

MIL-T-22755B (SHIPS)
 22 November 1972
 SUPERSEDING
 MIL-T-22755A (SHIPS)
 9 December 1968
 (See 6.2)

MILITARY SPECIFICATION
 TAPE, REPAIR; MAGNETIC MINESWEEPING
 CABLE SHEATH

1. SCOPE

1.1 Scope. This specification covers repair tape for the insulation of splices and for making watertight repairs on magnetic minesweeping cable sheaths.

1.2 Classification. Repair tape shall be of the following types, as specified (see 5.1):

Type I - Synthetic or natural rubber,
 Type II - Synthetic or natural rubber coated cotton fabric.

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 the specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

PPP-B-566 - Boxes, Folding, Paperboard.
 PPP-B-636 - Boxes, Shipping, Fiberboard.
 PPP-B-676 - Boxes, Setup.

MILITARY

MIL-P-116 - Preservation, Methods of.

STANDARDS

FEDERAL

FED-STD-501 - Rubber: Sampling and Testing.

MILITARY

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

(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.

UNIFORM CLASSIFICATION COMMITTEE

Uniform Freight Classification Rules.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

NATIONAL CLASSIFICATION BOARD

National Motor Freight Classification Rules.

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., 1616 P Street, N.W., Washington, D.C. 20036.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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3. REQUIREMENTS

3.1 Material.

3.1.1 Type I. The type I repair tape material shall consist of an unvulcanized or partially vulcanized natural or synthetic rubber compound or mixture suitable for unvulcanized and vulcanized repairs. No reclaimed rubber shall be used. The tape shall conform to the applicable requirements of 3.2 through 3.10.

3.1.2 Type II. The type II repair tape material shall be a rubberized fabric tape which shall be made by calendaring a layer of uncured rubber to clean cotton sheeting on one side only. The rubber shall be evenly and smoothly applied by the frictioning process. The spreading process shall not be used. No solvents or diluents of any kind may be used to expedite the calendaring process. The type II tape shall conform to the applicable requirements of 3.2, 3.3, 3.4, 3.10.1 and 3.11.

3.1.2.1 Rubber. The rubber used in the type II tape shall be the same material used in the type I tape, except that it shall be in the completely unvulcanized condition. The rubber shall meet the requirements of 3.5 through 3.9.

3.1.2.2 Fabric. The fabric used in the type II tape shall be clean cotton fabric of the type known commercially as "clean Osaberg," or equal, approximately 4.5 ounces per square yard.

3.2 Rolls.

3.2.1 Type I. The type I tape shall be wound evenly in 21-foot lengths on rolls. Adjacent layers in each roll shall be separated by parchment paper or glazed sheeting which shall cover the outer side of the tape. When unwound from the roll, the separator shall not exhibit any undue tendency to stick to the rubber or to ravel.

3.2.2 Type II. The type II tape shall be wound evenly in 60-foot lengths on rolls.

3.3 Thickness.

3.3.1 Type I. When tested as specified in 4.5.1.1, the thickness of the type I tape shall be 0.030 ± 0.003 inch.

3.3.2 Type II. When tested as specified in 4.5.1, the thickness of the type II tape shall be 0.015 ± 0.003 inch.

3.4 Width. When tested as specified in 4.5.2, the width of the tape shall be $2 \pm 1/32$ inches.

3.5 Tensile strength.

3.5.1 Unvulcanized. The tensile strength of unvulcanized material shall be as follows:

3.5.1.1 Initial. When tested as specified in 4.5.3, the tensile strength of the tape shall be 250 pounds per square inch (p.s.i.), minimum.

3.5.1.2 Aged. After the tape has been aged as specified in 4.5.10 and then tested as specified in 4.5.3, the tensile strength shall be 250 p.s.i. minimum.

3.5.2 Vulcanized. When tested as specified in 4.5.3.1, the tensile strength shall be 2,000 p.s.i., minimum.

3.6 Ultimate elongation.

3.6.1 Unvulcanized. The ultimate elongation of the unvulcanized material shall be as follows:

3.6.1.1 Initial. When tested as specified in 4.5.4, the ultimate elongation shall be 300 percent, minimum.

3.6.1.2 Aged. After the tape has been aged as specified in 4.5.10, and then tested as specified in 4.5.4, the ultimate elongation shall be 300 percent, minimum.

3.6.2 Vulcanized. When tested as specified in 4.5.4.1, the ultimate elongation shall be 400 percent, minimum.

3.7 Fusion.

3.7.1 Initial. When tested as specified in 4.5.5, the tape shall not unwind more than two and one-half turns in the first 2 minutes, during which time it shall sustain the weight or shall break at the point of unwinding.

