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 SUPERSEDING
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MILITARY SPECIFICATION

HOSES AND HOSE ASSEMBLIES, NONMETALLIC:

RUBBER, LIQUID FUEL

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers synthetic rubber, liquid fuel transfer hose and hose assemblies.

1.2 Classification. The hose and hose assemblies shall be the following types, sizes (inside diameter), classes, fitting styles, fitting material, and lengths, as specified (see 1.3 and 6.2).

A	1	B	1	C	1
Type	Size	Class	Fitting	Material	Length
(1.2.1)	(1.2.2)	(1.2.3)	(1.2.4)	(1.2.5)	(1.2.6)

1.2.1 Type. The hose and hose assemblies are identified by a one letter symbol as shown in table I.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606 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 4720

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TABLE I. Type designator.

Symbol	Characteristics
A	Type I - Non-wire reinforced
B	Type II - Wire reinforced, noncollapsible

1.2.2 Size. The hose and hose assembly size is identified by a two digit code number as shown in table II.

TABLE II. Size designator.

Code No.	Inside diameter
01	Size 1 - 1/2 inch
02	Size 2 - 3/4 inch
03	Size 3 - 1 inch
04	Size 4 - 1-1/4 inches
05	Size 5 - 1-1/2 inches
06	Size 6 - 2 inches
07	Size 7 - 2-1/2 inches
08	Size 8 - 3 inches
09	Size 9 - 4 inches
10	Size 10 - 6 inches

1.2.3 Class. The hose assembly class is identified by a one letter symbol as shown in table III.

TABLE III. Class designator.

Symbol	Characteristics
A	Class 0 - Not applicable
B	Class 1 - Male fitting on one end and female fitting on other end.
C	Class 2 - Male fitting both ends.
D	Class 3 - Female fittings both ends.

1.2.4 Fitting. The hose assembly fitting style is identified as a single code numeral as shown in table IV.

TABLE IV. Fitting designator.

Code No.	Characteristics
1	Style 0 - Not applicable.
2	Style A - Banded shank (reattachable).
3	Style B - Compression (reattachable-threaded).
4	Style D - Internal expanded (one time threaded).

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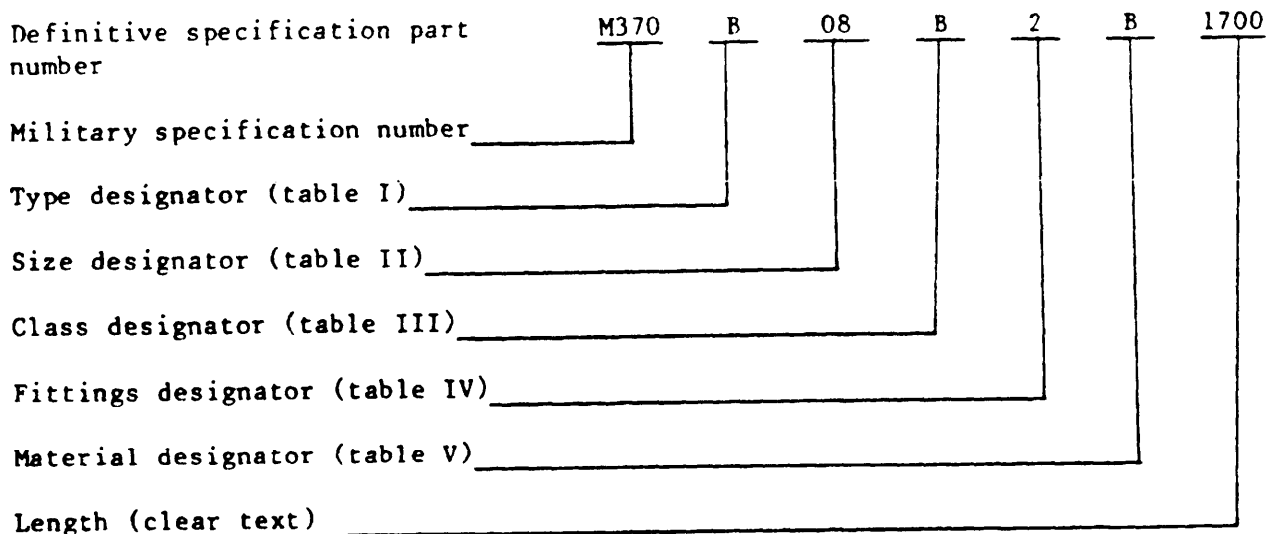
1.2.5 Material. The hose assembly fitting material is identified by a one letter symbol as shown in table V.

