

NOFORN THIS DOCUMENT IS SUBJECT TO SPECIAL EXPORT CONTROLS AND EACH TRANSMITTAL TO FOREIGN GOVERNMENTS OR FOREIGN NATIONALS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE NAVAL SHIP SYSTEMS COMMAND

MIL-I-24244(SHIPS)
AMENDMENT-2
1 May 1969
SUPERSEDING
Amendment-1
15 February 1968

**MILITARY SPECIFICATION
INSULATION MATERIALS, THERMAL, WITH SPECIAL
CORROSION AND CHLORIDE REQUIREMENTS**

This amendment forms a part of Military Specification MIL-I-24244(SHIPS), dated 22 August 1966.

Page 1

1.2, type 3B: Delete "1000°F." and substitute "1200°F."

Page 2

Delete types 12 and 13 in their entirety.

Add types 15 and 16 as follows:

Type 15 - Tape, asbestos (MIL-T-4117)
15A - Class 1, grade AAA, type XX
15B - Class 1, grade AAA, type XXI

Type 16 - Insulation, Blocks, Boards, Blankets, Felts, Sleevings (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type) (HH-I-556)
16A - Form A, rigid, class 2
16B - Form A, rigid, class 3
16C - Form A, rigid, class 4
16D - Form A, rigid, class 5
16E - Form B, type II, class 9
16F - Form C, class 10
16G - Form C, class 11."

2.1, under "SPECIFICATIONS, MILITARY", add:

"MIL-T-4117 - Tape, Asbestos."

Under "SPECIFICATIONS, FEDERAL", delete "HH-I-563 and HH-I-564" and substitute:

"HH-I-556 - Insulation, Blocks, Boards, Blankets, Felts, Sleevings (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type)."

Page 3

3.3.1, delete and substitute:

"3.3.1 Analysis. The specific material supplied shall be analyzed for the following leachable ions: (1) chloride, (2) sodium or silicate (if necessary to meet the acceptance requirement of figure 1, both sodium and silicate should be analyzed). The "plot point" of these analyses shall fall in the acceptable area of figure 1. The acceptance-rejection curve may be extrapolated, as necessary, to determine the acceptability of "plot points" which fall outside the area actually bounded by figure 1. However, the minimum allowable value of sodium plus silicate shall be 50 ppm."

1/ CHANGES FROM PREVIOUS ISSUE. THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "F" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

FSC 5640

3.3.2, delete and substitute:

"3.3.2 pH. Leach water from the specific material supplied except for MIL-C-2908, Type II (Type 5B of MIL-I-24244) cement, shall have a pH (Hydrogen ion concentration negative exponent) not greater than 11.2 at 25°C. For MIL-C-2908, Type II (Type 5B of MIL-I-24244) cement, the pH shall not be greater than 11.7 at 25°C."

Page 4

3.4.2(a), delete and substitute:

"(a) The production lot from which the sample was taken has met all the requirements of the specification listed in 1.2 for the specific type and subtype. The sample from this lot shall be analyzed for pH, chlorides, sodium and silicate in accordance with the chemistry methods permitted by this specification."

3.4.2(c), delete and substitute:

"(c) The actual numerical results of all chemistry tests including analyses for both sodium and silicate content, and actual numerical results of the preproduction corrosion test shall have been submitted to the command or agency concerned for information."

Add new paragraph 3.5:

"3.5 Mercury contamination. During the manufacturing process, tests and inspections, the insulation shall not have come in direct contact with mercury or any of its compounds, nor with any mercury containing device employing a single boundary of containment."

4.1, delete and substitute:

"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 in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government.^{1/} The Government^{1/} 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."

Add the following footnote 1/ to the bottom of page 4:

"1/ The term "Government" in this instance denotes "Command or agency concerned".

4.2.1, add a second sentence to this paragraph as follows:

"However, for molded thermal pipe and block insulation which is produced by a continuous process, a lot shall consist of all pipe or block insulation produced under the same conditions, from ingredients of the same kind, nature and quality offered for delivery at one time."

4.2.2, delete the first two sentences and replace with following:

"A minimum of three samples shall be taken from each lot, as defined in this specification, for the quality conformance tests except as noted below:

Where the type specification (see 1.2) requires a greater number of samples for product quality testing, the number of samples required by the type specification should be used for the quality conformance tests. However, for molded thermal pipe and block insulation which is produced by a continuous process, sampling shall be in accordance with table I."

Add table I after paragraph 4.2.2 as follows:

"Table I - Sampling for tests

Lot size in pieces 1/	Minimum number of quality conformance test samples
Up to 63	1
64 to 160	2

See footnote at end of table.