3.7.2 Aged. After being aged as specified in 4.5.10 and then tested as specified in 4.5.5, the tape shall conform to the requirements specified in 3.7.1.

3.8 Tackiness.

3.8.1 Initial. When tested as specified in 4.5.6, the tape shall not show any tendency to unwind.

3.8.2 Aged. After being aged as specified in 4.5.10 and then tested as specified in 4.5.6, the tape shall not show any tendency to unwind.

3.9 Dielectric strength.

3.9.1 Initial. When tested as specified in 4.5.7, the tape shall have a minimum dielectric strength of 350 volts per mil of thickness.

3.9.2 Immersed. After being immersed and tested as specified in 4.5.7.1, the tape shall have a minimum dielectric strength of 300 volts per mil of thickness after 48 hours immersion, and a minimum of 250 volts per mil of thickness after 168 hours immersion.

3.10 Adhesion.

3.10.1 Vulcanized. For vulcanized specimens, the adhesion shall be as follows:

3.10.1.1 Initial. When tested as specified in 4.5.8 as applicable for vulcanized specimens, the adhesion between the tape and each of the two standards shall be 15 pounds, minimum, per inch width pulled.

3.10.1.2 Aged. After being aged as specified in 4.5.10 and then tested as specified in 4.5.8 as applicable for vulcanized specimens, the adhesion between the tape and each of the two standards shall be 15 pounds, minimum, per inch width pulled.

3.11 Breaking strength (type II only). When tested as specified in 4.5.9, the breaking strength of the type II tape shall be 40 pounds per inch width pulled, minimum.

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 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. 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 Sampling.

4.2.1 Lot. For inspection purposes, a lot shall consist of all tape of the same type produced in one manufacturing batch and offered for delivery at one time.

4.2.2 Sampling for visual and dimensional examination. Sample rolls of tape shall be selected at random from each lot in accordance with table I and examined as specified in 4.3.1.

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Table I - Sampling for visual and dimensional examination.

Lot size number of rolls	Sample rolls to be inspected	Rejection number ^{1/}
Up to 25	7	1
26 to 65	10	1
66 to 180	15	1
181 to 500	25	2
501 to 1300	35	3
1301 to 3200	50	4
3201 and up	75	5

^{1/}The rejection number is that quantity of rolls which determines rejection of the lot.

4.2.3 Sampling for quality conformance tests. Sample rolls shall be selected at random from each lot in accordance with Table II for the tests specified in 4.3.2.

Table II - Sampling for quality conformance tests.

No. of rolls in shipment	No. of sample rolls
50 to 200	2
201 to 500	3
501 to 1000	4
1001 to 5000	5

If any sample fails to conform to any of the tests, the lot which it represents shall be rejected.

4.3 Quality conformance inspection.

4.3.1 Visual and dimensional examination. Each sample selected in accordance with 4.2.2 shall be examined for conformance with all the requirements of this specification not involving tests. Any roll having one or more defects shall not be offered for delivery.

4.3.2 Quality conformance tests. Sample rolls selected in accordance with 4.2.3 shall be subjected to the following tests:

<u>Test</u>	<u>Paragraph</u>
Thickness	4.5.1
Width	4.5.2
Tensile strength (initial, unvulcanized)	4.5.3
Ultimate elongation (initial, unvulcanized)	4.5.4
Tackiness (initial)	4.5.6
Dielectric strength (initial)	4.5.7

4.4 Material for performance of tests.

4.4.1 When type II rubber tape is to be tested, the manufacturer shall provide sufficient rubber (exactly the same as that used on the type II tape without fabric backing) to conduct the tests of 4.5.3, 4.5.4, 4.5.5, 4.5.6 and 4.5.7 (see 3.1.2.1). If a manufacturer submits type I and type II tape at the same time for testing, the results obtained for the type I tape may also be used for the type II rubber tests, provided it complies with 3.1.2.1.

4.4.2 Specimens. Specimens shall be taken at least 2 feet from either end of the sample roll.

4.5 Test procedures.

4.5.1 Thickness. The thickness of the tape shall be determined by method 2011 of FED-STD-601. Measurements shall be made on a specimen not less than 3 feet in length.

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4.5.1.1 Type I only. For type I tape, the thickness measurement shall be made with the separator attached to the tape. The thickness of the separator shall then be determined at approximately the same points where measurements were made of the tape and the separator, and the value shall be deducted to give the true tape thickness.