TABLE V. Material designator.

Symbol	Metal
A	Aluminum
B	Bronze
C	Brass

1.2.6 Length. The length of hose or hose assemblies shall be specified ± 2 percent, exclusive of fittings and written in clear text and will be in inches with last number expressed in tenths of an inch.

1.3 Definitive specification part number. Hose and hose assemblies covered in this specification shall be designated in the following form (see 1.2, 6.2 and 6.6):



Example: M370-B08B2B1700 - Hose assembly, in accordance with MIL-H-370, type II, (type II - wire reinforced), size 8 (3 inches), class 1 (male fitting one end, female fitting on the other end), style A (banded shank reattachable), material B (bronze), length (170.0 inches long).

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.

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SPECIFICATIONS

FEDERAL

- QQ-A-601 - Aluminum Alloy Sand Castings.
- QQ-B-626 - Brass, Leaded and Nonleaded: Rod, Shapes, Forgings, and Flat Products with Finished Edges (Bar and Strip).
- QQ-C-390 - Copper Alloy Castings (Including Cast Bar).
- WW-C-440 - Clamps, Hose, (Low-Pressure).

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- MIL-P-775 - Packaging of Hose, Hose Assemblies; Rubber, Plastic, Fabric, or Metal (Including Tubing); and Fittings, Nozzles, and Strainers.
- MIL-C-27487 - Coupling Halves, Quick-Disconnect, Cam-Locking Type.

STANDARDS

FEDERAL

- FED-STD-H28/10 - Screw-Thread Standards for Federal Services (Section 10 American National Hose Coupling and Fire Hose Coupling Threads.)

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- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-889 - Dissimilar Metals.

(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 documents form 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 non-Government documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B 176 - Copper-Alloy Castings.
- D 380 - Rubber Hose.
- D 381 - Existent Gum in Fuels by Jet Evaporation.
- D 412 - Rubber Properties in Tension.

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- D 413 - Rubber Property - Adhesion to Flexible Substrate.
- D 471 - Rubber Property - Effect of Liquids.
- D 518 - Surface Cracking Resistance of Stretched Rubber Compounds.
- D 1053 - Measuring Rubber Property - Stiffening at Low Temperature Using a Torsional Wire Apparatus.
- D 1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimen).
- D 3951 - Standard Practices for Commercial Packaging.

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

(Non-Government standards 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 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 Description. The hose and hose assemblies shall consist of a tube, two or more plies of reinforcement, and a cover, for use with liquid hydrocarbon fuels as specified herein.

3.2 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 4.3 and 6.3). Any changes or deviations of hose and hose assembly from the approved first article during production will be subject to the approval of the contracting officer. Approval of the first article will not relieve the contractor of his obligation to furnish hoses and hose assemblies conforming to this specification.

3.3 Material. Material shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.3.1 Material deterioration prevention and control. The hoses and hose assemblies shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operation and storage environments to which the hoses or hose assemblies may be exposed.

3.3.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

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3.3.1.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.3.2 Rubber.

3.3.2.1 Tube. The basic material for the tube shall be a synthetic compound utilizing a copolymer product of butadiene and acrylonitrile or other synthetic fuel resistant rubber that will comply with all requirements specified herein.

3.3.2.2 Cover. The cover shall be synthetic rubber compounded for fuel, oil, hydrolitic stability and ozone resistance that complies with all requirements specified herein.

3.3.3 Reinforcement.

3.3.3.1 Type I.

3.3.3.1.1 Hose up to and including 1-1/2 inches in diameter. The reinforcement shall be two or more plies of braided or spiralled synthetic fiber cord, evenly and firmly fabricated, and thoroughly impregnated with synthetic rubber compound, causing the plies to adhere firmly to each other and to the tube and cover and be of sufficient strength to assure conformance to the applicable requirements of this specification. Dirt, knots, lumps, and irregularity of twist shall be kept at a minimum during fabrication.

