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MIL-H-24580(SH)
25 September 1970
SUPERSEDING
(See 6.5)

MILITARY SPECIFICATION

HOSE ASSEMBLIES, SYNTHETIC RUBBER, NONCOLLAPSIBLE, FIRE FIGHTING

This specification is approved for use by 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 a heat resistant noncollapsible synthetic rubber hose assembly for use on fire fighting hose reels in shipboard machinery and auxiliary spaces.

1.2 Classification. Hose covered by this specification shall be one of the following types and sizes (for type B) as specified (see 6.2.1).

Type A - Dual hose assembly consisting of one length of 1-1/2-inch hose and one length of 3/4-inch hose banded together with nylon straps.
Type B - Single hose assembly of either:

Size 1-1/2
Size 3/4

2. APPLICABLE DOCUMENTS

2.1 Issue of documents. 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.

SPECIFICATIONS

FEDERAL
WW-C-624 - Coupling Assembly, Hose (Garden, Water and Water Suction)

MILITARY
MIL-P-775 - Packaging of Hose, Hose Assemblies, Rubber, Plastic, Fabric, or Metal (including tubing), and Fittings, Nozzles and Strainers.
MIL-S-23190 - Straps, Clamps and Mounting Hardware, Plastic for Cable, Harness Tying and Support.

STANDARDS

FEDERAL
FED-STD-162 - Hose, Rubber, Visual Inspection Guide For.

MILITARY
MIL-STD-105 - Sampling Prooedures and Tables For Inspection by Attributes.

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

2.2 Other publications. The following documents form 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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Ship Engineering Center, SEC 6124, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
ASTM D412 - Tension Testing of Rubber, Method of.

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

3. REQUIREMENTS

3.1 Material.

3.1.1 Hose. The tube and cover shall be made of ethylene propylene rubber (EPDM) compound. The compounds shall be resistant to high ambient temperature conditions.

3.1.2 Couplings. End couplings shall be in accordance with Type B, Style 1 of WW-C-624.

3.1.3 Reinforcement fiber. The reinforcement fibers shall be a synthetic, man made fiber of either polyester or aramid fibers.

3.1.4 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. Recovered materials shall meet all the requirements of the material specifications specified herein. 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.

3.1.4.1 Nonmetallic items of the hose assemblies shall be constructed of virgin material only.

3.2 Construction. The hose construction shall consist of an extruded tube of EPDM rubber compound reinforced by two layers of synthetic polyester or aramid fibers braided in such a way to meet the elongation and other requirements of this specification and shall be covered with an extruded cover of EPDM compounded rubber. The outer cover of the 3/4-inch size hose shall be pinpricked.

3.2.1 Type A, dual hose assembly. The type A dual hose assembly shall consist of one 50-foot length of 1-1/2-inch hose and one 50-foot length of 3/4-inch hose. The hoses shall be banded together with self-clinching straps in accordance with type I of MIL-S-23190. The straps shall be 1 foot apart, plus or minus 1 inch, starting 1-1/2 feet from the male hose ends, which shall be at one end of the banded pair of hoses.

3.2.2 Type B, single hose assembly. The type B single hose assembly shall consist of either 1-1/2-inch hose or 3/4-inch hose (see 6.2.1). The length shall be 50 feet, unless otherwise specified (see 6.2.1).

3.3 Physical and mechanical properties.

3.3.1 Oven aging. The hose assembly shall exhibit no evidence of ply separation, blistering, cracking, or hardening when subjected to the test of 4.5.2.

3.3.2 Pressure.

3.3.2.1 Proof. The hose assembly shall meet the applicable proof pressure of table I and shall exhibit no evidence of ply separation, coupling slippage, leakage or rupture when subjected to the test of 4.5.3.

TABLE I. Pressure measurements.

Hose Size	Working Pressure, minimum	Proof Pressure, minimum	Burst Pressure minimum
(Inches)	(lb/in^2, gage)	(lb/in^2, gage)	(lb/in^2, gage)
3/4	350	700	1400
1-1/2	350	700	1400

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3.3.2.2 Burst. The hose assembly shall not leak or burst at a burst pressure less than that specified in table I when subjected to the test of 4.5.5.

3.3.3 Elongation and twist. The hose assembly shall not exhibit any change in length in excess of minus 0 percent or plus 6 percent, there shall not be a twist of more than 1/2 degree per foot, and shall meet the working pressure specified in table I when subjected to the test of 4.5.4.

