

MIL-A-0017472A(SHIPS)  
4 January 1963  
USED IN LIEU OF  
MIL-A-17472(NAVY)  
12 February 1953

## INTERIM MILITARY SPECIFICATION

### ASBESTOS SHEET, COMPRESSED (GASKET MATERIAL)

This limited coordination Military specification has been prepared by the Bureau of Ships based upon currently available technical information, but has not been approved for promulgation as a revision of Military Specification MIL-A-17472. It is subject to modification. However, pending its promulgation as a coordinated Military specification, it may be used for procurement.

#### 1. SCOPE

1.1 This specification covers symbol 2150 compressed asbestos sheet basket material used as a gasket joint sealing material for steam, hot and cold water or brine, air and gases, and oils.

#### 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:

##### STANDARDS

###### FEDERAL

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

###### MILITARY

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

(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 document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

OFFICIAL CLASSIFICATION COMMITTEE  
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, N. Y.)

#### 3. REQUIREMENTS

3.1 Qualification. - The compressed asbestos sheet furnished under this specification shall be a

product which has been tested, and passed the qualification tests specified herein, and has been listed on or approved for listing on the applicable qualified products list.

3.2 Material. - The compressed asbestos sheet shall be made of asbestos fiber, natural or synthetic rubber, or a mixture of the two, and suitable mineral fillers.

3.2.1 Asbestos fiber. - The asbestos fiber shall be chrysotile and shall contain not less than 12 percent chemically combined water (see 4.5.1).

3.3 Construction. - The compressed asbestos sheet shall be either cross-laminated or not.

3.4 Asbestos fiber and rubber content. - The compressed asbestos sheet shall contain not less than 70 percent by weight, of asbestos fiber, and not less than 10 percent by weight, of rubber (see 4.5.1).

3.5 Loss of weight on heating. - The loss in weight on heating at 900° to 925 degrees Centigrade (° C.) shall not be more than 35 percent (see 4.5.2).

3.6 Thickness and weight. - The thickness and weight of the finished compressed asbestos sheet shall be as shown in table I as specified (see 6.2).

Table I - Thickness and weight

Thickness	Weight, minimum
Inch	Pounds per square yard
1/64	0.8
1/32	2.0
1/16	4.0
3/32	6.0
1/8	8.0
3/16	12.0
1/4	16.0

3.6.1 Thickness tolerances. - The permissible tolerances in thickness shall be as shown in table II.

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Table II - Thickness tolerances.

Thickness	Tolerance
Inch	
1/64	+ 0.005 inch; -0.002 inch
1/32	± 0.005 inch
1/16 and over	± 10 percent

3.7 Length and width. - Unless otherwise specified (see 6.2), asbestos sheet shall be furnished in widths not less than 36 inches, and in lengths not greater than 150 inches.

3.8 Compressibility and recovery. - The compressibility of the sheet shall be not less than 7 percent nor more than 17 percent. The recovery shall be not less than 40 percent (see 4.5.3).

3.9 Tensile strength. - The average tensile strength of sheets 1/32 inch and thicker shall be not less than 3500 pounds per square inch (p. s. i.). Single ply sheets 1/64 inch thick shall have a minimum average tensile strength of 1200 p. s. i. in the weakest direction and an average tensile strength of both the longitudinal and transverse directions of not less than 2,000 p. s. i. (see 4.5.4).

3.10 Graphite. - Unless otherwise specified (see 6.2), the finished sheets shall not be lubricated or graphited.

3.11 Branding. - Each square foot of the asbestos sheet shall be plainly marked with the manufacturer's name, brand identification, and Navy symbol 2150.

3.12 Workmanship. - Workmanship shall be first class in every respect. The asbestos sheet shall have smooth surfaces and shall be free from imperfections.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - 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.

4.2 Qualification tests<sup>1/</sup>. - Qualification tests shall be conducted at a laboratory satisfactory to the Bureau of Ships. Qualification tests shall consist of the tests specified in 4.5.

#### 4.3 Sampling. -

4.3.1 Lot. - For purposes of sampling a lot shall consist of all asbestos sheet of the same thickness produced under essentially the same conditions and offered for delivery at one time.