3.3.3.1.2 Hose, 2-inch diameter and larger. The reinforcement may be two or more plies of braided or spiralled synthetic fiber cord evenly and firmly fabricated and shall be thoroughly impregnated with synthetic rubber compound, causing plies to adhere firmly to each other and to the tube and cover, and be of sufficient strength to conform to the applicable requirements of this specification. As an alternative, the reinforcement may be an even number of layers of parallel synthetic woven fiber fabric embedded in synthetic rubber compound, wound in contradirection, so that there is a rubber bond throughout, providing a continuous rubber bond from the inner tube through the reinforcement to the outer cover. Dirt, knots, lumps, and irregularity of twist shall be kept at a minimum during fabrication.

3.3.3.1.3 Static wires. Two helically wound, static electric bonding wires shall be embedded within or between the plies to form an angle of not less than 45 degrees to the longitudinal axis of the hose. The wires shall not break when the hose is coiled or subjected to internal or external pressure. The wires may be either braided or stranded and shall have an area equivalent to:

Stranded - 7 strands No. 31 B&S Ga. (0.0089 inch diameter).

Braided - 48 strands No. 36 B&S Ga. (0.005 inch diameter).

3.3.3.2 Type II. The type II hose reinforcement shall be in accordance with 3.3.3.1.1 or 3.3.3.1.2, as applicable, and shall have a helix or helixes of round, steel wire between the fiber reinforcement; or, hose reinforcement may consist of a carcass of synthetic filament warp yarns interwoven with a helix or

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helixes of round, steel wire and fillers of cotton or synthetic filament yarns, alternately spaced. The reinforcing wire shall have the physical and dimensional characteristics required to enable the hose to conform to 3.5.8.

3.3.4 Fittings (couplings). The fittings (couplings) shall be cast or forged bronze, brass, or aluminum, as specified (see 1.2).

3.3.4.1 Aluminum. Aluminum shall conform to QQ-A-601, alloy UNS 356.0 temper T-6 or 712.0, temper T-5.

3.3.4.2 Bronze and brass. Bronze shall conform to QQ-C-390, UNS C83600, C85400, C85700, or C92200, type I, in as-cast condition. Brass shall conform to QQ-B-626, UNS C37700, in as-forged condition, or ASTM B 176 UNS C87900.

3.3.4.3 Style A, banded shank. Unless otherwise specified (see 6.2), style A fittings shall be cam-locking, quick-disconnect fittings conforming to MIL-C-27487, type II or type VI, class 1 or 2.

3.3.4.3.1 Clamps. Hose clamps shall conform to WW-C-440, type H, and shall be corrosion-resistant steel. Hose clamps shall be non-reflective. Two clamps shall be used for each fitting, except for 6-inch hose, which shall have three clamps for each fitting. The widths of clamps shall be minimum 1/2 inch for hose size up to and including 2-1/2 inches inside diameter (I.D.) and 3/4 inch for hose 3 inches I.D. and up.

3.3.4.4 Style B. Reattachable compression fittings shall be three-piece construction. No cement, sealers, or adhesives shall be used in their installation other than to seal the cut ends of the hose. The body of the coupling shall be cast or forged with a smooth bore and shall include central hexagon or octagon wrench surfaces and a tail-piece consisting of two concentric walls with an intermediate hose chamber. The outer wall of the tailpiece shall have male threads to engage the sleeve and a tapered end to compress the grip. The inner wall shall be constructed so as to insure a tight grip on the hose and shall have a rounded outer edge to prevent cutting of the hose during installation or upon sharp bending. The grip shall be reusable, left-hand wound into a coil of approximately 3 loops and may be round, or flat with rounded edges. The ends shall be ground square and smooth. The sleeve shall be provided with sturdy lugs offering generous wrench surfaces. The sleeve shall be threaded and tapered in order to facilitate assembly and provide maximum compression of the hose. When the coupling is brass, the sleeve may be brass conforming to QQ-C-390, copper alloy UNS C85700 or UNS C85400, type I, in as-cast condition, or ASTM B 176, copper alloy UNS C87900. The edge of the sleeve in contact with the hose shall be rounded to prevent cutting of the hose upon sharp bending and shall extend beyond the end of the coupling tailpiece. Body, sleeve, and grip shall be free from porosity and other imperfections.