3.3.4 Bend radius. The hose assembly shall not collapse or exhibit any kinking (sharp bend) when wrapped on a mandrel having a 7.5-inch radius (see 4.5.6).

3.3.5 Tube and cover tensile strength. The tensile strength of the tube shall be 1000 lb/in^2, gage minimum. The tensile strength of the cover shall be 1200 lb/in^2, gage minimum when subjected to the test of 4.5.7.

3.3.6 Tube and cover elongation. The elongation of the tube shall be 200 percent minimum and the cover elongation shall be 250 percent minimum when subjected to the test of 4.5.8.

3.4 Marking. Each length of hose shall be permanently marked with a continuous layline containing the following information:

(a) Manufacturer's name or trademark
(b) Number of this specification
(c) Hose size
(d) Quarter and year of manufacture

3.4.1 Age upon delivery. No hose or hose assembly shall be offered for delivery where the age of the hose, as determined from the layline marking, is more than 8 quarters from the date of manufacture.

3.5 Workmanship. Workmanship shall be in accordance with the best current manufacturing practice. The hose assemblies shall show no evidence of delaminations, ply separation, blistering, exposed reinforcement or cracking. The 3/4-inch size hose shall show evidence of pinpricking on the cover. The hose assemblies shall be clean, dry, and free of dirt, oils, metal shavings and test fluids.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 Inspection system. The contractor shall provide and maintain an inspection system in accordance with the data ordering documents included in the contract (see 6.2.2).

4.1.2 Material inspection. Material inspection shall consist of certification supported by verifying data submitted to the contracting officer or his authorized representative that the material used in the fabrication of the hose is in accordance with the requirements of this specification prior to start of production. The certification data shall be furnished to the Contracting Officer when specified (see 6.2.2).

4.1.3 Submission of test reports. Reports covering the inspection and test for first article inspection and the quality conformance inspection shall be furnished to the contracting officer when specified (see 6.2.2).

4.2 First article inspection. First article inspection shall consist of the examination and tests specified in table II (see 6.3).

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TABLE II. First article inspection.

Test	Requirement paragraph	Test paragraph
Visual examination	3.5	4.5.1
Oven Aging[1/]	3.3.1	4.5.2
Proof Pressure	3.3.2.1	4.5.3
Elongation and Twist (Hose Assy)	3.3.3	4.5.4
Burst	3.3.2.2	4.5.5
Bend Radius	3.3.4	4.5.6
Tube and Cover Tensile strength	3.3.5	4.5.7
Tube and Cover Elongation	3.3.6	4.5.8

1/ The oven aging test shall be performed prior to the burst test. All other tests may be performed in any sequence.

4.3 Sampling.

4.3.1 Lot. For purposes of sampling, a lot shall consist of all hose of the same size, made at the same factory, of the same materials, of the same construction, and offered for inspection at the same time.

4.3.2 Sampling for visual and dimensional examination. Sampling for visual and dimensional examination shall be in accordance with MIL-STD-105.

4.3.3 Sampling for quality conformance (Group A). Hose samples shall be selected at random from bulk hose, prior to coupling for those tests specified in table III. The sampling shall be in accordance with MIL-STD-105 for the single sampling plan for normal inspection. The general inspection level shall be II. The Acceptable Quality Level (AQL) shall be 2.5 percent.

4.4 Quality conformance inspection.

4.4.1 Group A. Sample hose selected in accordance with 4.3.3 shall be subjected to the quality conformance tests of table III.

TABLE III. Group A quality conformance inspection.

Test	Requirement paragraph	Test paragraph
Elongation and Twist (hose assy)	3.3.3	4.5.4
Burst	3.3.2.2	4.5.5

4.4.2 Group B. Each hose assembly shall be subjected to the test of 4.5.3. Failure to pass the test shall be cause for rejection.

4.5 Visual examination and tests.

4.5.1 Visual and dimensional examination. Visual and dimensional examination shall be in accordance with Class B of FED-STD-162 and shall be conducted on the hose selected in accordance with 4.3.2. The AQL shall be 1.0 for major defects and 4.0 for minor defects. In addition, each hose assembly shall be examined for cleanliness. Hose assemblies which evidence dirt, oil, metal shavings may be cleaned and resubmitted for further examination.