#### 4.3.2 Sampling for quality conformance inspection. -

4.3.2.1 Sampling for examination. - A random sample of sheets shall be selected from each lot offered for examination in accordance with Standard MIL-STD-105 at Inspection Level II. The Acceptable Quality Level shall be 2.5 percent defective.

4.3.2.2 Sampling for tests. - Two samples of gasket material shall be selected at random from each 2,000 pound lot or less for the tests described in 4.4.2. Each sample piece shall be 12 by 12 inches.

#### 4.4 Quality conformance inspection. -

4.4.1 Examination. - Each of the sample sheets selected in accordance with 4.3.2.1 shall be surface examined, and measured to determine conformance with the requirements of this specification which do not require tests. Any sheet in the sample containing one or more visual or dimensional defects shall not be offered, and if the number of defective sheets in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be cause for rejection.

4.4.2 Lot tests. - The samples selected in accordance with 4.3.2.2 shall be subjected to the tests specified in 4.5.2 through 4.5.4. If any of the samples tested is found to be not in conformance with this specification this shall be cause for rejection of the lot represented by the sample.

<sup>1/</sup> Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.3 and 6.4).

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4.5 Test procedures. -4.5.1 Chemical analysis. -4.5.1.1 Preparation of sample for analysis. -

Small strips or cross-sections shall be cut from various parts of the sample so as to be representative of the sample. The specimen shall be split with the aid of a knife to produce relatively thin layers of material.

4.5.1.2 Rubber. -

4.5.1.2.1 A specimen, prepared as specified in 4.5.1.1 shall be placed in a 125 milliliter (ml.) lipped assay flask or a 250 ml. Erlenmeyer flask fitted with a standard taper and an air condenser. Ten grams of paranitrotoluene and 25 ml. of orthodichlorobenzene shall be added, and the mixture heated to 180 to 190° C. on a hot plate under a hood with occasional stirring until the rubber dissolves. From 4 to 10 hours are usually sufficient to effect solution.

4.5.1.2.2 The flask and contents shall be cooled, 10 ml. of chloroform added, and the mixture decanted through a 100 mesh screen. The residue shall be washed with chloroform until the insoluble fillers are removed as indicated by a clear filtrate. If undissolved rubber remains, the fibers shall be returned to the digestion flask and the treatment with paranitrotoluene and orthodichlorobenzene repeated.

4.5.1.2.3 The filtrates and wash solutions shall be combined and poured through a portion of the sieve that is free of fibers in order to collect any fibers that may have passed through previously. The fibers shall then be transferred to a siphon cup and extracted for 1 hour with chloroform, dried at 105° C. for 1 hour, cooled and weighed.

4.5.1.2.4 Calculation. -

$$\text{Asbestos fibers, percent} = \frac{F}{S}$$

$$\text{Rubber content, percent} = 100 - A - B$$

Where F = weight of fibers

S = weight of specimen

A = percent fibers

B = percent lubricant

4.5.1.3 Chemically combined water. - A specimen of approximately 1 gram shall be taken from the fibrous material which has been treated as

required in 4.5.1.2.3. It shall be dried for 1 hour in a platinum crucible at a temperature of 105 to 110° C., cooled in a desiccator and again weighed. The specimen and crucible shall be ignited in an electric furnace at a temperature of 800° to 825° C., or over a blast lamp, to a constant weight.

4.5.1.3.1 Calculation. -

Chemically combined water,

$$\text{percent} = \frac{S-R}{S} \times 100$$

Where R = weight of specimen after ignition

S = weight of specimen before ignition

4.5.1.3.2 Two specimens shall be tested. The average of the results obtained from the two specimens shall be the chemically combined water of the sample.

4.5.1.4 Cotton, asbestos and chemically combined water. - If the fibrous material contains cotton or other organic materials as indicated by nonconformance to 3.2.1 it may be determined as follows: The asbestos content of the fibrous material which has been treated as specified in 4.5.2.2 shall be determined by the combustion procedure for cotton and asbestos. If graphite, carbon black, or other material insoluble in the paranitrotoluene - orthodichlorobenzene mixture remains on the fibers, the combustion method will not give reliable results, and in such cases the results obtained shall be considered to be approximations.

