic rubber shall be furnished in the form of sheets with dimensions and tolerances as specified (see 6.1).

3.2 Physical requirements. The synthetic rubber material shall conform to the requirements specified in table I.

TABLE I. Physical requirements of rubber.

Properties	Requirement	Test method
Initial properties:		
Tensile strength, lb/in^2, minimum	1600	4.7.1
Ultimate elongation, percent, minimum	70	4.7.1
Hardness, shore A durometer, 3 second	85 ± 5	4.7.2
Properties after oven aging:		4.7.3
Tensile strength, lb/in^2, minimum	1600	4.7.3.1
Ultimate elongation, percent, minimum	40	4.7.3.1
Hardness, shore A durometer, maximum	95	4.7.3.2
Compression set, percent, maximum	65	4.7.3.3
Properties after immersion in distilled water:		4.7.4
Tensile strength, lb/in^2, minimum	1200	4.7.4.1
Ultimate elongation, percent, minimum	60	4.7.4.1
Volume change, percent	0 to 25	4.7.4.2
Extraction, percent, maximum	0.5	4.7.4.3
Properties after immersion in descaling solution:		4.7.5
(a) After immersion in hydrochloric acid solution.		
(b) After immersion in sodium bisulfate solution.		
(c) After immersion in sulfamic acid solution.		
Tensile strength, lb/in^2, minimum	1200	4.7.5.1
Ultimate elongation, percent, minimum	60	4.7.5.1
Volume change, percent	0 to 25	4.7.5.2
Sealing ability:		4.7.6
Initial	no leaks	4.7.6
After oven aging	no leaks	4.7.6
Crushing resistance	no damage	4.7.6

3.3 Material.

3.3.1 Recovered materials. Unless otherwise specified herein, all material incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable 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 is allowed under this specification unless otherwise specifically specified.

3.4 Workmanship. The workmanship shall be such as to meet all applicable requirements of 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 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Sampling.

4.2.1 Lot. For purposes of sampling, examinations and tests, a lot shall consist of not more than 2500 pounds of material of the same form and dimensions, produced in one plant under essentially the same conditions and offered for delivery at one time.

4.2.2 Sampling for examination. A random sample of rolls shall be selected from each lot in accordance with table II for the examination specified in 4.3. A unit area is defined as an area of 1-square foot.

TABLE II. Sampling for examination.

Lot size, number of unit areas	Sample size, number of unit areas	Number of nonconforming defective unit areas of material			
		Major defects		Total defects	
		Accept	Reject	Accept	Reject
Up to 8	5	0	1	0	1
9 to 25	8	0	1	1	2
26 to 50	13	0	1	2	3
51 to 90	13	1	2	2	3
91 to 150	20	1	2	3	4
151 to 280	32	2	3	5	6
281 to 500	50	3	4	7	8
501 to 1200	80	5	6	10	11
1201 to 3200	125	7	8	14	15
3201 and over	200	10	11	21	22

A major defect is a defect that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose. A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit. Total defects is major and minor defects combined.

4.2.3 Sampling for tests. Samples shall be taken at random from those selected in 4.2.2 in sufficient quantity to conduct either the production check tests or the quality conformance tests specified in 4.4 and 4.5, as applicable.

4.3 Quality conformance examination. Each of the samples selected in accordance with 4.2.2 shall be subjected to surface examination for workmanship, dimensions and tolerances. MIL-STD-289 shall be used to determine and evaluate visual defects. If the number of defects exceeds the acceptance number, this shall be cause for rejection of the entire lot represented by the sample.

4.4 Production check tests. Production check tests shall be conducted on samples from the first lot of material offered under a contract or order and from every tenth lot thereafter. Each of the tests specified in 4.7 shall be conducted.

4.5 Quality conformance tests. Quality conformance tests shall be conducted on those lots which are not represented by 4.4. The tests specified in 4.7.1, 4.7.2, and 4.7.3 shall be conducted.