4.5.2 Width. The width of the tape shall be determined by method 2121 of FED-STD-601. Five measurements shall be made on a specimen not less than 3 feet in length. When measurements are made on the type I tape, the separator shall be attached.

4.5.3 Tensile strength. The tensile strength shall be determined by method 13021 of FED-STD-601.

4.5.3.1 Vulcanized. When testing the vulcanized samples, the tensile strength shall be determined as specified in 4.5.3 after the tape has been vulcanized for 30 minutes at 310°F.

4.5.4 Ultimate elongation. The ultimate elongation shall be determined by method 13031 of FED-STD-601.

4.5.4.1 Vulcanized. When testing vulcanized samples, the ultimate elongation shall be determined as specified in 4.5.4, after the tape has been vulcanized for 30 minutes at 310°F.

4.5.5 Fusion. The fusion of the tape shall be determined by method 13131 of FED-STD-601.

4.5.6 Tackiness. The tackiness of the tape shall be determined by method 13151 of FED-STD-601.

4.5.7 Dielectric strength. The dielectric strength of the tape shall be determined by method 13321 of FED-STD-601.

4.5.7.1 After immersion in distilled water. Test specimens for dielectric strength measurement of water absorption shall be cut 6 inches in length. A total of four specimens shall be prepared from each sample being tested. The specimens shall be immersed in distilled water at 73° ± 3°F. Two specimens shall be removed after 48 hours and two specimens shall be removed after 168 hours. The specimens shall have the free water shaken off and be blotted lightly with lintless cloth. They shall then be tested for dielectric strength in accordance with method 13321 of FED-STD-601 within 3 minutes. The reported dielectric strength shall be the average of the two samples tested at the specific interval.

4.5.8 Adhesion. Determinations of adhesion require the use of vulcanizates of two standard reference compounds which shall be prepared in the form of sheets having a nominal thickness of 1/8 inch, according to the following formulas:

<u>Material</u>	<u>Parts by weight</u>	
	<u>Standard No. 1</u>	<u>Standard No. 2</u>
SBR (Synpol 1500)	100	---
Neoprene GN-A	---	100
Easy processing channel back (Wyex)	40	27
Zinc oxide treated with propionic acid (Protox 166)	5	5
Stearic acid	1.5	0.5
Di-2 benzothiazyl disulfide (Altax)	3	---
Sulfur	2	---
Phenyl alpha naphthylamine (Neozone A)	---	2
Sodium acetate	---	1
Light naphthenic petroleum product (Circo Light process oil)	--	3
Magnesium oxide (Maglite D)	---	4
Vulcanize	50 minutes at 292° ± 2°F.	30 minutes at 287° ± 2°F.

4.5.8.1 Vulcanization of standards. The standards shall be vulcanized in a hydraulic press under a pressure of not less than 500 p.s.i. A mold not less than 2 inches in width by 6 inches in length is satisfactory; however, any mold which will produce 1/8 inch thick sheets of larger area may be used.

4.5.8.2 Preparation of adhesion specimens. The vulcanized sheets of Standard No. 1 and Standard No. 2 shall be cut into 2-inch by 6-inch long strips. These strips shall be roughened on one face by buffing on a coarse grinding wheel or other suitable means. Buffing

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dust shall be removed by means of a clean brush. One brush coat of rubber cement formulated as follows shall be applied to the roughened surface and allowed to dry until the odor of solvent is no longer apparent:

<u>Cement</u>	
<u>Ingredients</u>	<u>Parts by weight</u>
Smoked sheet	100
Zinc oxide treated with propionic acid (Protox 166)	5
Medium processing channel black (Microncx)	20
Semi-reinforcing furnace black (Pelletex)	20
Stearic acid	2
Pine tar	2
RPA No. 2	0.2
Phenyl beta naphthylamine (Neozone D)	1.5
2 - Mercaptobenzothiazole (Captax)	1
Sulfur with small percentage of magaes sium carbonate (Spider sulfur)	5

The above ingredients shall be mixed on a mill and then dissolved in 883 parts by weight of toluene to make a 15-percent solids content cement.

A piece of separator (parchment paper or glazed sheeting) 2 inches wide shall be applied to the cemented surface to cover about two inches of the length at one end of the strip.

4.5.8.2.1 Procedure for vulcanized specimen.

4.5.8.2.1.1 Type I. Six-inch lengths of tape shall be rolled down against the cemented surface prepared as specified in 4.5.8.3, and over the separator, to build up the thickness of the assembly or slightly more than 1/4 inch. The assembly shall then be placed in a 2 by 6 by 1/4 inch mold and vulcanized for 30 minutes at $310^{\circ} \pm 2^{\circ}\text{F}$. under a pressure not less than 500 p.s.i. The vulcanized assembly shall then be reduced to a 1-inch width, cutting off both sides. The adhesion shall then be determined as specified in 4.5.8.3.