4.5.2 Oven aging. Hose samples shall be aged in air by immersing in a non-pressurized closed type container and heating to 150 degrees Celsius (°C) for a period of 76 plus or minus 1/4 hours. The hose shall then be examined to determine conformance with 3.3.1.

4.5.3 Proof pressure. Each hose assembly shall be tested to determine conformance with 3.3.2.1.

4.5.4 Elongation and twist. The elongation and twist test may be conducted concurrent with the proof pressure test. The length shall be marked on the sample hose and the length recorded at 0 [illegible] gage pressure and again at the working pressure specified in table I to determine conformance with 3.3.3.

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4.5.5 Burst. Hose samples shall be subjected to the burst pressure specified in table I. The pressure shall be increased at a rate not less than 1000 lb/in^2, gage nor more than 10,000 lb/in^2, gage per minute until failure occurs. The pressure at which the failure occurs shall be recorded.

4.5.6 Bend radius. Hose samples shall be wrapped on a mandrel having a 7.5 inch radius and shall meet the requirements of 3.3.4.

4.5.7 Tube and cover tensile strength. The tensile strengths of the tube and cover shall be determined in accordance with publication ASTM D412, Method A, using specimens cut with Die C.

4.5.8 Tube and cover elongation. The elongation of the tube and cover shall be determined in accordance with publication ASTM D412. Method A, using specimens cut with Die C.

4.6 Inspection of preparation for delivery. 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 document specified therein.

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation-packaging, packing and marking. Hose, hose assemblies and couplings shall be preserved-packaged level A or C, packed level A, B or C as specified (see 6.2.1) and marked in accordance with MIL-P-775. Markings shall include date of manufacture (see 3.4). Additionally, when option (a) under hose assemblies of MIL-P-775 is selected, the hose shall be initially wrapped with an opaque material or the bag material shall be opaque to provide additional environmental protection.

5.2 Cushioning, filler, dunnage and wrapping materials.

5.2.1 Level A preservation-packaging and levels A and B packing. Use of all types of loose-fill materials for packaging and packing applications such as cushioning, filler or dunnage is prohibited for materials destined for shipboard installation or stowage.

5.2.2 Level C preservation-packaging and packing. When loose fill type materials are used for packaging and packing applications such as cushioning, filler and dunnage, all containers (unit, intermediate and shipping) shall be marked or labelled with the following information:

"CAUTION

Contents cushioned etc., with loose-fill material. Not to be taken aboard ship. Remove and discard loose-fill material. If required, recushion with cellulosic material, bound fiber, fiberboard or transparent flexible cellular material."

5.2.3 Cushioning, filler, dunnage and wrapping materials selected, whenever available, shall exhibit improved performance for resistance to fire.

6. Notes.

6.1 Intended use. The hose assemblies covered by this specification are intended for use with aqueous film forming foam conforming to MIL-F-24385, fresh water, or potassium dry chemical conforming to O-D-1407. The hose assemblies are intended to be mounted on hose reels conforming to MIL-R-24414.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number and date of this specification.
(b) Type, size (of type B), and number of hose assemblies required (see 1.2).

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(c) Length of type B hose if other than 50 feet (see 3.2.2).
(d) Preservation, packaging and packing and marking if other than as specified in Section 5.

6.2.2 Data requirements. When this specification is used in a contract which invokes the provision of the "Requirements for Data" of the Defense Acquisition Regulation (DAR), the data identified below, which are required to be developed by the contractor, as specified on an approved Data Item Description (DD Form 1664), and which are required to be delivered to the Government, should be selected and specified on the approved Contract Data Requirement List (DD Form 1423) and incorporated in the contract. When the provisions of the "Requirements for Data" of the DAR are not invoked in a contract, the data required to be developed by the contractor and required to be delivered to the Government should be selected from the list below and specified in the contract.

Paragraph	Data requirements	Applicable DID
4.1.1	Inspection system	UDI-T-23741
4.1.2	Material certification	UDI-T-23741
4.1.3	First article and quality conformance inspection reports	UDI-T-23473

(Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.)

6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously acquired or tested by the 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.

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 acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.5 Suppersession data. This specification supersedes the hose requirements of MIL-H-24414A(SH) dated 20 June 1972.

Preparing activity:
Navy - SH
(Project 4210-N141)

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