4.6 Action in case of nonconformance. If any of the samples tested in accordance with 4.4 or 4.5 is found not to be in conformance with the requirements of this specification, the lot which it represents shall be subject to rejection. Furthermore, if the failure was a production check test, additional samples shall be taken from (or provided to represent) each subsequent lot and shall be subjected to the test or tests wherein the failure occurred. Each lot shall then be considered acceptable only after satisfactory results are obtained on the test or tests by all the samples taken to represent the lot. This additional testing shall be discontinued after four successive lots have passed the test or tests.

4.7 Test procedures.

4.7.1 Tensile strength and ultimate elongation. The tensile strength and ultimate elongation shall be determined by methods 4111 and 4121, respectively, of FED-STD-601. Die III specimens shall be used for determinations of these properties.

4.7.2 Hardness. The hardness shall be determined by method 3021 of FED-STD-601. Plied up specimens may be used and the reading shall be taken 3 seconds after firm contact is made between the rubber and the presser foot of a shore A durometer.

4.7.3 Oven aging. Method 7221 of FED-STD-601 shall be used for oven aging. The aging period shall be 70 + 1/4 hours at 100 ± 1.1 degrees Celsius (°C) (212 ± 2 degrees Fahrenheit (°F)).

4.7.3.1 Tensile strength and ultimate elongation. Tensile strength and ultimate elongation after oven aging shall be determined by the procedure specified in 4.7.1.

4.7.3.2 Hardness after oven aging. Hardness after oven aging shall be determined by the procedure specified in 4.7.2.

4.7.3.3 Hot compression set. Hot compression set shall be determined by method 3311 of FED-STD-601. The specimens shall be compressed to 25 percent deflection and subjected to the conditions specified in 4.7.3. Plied up specimens may be used.

4.7.4 Immersion in distilled water. Specimens for tensile strength and ultimate elongation and volume change shall be conditioned for 70 ± 1/4 hours at 90 ± 1.1°C (194 ± 2°F) in distilled water. Specimens for the extraction test shall be conditioned for 1 hour at 100 ± 1.1°C (212 ± 2°F) in distilled water.

4.7.4.1 Tensile strength and ultimate elongation after water immersion. Tensile strength and ultimate elongation after water immersion shall be determined in accordance with method 6111 of FED-STD-601. The tensile strength shall be based on the swollen cross-sectional area.

4.7.4.2 Volume change after water immersion. The change in volume after water immersion shall be determined in accordance with method 6211 of FED-STD-601.

4.7.4.3 Extraction. The extraction in boiling water shall be determined in accordance with method 6621 of FED-STD-601.

4.7.5 Immersion in descaling solutions. Test specimens shall be immersed in each of the following descaling solutions for 70 ± 1/4 hours at 90 ± 1.1°C (194 ± 2°F):

(a) A 10 percent solution by weight of hydrochloric acid in water containing an inhibitor. The inhibitor shall conform to MIL-I-17433.
(b) A solution of 1 pound of sodium bisulfate in 1 gallon of water.
(c) Sulfamic acid solution. One pound of sulfamic acid containing 1 percent by weight of diethylthiourea inhibitor added to 1 gallon of water.

4.7.5.1 Tensile strength and ultimate elongation after immersion in descaling solutions. The tensile strength and ultimate elongation shall be determined after immersion in each of the descaling solutions specified in 4.7.5. The procedure shall be in accordance with method 6111 of FED-STD-601.

4.7.5.2 Volume change after immersion in descaling solutions. The change in volume shall be determined after immersion in each of the descaling solutions specified in 4.7.5. The procedure shall be in accordance with method 6211 of FED-STD-601.

4.7.6 Sealing ability test. The details and constructions of the special test equipment required for the sealability test of the synthetic rubber sheet material shall be as shown on figures 1, 2, and 3. Gaskets of the sheet rubber shall be cut to fit the flanges and the bolt holes of the test apparatus. The apparatus shall then be assembled by applying 100 foot-pounds of torque to each of the bolts. Nitrogen pressure of 500 pounds per square inch (lb/in^2) gauge shall then be applied while the apparatus is immersed and any leakage noted. The gas pressure shall be released and the device placed in a circulating air oven for 2 weeks at 100 ± 1.1°C (212 ± 2°F). Upon removal, the device shall be subjected to 500 lb/in^2 gauge nitrogen pressure under water and again examined for leaks. After releasing the gas pressure, the test apparatus shall be disassembled assembled and the gaskets examined for cracking, crushing, or any other damage.