4.5.1.4.1 A specimen weighing approximately 1 gram shall be taken from the fibrous material (see 4.5.1.2). It shall be placed in a porcelain or platinum combustion boat, dried for 1 hour at a temperature of 105° to 110° C., cooled in a desiccator and weighed. The dried specimen in the boat shall be inserted in the combustion tube of an electric organic combustion furnace. The specimen shall be maintained at a temperature of  $900 \pm 50$ ° C. for approximately 30 minutes or until combustion of the cotton is complete. During the combustion period a current of oxygen (carbon dioxide free) shall be passed through the combustion tube at a rate of approximately 200 milliliters per minute. The combustion gases shall be passed through either two U-tubes containing calcium chloride or through a drying tube containing anhydrous magnesium perchlorate or calcium sulphate to remove the moisture; and finally the gases shall be passed into either a weighed Vanier or similar absorption bulb containing a strong

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solution of caustic potash, or in a weighed carbon dioxide absorption bulb containing a sodium hydroxide impregnated base (the absorbent having the trade name "ascarite" is of this type) to absorb the carbon dioxide. Three-elevenths of the increase in weight of the Vanier or other carbon dioxide absorption bulb shall represent the weight of the carbon in the asbestos. This shall be 44.40 percent of the cotton. These factors may be combined to give a constant of 0.614. When the combustion has been completed, the absorption tube shall be weighed, and the combustion boat containing the ignited residue shall be removed from the furnace, cooled in a desiccator and weighed.

4.5.2 Loss in weight on heating. -

4.5.2.1 Preparation of sample. - Small strips or cross-sections shall be cut from various parts of the sample so as to be representative of the sample. The specimen shall be split with the aid of a knife to produce relatively thin layers of material.

4.5.2.2 Procedure. - Specimens of approximately 5 grams each prepared as in 4.5.2.1 shall be dried for 1 hour in a porcelain crucible at a temperature at 105° to 110° C., cooled in a desiccator and again weighed. The specimen and crucible shall be ignited in an electric furnace at a temperature of 900° to 925° C., or over a blast lamp, to a constant weight. The loss in weight shall be calculated as follows:

Loss in weight (percent

$$\text{ash}) = \frac{R}{S} \times 100$$

Where R = weight of specimen after ignition

S = weight of specimen before ignition

4.5.3 Compressibility and recovery. - Compressibility and recovery shall be determined in accordance with method 3331 of Standard FED-STD-601.

4.5.4 Tensile strength. - Specimens 1/2 inch wide by 6 inches long shall be used, with a 3-inch length of specimen between the jaws. The testing machine shall be operated at a rate of separation of the grips of 12±1 inches per minute. Three specimens shall be cut lengthwise of the sheet (longitudinal) and three specimens at right angles thereto (transverse). All specimens shall be conditioned at 212° F. for 1 hour and cooled to

room temperature in a desiccator before testing. The average of the results of six specimens shall be used to determine the average tensile strength. The average of the results of three specimens from one direction of the asbestos sheet shall be the average tensile strength of the asbestos sheet in that direction.

4.6 Examination of preparation for delivery. - Packaging, packing and marking shall be examined to determine conformance with the requirements of section 5.

## 5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early material use. -

5.1.1 Packaging. - Packaging shall be sufficient to afford adequate protection against physical damage during shipment from the supply source to the using activity and until early installation and may conform to the supplier'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 lowest rate, and will afford protection against physical 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 supplier's commercial practice when such meets the 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, Federal stock number or manufacturer's part number, contract or order number, contractor's name and destination.

5.2 Domestic shipment and storage or overseas shipment. - The requirements and levels of packaging, packing and marking for shipment shall be specified by the procuring activity (see 6.2).

(5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment, which may be required when procurement is made by a Government activity (see 6.2).

5.2.1.1 Packaging. -5.2.1.1.1 Level A. -

5.2.1.1.1.1 Rolls. - Asbestos sheets shall be rolled and restrained from unwinding. The roll

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shall be wrapped with Class 2 Kraft paper conforming to Specification UU-P-271 with ends enclosed. All seams, joints and closures shall be sealed with adhesives or other suitable materials to afford waterproofness equal to that of the wrap material itself. A minimum of 2-inch overlap shall be provided at all overlapping edges.