4.5.8.2.1.2 Type II. A 6-inch length of tape shall be rolled, rubber-coated side down, against the cemented surface prepared as specified in 4.5.8.3 and over the separator. The assembly shall then be placed in a 2 by 6 by 1/3 inch mold and vulcanized for 30 minutes at $310^{\circ} \pm 2^{\circ}\text{F}$. under a pressure not less than 500 p.s.i. The vulcanized assembly shall then be reduced to a 1-inch width, cutting off both sides. The adhesion shall then be determined as specified in 4.5.8.3.

4.5.8.3 Determination of adhesion. The specimens prepared as specified in 4.5.8.2 and 4.5.8.2.1 as applicable, shall be subjected to the adhesion test specified in method 8011 of FED-STD-601. The 2 inches of tape lying over the separator of each specimen being tested shall be pulled back by hand and clamped in the upper jaw of the testing machine. The exposed 2 inches of base standard strip with separator shall be attached to the lower jaw of the testing machine and the adhesion determined.

4.5.9 Breaking strength (type II only). The breaking strength of the type II tape shall be determined by method 13011 of FED-STD-601.

4.5.10 Oven aging. Oven aging shall be conducted at $140^{\circ} \pm 2^{\circ}\text{F}$. for 28 days in accordance with method 7221 of FED-STD-601. The tape shall be aged as furnished in the roll.

4.6 Inspection of preparation for delivery. Sample rolls, packages, and packs shall be selected and inspected in accordance with MIL-P-116 to verify conformance with section 5 of this specification.

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements.)

5.1 Packaging. Packaging shall be level A or C, as specified (see 6.1).

5.1.1 Level A. Rolls of tape as specified in 3.2 shall be individually wrapped and packaged in a folding or setup paperboard box conforming to PPP-B-566 and PPP-B-676, respectively at the option of the contractor. Box closure shall be in accordance with the

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applicable box specification or appendix thereto. Where specific container designs are not specifically described by the applicable box specification, the manufacturer's commercial design box and closure may apply.

5.1.2 Level C. Rolls of tape as specified in 3.2 shall be packaged in a manner to afford protection against deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. The supplier's normal packaging methods may be utilized when such meet the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. Tape packaged as specified in 5.1 shall be packed in a fiberboard box conforming to PPP-B-636, class-weather resistant, grade V, with variety and style at the supplier's option. Box reinforcing shall be by use of non-metallic or tape banding. All box seams, corners, and the manufacturer's joint shall be waterproofed in accordance with the appendix to PPP-B-636. Unless otherwise specified (see 6.1), each shipping container shall contain a quantity of 50 individually packaged rolls.

5.2.2 Level B. Tape, packaged as specified in 5.1, shall be packed in a fiberboard box conforming to PPP-B-636, class-domestic, with variety and style at the supplier's option. Unless otherwise specified (see 6.1), each shipping container shall contain a quantity of 50 individually packaged rolls.

5.2.3 Level C. Tape, packaged as specified in 5.1, shall be packed in containers acceptable to the common carrier which will insure safe delivery at destination in a satisfactory condition at the lowest applicable rate. Containers, packing, or method of shipment, shall comply with Uniform Freight or National Motor Freight Classification Rules or Regulations or other carrier rules as applicable to the mode of transportation.

5.3 Marking. In addition to any special marking required (see 6.1), interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129, including shelf-life markings.

5.3.1 Precautionary marking. The following precautionary marking shall be included on each package of tape and on two opposite sides of each shipping container:

"STORE IN COOL DRY PLACE
DO NOT REMOVE CONTENTS UNTIL READY
FOR USE
DO NOT USE AFTER _____"
Date

The date shown shall be the twelfth calendar month after the date of manufacture and the markings shall be stamped with a durable waterproof ink.

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type required (see 1.2).
- (c) Levels of packaging and packing required (see 5.1 and 5.2).
- (d) Special marking required (see 5.3).

6.2 THE MARGINS OF THIS SPECIFICATION ARE MARKED "#" TO INDICATE WHERE CHANGES (ADDITIONS, MODIFICATIONS, CORRECTIONS, DELETIONS) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS WAS 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 IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

Preparing activity:
Navy - SI
(Project 5970-N386)

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<p>INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. 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. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.</p>		
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