4.8 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Domestic shipment and early material use and for storage of on board repair parts.

5.1.1 Preservation and packaging. Preservation and packaging shall afford adequate protection against deterioration and physical damage during shipment from the supply source to the using activity and until early installation and may conform to the contractor's commercial practice when such meets these requirements.

5.1.2 Packing. Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations as applicable to the mode of transportation and may conform to the contractor's commercial practice when such meets these requirements.

5.1.3 Marking. Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the contractor's commercial practice. The information shall include nomenclature, National stock number or manufacturer's part number, contract or order number, contractor's name and destination, date of cure and size.

5.1.4 On board repair parts.

5.1.4.1 Preservation and packaging. Rubber sheets in rolls shall be individually packaged in accordance with method III or MIL-P-116.

5.1.4.2 Packing. Packing of sheet material shall be in accordance with 5.1.2.

5.1.4.3 Marking. In addition to any special marking required by the contract or order (see 6.1), interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129 and shall contain the contractor's name, and the date of cure of the material.

5.2 Domestic shipment and storage or overseas shipment. The requirements and levels of packaging, packing, and marking for shipment shall be as specified (see 6.1).

5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment, which may be required when acquisition is made by a Government activity (see 6.1).

5.2.1.1 Packaging.

5.2.1.1.1 Level A. Rubber sheets in rolls shall be individually packaged in accordance with method III of MIL-P-116.

5.2.1.1.2 Level C. Packaging shall afford adequate protection against deterioration and physical damage during shipment from the supply source to the using activity and until early installation and may conform to the contractor's commercial practice when such meets these requirements.

5.2.1.2 Packing.

5.2.1.2.1 Level A. Rubber sheets, packaged as specified (see 6.1) shall be packed in overseas type, wood-cleated fiberboard, nailed wood, wirebound wood, corrugated or solid fiberboard, wood-cleated veneer paper overlaid, or wood cleated-plywood boxes conforming to PPP-B-591, PPP-B-621, PPP-B-585, PPP-B-636 weather-resistant class, PPP-B-576 or PPP-B-601, respectively, at the option of the contractor. Shipping containers shall have caseliners conforming to MIL-L-10547 and shall be closed and sealed in accordance with the appendix thereto. Caseliners for boxes conforming to PPP-B-636 may be omitted provided all joints and corners of the boxes are sealed with minimum 1-1/2 inch wide tape conforming to PPP-T-76. Boxes shall be closed and strapped in accordance with the applicable box specification or appendix thereto. The gross weight of wood boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specification.

5.2.1.2.2 Level B. Rubber sheets, packaged as specified (see 6.1), shall be packed in domestic type wood-cleated fiberboard, nailed wood, wirebound wood, cleated-plywood or wood-cleated veneer paper overlaid boxes or weather-resistant class fiberboard boxes conforming to PPP-B-591, PPP-B-621, PPP-B-585, PPP-B-601, PPP-B-576, or PPP-B-636, respectively, at the option of the contractor. Box closures shall be as specified in the applicable box specification or appendix thereto. The gross weight of wood boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specifications.

5.2.1.3 Marking. Marking of interior packages and exterior packing shall be in accordance with 5.1.4.3.

6. NOTES

6.1 Ordering data. Acquisition documents shall specify the following:

(a) Title, number, and date of this specification.
(b) Dimensions and tolerances required (see 3.1).
(c) Levels of packaging and packing required (see 5.1, 5.2, 5.2.1, 5.2.1.2.1 and 5.2.1.2.2).

6.2 Subject term (key word) listing.

Elongation
Tensile strength
Water still

6.3 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.