5.2.1.1.1.2 Sheets. - No over packaging required.

5.2.2 Packing. -

5.2.2.1 Level A. - Rolls and sheets shall be packed in containers conforming to any one of the following specifications at the option of the contractor:

<u>Specification</u>	<u>Classification</u>
PPP-B-576	Class 2
PPP-B-585	Class 3 use
PPP-B-591	Overseas type
PPP-B-601	Overseas type
PPP-B-621	Class 2
PPP-B-636	Class 2
PPP-B-640	Class 2

5.2.2.1.1 Shipping containers shall be closed, strapped or banded in accordance with the applicable box specification or appendix thereto. The gross weight of wood or wood-cleated boxes shall not exceed 200-pounds; fiberboard boxes shall not exceed the weight limitations of the applicable fiberboard box specification.

5.2.2.1.1.1 Caseliners. - Shipping containers for sheets shall have caseliners conforming to Specification MIL-L-10547. Caseliners shall be closed and sealed in accordance with the appendix to Specification MIL-L-10547. Caseliners for fiberboard boxes, Specifications PPP-B-636 and PPP-B-640, may be omitted provided all center and edge seams and manufacturer's joint are sealed and waterproofed with pressure sensitive type in accordance with the applicable fiberboard box specification.

5.2.2.2 Level B. - Rolls and sheets shall be packed in containers conforming to any one of the following specifications at the option of the contractor:

<u>Specification</u>	<u>Classification</u>
PPP-B-576	Class 1
PPP-B-585	Class 1 or 2 use

<u>Specification</u> (Cont'd)	<u>Classification</u> (Cont'd)
PPP-B-591	Domestic type
PPP-B-601	Domestic type
PPP-B-621	Class 1
PPP-B-636	Class 1
PPP-B-640	Class 1

5.2.2.2.1 Shipping containers shall be closed in accordance with the applicable box specification or appendix thereto. The gross weight of wood or wood-cleated boxes shall not exceed 200-pounds; fiberboard boxes shall not exceed the weight limitations of the applicable fiberboard box specification. Rolls packaged as specified in 5.2.1.1.1 shall need no over packing.

5.2.2.3 Palletization. - When specified (see 6.2), shipping containers shall be palletized in accordance with Standard MIL-STD-147.

5.3 Marking. - In addition to any special marking required by the contract or order, shipping containers shall be marked for shipment in accordance with Standard MIL-STD-129.)

6. NOTES

6.1 Intended use. - Compressed asbestos sheet is intended for use for the following services:

- Saturated steam to 300 psig.
- Oil-fuel, lubricating, diesel to 500 psig and 250° F.
- Water-fresh, brine, hot, cold to 400 psig.
- Air or gas to 3,000 psig.
- Gases of combustion to 500 psig and 700° F.

6.2 Ordering data. - Procurement documents should specify the following:

- Title, number, and date of this specification.
- Thickness required (see 3.6).
- Length and width of sheet required (see 3.7.1).
- Whether finished sheet should be lubricated or graphited (see 3.10).
- Packing or marking requirements other than those of 5.1 (see 5.2).
- When pallets are required (see 5.2.2.3).

6.3 With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in Qualified Products List QPL-17472, whether or not such products



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products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government, tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Bureau of Ships, Department of the Navy, Washington 25, D. C. and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.3).

6.4 Copies of "Provisions Governing Qualification" may be obtained upon application to

Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia 20, Pennsylvania.

Notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Preparing activity:  
Navy - Ships  
(Project 5330-N053Sh)

SPECIFICATION ANALYSIS SHEET  
NAVSHIPS-4863 (8-61)

## INSTRUCTIONS

BUDGET BU. NO. 45-R309

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 Bureau of Ships

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 dotted lines on reverse side, staple in corner, and send to Bureau of Ships, Specifications and Standardization Branch, Washington 25, D.C.

## SPECIFICATION

ORGANIZATION		CITY	STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED		DOLLAR AMOUNT \$
MATERIAL PROCURED UNDER A DIRECT GOVERNMENT CONTRACT <input type="checkbox"/>		OR A SUBCONTRACT <input type="checkbox"/>	

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?

YES

NO

IF THE ANSWER IS "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification.) PLACE THIS FORM AND PAPERS IN AN ENVELOPE AND SEND TO THE BUREAU.

SUBMITTED BY (Print name and activity)

DATE

Fold

DEPARTMENT OF THE NAVY  
BUREAU OF SHIPS  
WASHINGTON 25, D. C.  
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