3.3.4.5 Style D. The one-time-use internal expanded fittings shall have an internal expanding serrated tailpiece, suitably gripping and compressing the wall of the hose against an external ferrule. When expanded, these fittings shall have an inside diameter conforming to the normal inside diameter of the hose.

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3.3.5 Threads. Unless otherwise specified (see 6.2), styles B and D fittings shall have tapered male or NPSH female threads. The threads shall conform to FED-STD-H28/10.

3.4 Construction.

3.4.1 Hose. The hose shall be constructed of a compounded rubber inner tube, a synthetic fiber reinforcement with two helically wound static wires (type I) or reinforcing wires (type II), and a compounded rubber cover.

3.4.1.1 Tubing. The tubing shall be fabricated from the material specified in 3.3.2.1. The inside wall of the tube shall be smooth and free from pits. The tube shall be of uniform thickness not less than 5/64 inch.

3.4.1.2 Cover color. The cover color shall be as specified (see 6.2g), fabricated from material specified in 3.3.2.2, and shall be of uniform thickness not less than 5/64 inch.

3.4.1.3 Reinforcement and static wires.

3.4.1.3.1 Type I hose. The static wire (see 3.3.3.1.3) shall be continuous to effect an electric bond (see 6.4) between both ends of the hose when tested as specified in 4.5.2.1.

3.4.1.3.2 Type II hose. The reinforcing wire (see 3.3.3.2) shall be continuous to effect an electric bond (see 6.4) between both ends of the hose when tested in accordance with 4.5.2.1, and shall withstand the crush resistance requirements in table VI when tested in accordance with 4.5.2.9.

3.4.2 Hose assemblies. Hose assemblies shall be type I or type II hose with fittings attached as specified herein.

3.4.2.1 Fittings. Fittings shall be securely attached to the hose to form a permanent electric bond with the static or stiffening wires. The hose assembly shall not leak.

3.4.3 Diameters and tolerances of hose. Hose diameters and tolerances shall be as follows:

<u>Inside diameter</u>	<u>Outside diameter</u>
1/2 +1/32 inch.	1-1/16 +1/32 inch.
3/4 +1/32 inch.	1-3/8 +1/32 inch.
1 +1/16 inch.	1-5/8 +1/16 inch.
1-1/4 +1/16 inch.	1-7/8 +1/16 inch.
1-1/2 +1/16 inch.	2-1/8 +1/16 inch.
2 +1/16 inch.	2-21/32 +1/16 inch.
2-1/2 +1/16 inch.	3-3/16 +1/16 inch.
3 +1/16 inch.	3-3/4 +1/16 inch.
4 +1/16 inch.	4-3/4 +1/16 inch.
6 +1/16 inch.	6-7/8 +1/8 inch.
	-1/16 inch.

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3.5 Physical and chemical requirements.3.5.1 Hydrostatic pressure.

3.5.1.1 Hose assembly. When tested as specified in 4.5.2.1 at the appropriate proof pressure (see table VI), the hose or hose assemblies shall not leak nor show any imperfections in either the hose or the fittings, and there shall be no indication of slippage or pullout of the fitting from the hose. The length of the hose shall not change more than +7 percent. Type I hose shall not twist, either clockwise or counterclockwise, more than one-half turn (180 degrees) in 25 feet.

3.5.1.2 Minimum burst. When tested as specified in 4.5.2.2, each size hose or hose assembly shall have no failure of hose under the applicable minimum burst pressure shown in table VI.

3.5.2 Tensile strength. The tensile strength of the tube and cover shall be not less than 1250 pounds per square inch (psi) when tested as specified in 4.5.2.3. The tensile strength of the tube and cover after immersion, when tested as specified in 4.5.2.4, shall be not less than 40 percent or less than 600 psi (whichever is greater) of the tensile strength obtained before immersion.

TABLE VI. Test loads and pressures.