Page 2
of 4 pages

THIS DOCUMENT IS SUBJECT TO SPECIAL EXPORT CONTROLS AND EACH TRANSMITTAL TO FOREIGN GOVERNMENTS OR FOREIGN NATIONALS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE NAVAL SHIP SYSTEMS COMMAND

"Table I - Sampling for tests (cont'd)

Lot size in pieces ^{1/}	Minimum number of quality conformance test samples
161 to 400	3
401 to 1,000	5
1,001 to 2,500	8
2,501 to 6,300	13
6,301 to 16,000	20
Over 16,000	32

^{1/}A piece is defined as one segment, section or block."

4.2.3 (d), delete and substitute:

"(d) The actual results of chemical analyses and pH determinations. Identification of the chemistry analysis procedures (methods) used."

Page 5

4.2.4.1.1 (c), delete first subparagraph and substitute:

"(c) Specimens, approximately 20 grams dry basis, of liquid adhesives (or cements) shall be air dried for 24 hours into 2-inch minimum diameter disks in tared dishes (pans) made of metal, teflon, or polyethylene. Actual dry weight shall be determined after drying. If the disk is dry and hard, it shall be pulverized."

4.2.4.1.2, delete first two sentences and substitute:

"4.2.4.1.2 Water leaching. Place each specimen in an individual 300 milliliter (ml) Pyrex beaker (or equal) and cover the specimen with 400 ml. of water. Cover the beaker with a watch glass and heat for 1/2 hour at 95°C. to 100°C., then remove heat. Cool the beaker and its contents naturally (do not agitate) to a room temperature of 20°C. to 30°C."

4.2.4.2.1, add the following sentence:

"The pH shall be corrected to 25°C."

4.2.4.2.2, delete the first two sentences of this paragraph and substitute:

"The chemical analyses for the chloride, silicate and sodium ions shall be made by the methods contained in this specification, or equal, as approved in writing by the command or agency concerned. Requests for approval of alternate chemistry procedures shall be accompanied by justification evidence of their accuracy, e.g., such as by measuring differences in test results when known amounts of chlorides, silicates or sodium are added and comparing these differences with comparable results obtained when using the procedures contained in this specification on the same samples of insulation. The analyses shall be made on suitable aliquots from solution A."

Pages 5 and 6

4.2.4.2.2.1, delete and substitute:

"4.2.4.2.2.1 Analysis for chloride. An aliquot of solution A shall be analyzed by either of the following methods:

(a) Amperometric-coulometric titration method. An amperometric-coulometric titration method such as the Arino-Collins Automatic Chloride Titrator method (or equal).

(b) Colorimetric method:

(1) Optical density shall be measured on a prepared solution against a water reference solution in 5 centimeter (cm) cells by a Beckman Model "B" spectrophotometer (or equal) at 470 millimicrons (mμ) and the chloride content read from a calibration curve made from aliquots of a standard chloride solution representing 20, 40, 60, 80 and 100 micrograms of chloride ion. Both a sample blank and a reagent blank shall be used and the reading obtained on solution A shall be corrected by subtracting the sum of the blank readings.

Page 3
of 4 pages

THIS DOCUMENT IS SUBJECT TO SPECIAL EXPORT CONTROLS AND EACH TRANSMITTAL TO FOREIGN GOVERNMENTS OR FOREIGN NATIONALS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE NAVAL SHIP SYSTEMS COMMAND

Pages 5 and 6 (cont'd)

Note: Sulphate and phosphate cause positive interference at concentrations exceeding 0.2 weight percent.

- (2) Add in turn to a 50 ml volumetric flask: an aliquot of solution A which contains a 20-60 micrograms of chloride ion (adjusted to pH 6 to 8 with 6N HNO₃ using indicating paper), 2 ml each of reagents (a) and (b), and water to 50 ml, mixing thoroughly at each addition. Read 15 minutes after preparation, mixing the solutions thoroughly just prior to reading.
- (3) Reagents. Reagents shall be of suitable analytical grade. Reagent solutions shall have the following composition:
 - (a) 99.7 grams of Fe₂(SO₄)₃ · (NH₄)₂SO₄ · 2H₂O per liter dissolved in 6N nitric acid. Store in a brown bottle for at least 24 hours before use. (Stable for several months).
 - (b) 7.5 grams of Hg(SCH₃)₂ dissolved in methyl alcohol to a final volume of 500 ml. after mixing at least 1 hour with a stirrer and filtering through Whatman No. 41 paper (or equal).
 - (c) Water shall be distilled water containing less than 0.1 parts per million (ppm) of chloride ion.

Note: For reference, see Method C of ASTM D 512."

Page 9

Under "5. PREPARATION FOR DELIVERY", add:

"(For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4)."

Page 10

Add new paragraph 6.4:

"6.4 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are procured by the supplier for incorporation into the equipment and lose their separate identity when the equipment is shipped."

Preparing activity:
Navy - SH
(Project 5640-N007)

Page 4
of 4 pages

THIS DOCUMENT IS SUBJECT TO SPECIAL EXPORT CONTROLS AND EACH TRANSMITTAL TO FOREIGN GOVERNMENTS OR FOREIGN NATIONALS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE NAVAL SHIP SYSTEMS COMMAND