Preparing activity:
Navy - SH
(Project 5330-N108)

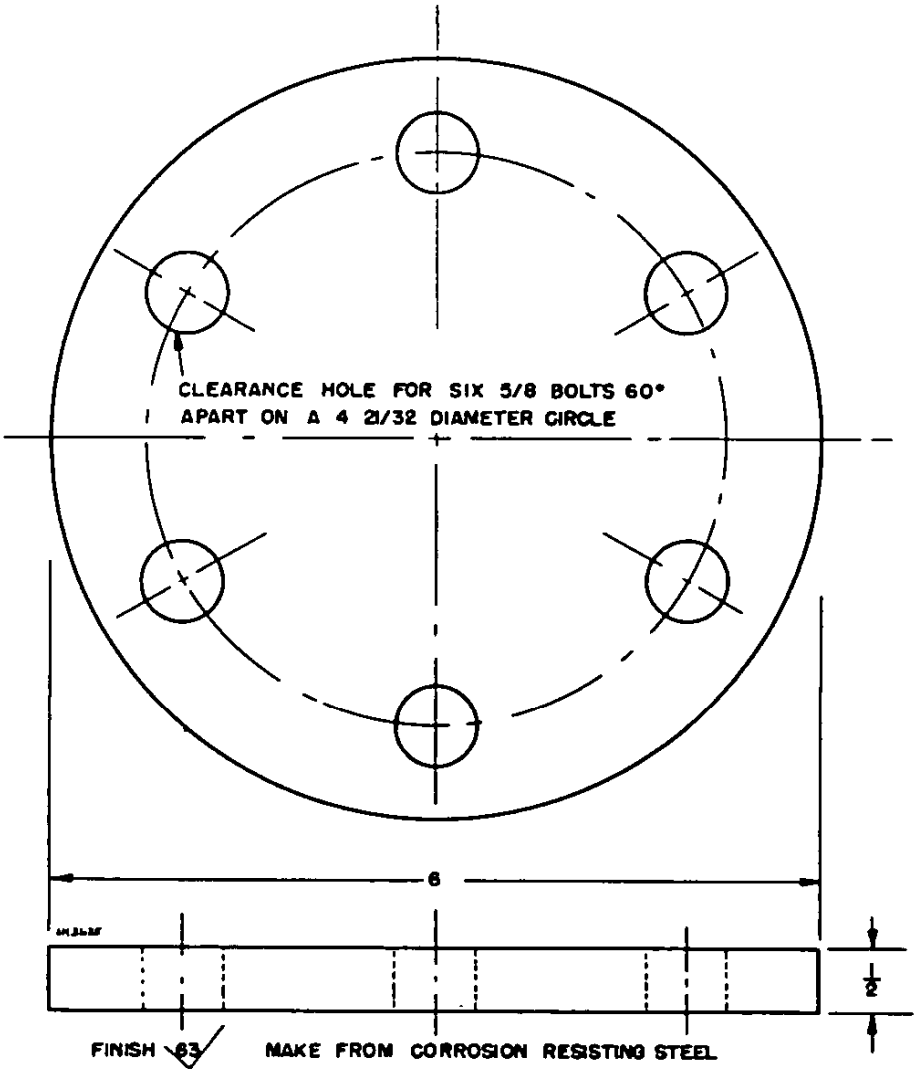

FIGURE 1. Piece 1 of device used to test sealability of gasket material for water stills.

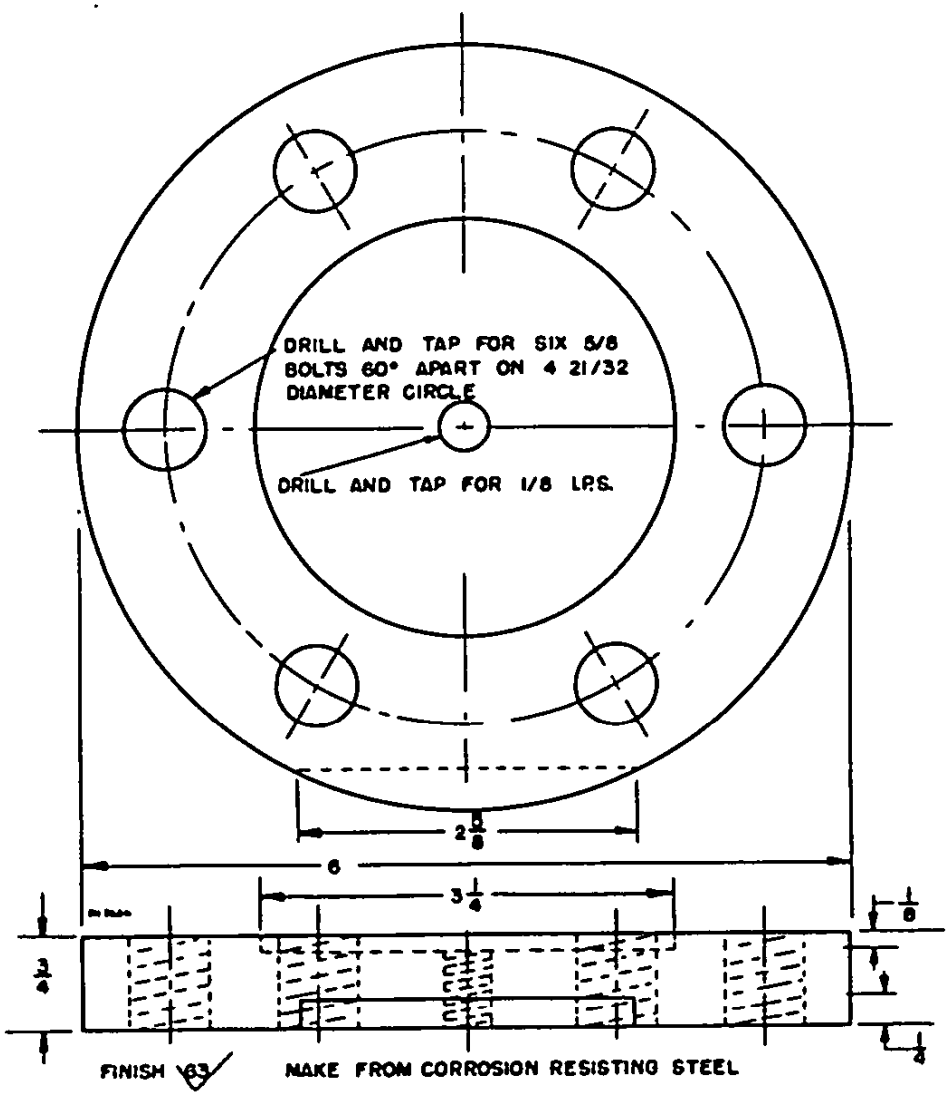

FIGURE 2. Piece 2 of device used to test sealability of gasket material for water stills.

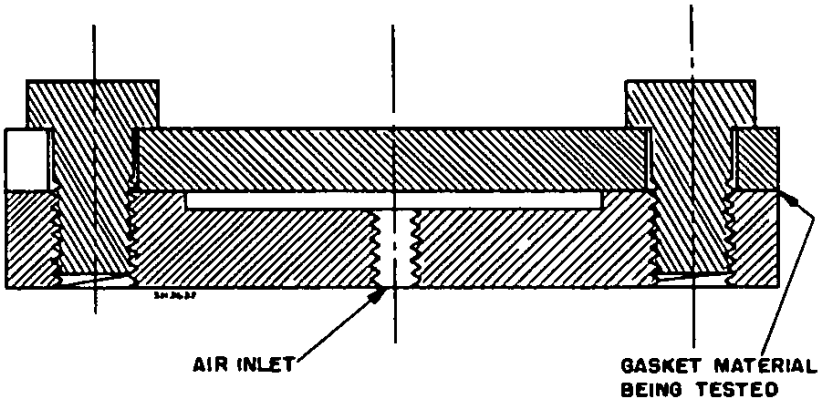

FIGURE 3. Cross-section view of assembled device used to test sealability of gasket material for water stills.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-R-21252B(SH)	RUBBER SHEET, SOLID, SYNTHETIC, SHIPBOARD WATER EVAPORATOR

3a. NAME OF SUBMITTING ORGANIZATION GASKETING

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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