Size of hose (inside diameter) (inches)	Proof test pressure (psi)	Burst test pressure (psi)	Crush resistance (pounds)
1/2	150	500	200
3/4	150	500	200
1	150	500	200
1-1/4	150	500	200
1-1/2	150	500	225
2	125	400	250
2-1/2	125	375	325
3	100	300	325
4	100	300	325
6	100	300	325

3.5.3 Ultimate elongation. When tested as specified in 4.5.2.3, the ultimate elongation of the tube and cover shall be not less than 200 percent, and, when tested as specified in 4.5.2.4, the elongation after immersion shall be not less than 100 percent.

3.5.4 Adhesion.

3.5.4.1 Original. The original adhesion between tube and plies, between the plies, and between the cover and the plies shall be a minimum load of 10 pounds when tested as specified in 4.5.2.5.

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3.5.4.2 After fuel immersion. After fuel immersion, adhesion between the tube and plies, between the plies, and between the cover and the plies shall be a minimum load of 6 pounds after testing as specified in 4.5.2.6.

3.5.5 Volume increase. When tested as specified in 4.5.2.4, the volume increase of the tube specimen after immersion in test fluid shall not exceed 60 percent and the volume increase of the cover specimen shall not exceed 100 percent.

3.5.6 Low temperature flexibility.

3.5.6.1 Hose, all sizes. When tested as specified in 4.5.2.7.1, the cover and tube shall not exceed Young's modulus of 10,000 psi.

3.5.7 Existent gum content. When tested as specified in 4.5.2.8, the existent gum residue extracted with heptane shall be not more than 20 milligrams per 100 milliliters of test fluid.

3.5.8 Crush resistance (type II only). During the crush resistance test specified in 4.5.2.9, the smallest outside diameter shall not be less than 85 percent of the original outside diameter. After release of the load, the smallest outside diameter shall be not less than 95 percent of the original outside diameter.

3.5.9 Ozone resistance. Ozone resistance shall comply with ASTM D 1149. At the end of the exposure time, there shall be no visible cracking in the cover with 7X magnification when tested in accordance with 4.5.2.10.

3.6 Branding. Each length of the hose shall be branded with the contractor's name or trademark, the quarter and year of manufacture, "MIL-H-370", "type I" or "type II", as applicable, and the words "Liquid Fuel". Each length of hose shall be branded with specification part number when required (see 6.2). The letters shall be molded either recessed or in relief and shall be not less than 0.50 inch high. Hoses shall be branded at 10-foot intervals or by continuous impression branding, provided that the pattern will be repeated every 5 feet or less. Label color shall contrast with the hose cover color. Labels shall be provided whenever it is necessary for personnel to identify, interpret, or follow procedures for deployment. Labeling shall remain clear, distinct and legible for the life of the hose.

3.7 Workmanship. The hose and hose assemblies shall conform to the quality specified herein with no cuts, nicks, bruises, blisters, sharp edges, or lumps, and shall be clean and smooth.

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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.

4.1.2 Component and material inspection. The contractor is responsible for insuring that components and materials are manufactured, examined, and tested in accordance with referenced specifications and standards as applicable.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Inspection of packaging (see 4.6).

4.3 First article inspection.

4.3.1 Examination. The first article hose or hose assembly shall be examined as specified in 4.5.1. AQL shall be 1.0 percent defective.

4.3.2 Tests. The first article hose or hose assembly shall be tested as specified in table VII. Failure of any test shall be cause for rejection of the hose or hose assembly.

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TABLE VII. Test Schedule.

First Article	Quality Conformance		Test	Reqmt Para	Test Para
	Individual	Sample			
X	X		Hydrostatic.	3.5.1.1	4.5.2.1
X		X	Burst pressure.	3.5.1.2	4.5.2.2
X		X	Tensile strength.	3.5.2	4.5.2.3
X		X	Tensile strength after immersion.	3.5.2	4.5.2.4
X		X	Ultimate elongation.	3.5.3	4.5.2.3
X		X	Ultimate elongation after immersion.	3.5.3	4.5.2.4
X		X	Original adhesion.	3.5.4.1	4.5.2.5
X		X	Adhesion after immersion.	3.5.4.2	4.5.2.6
X		X	Low temperature flexibility.	3.5.6	4.5.2.7
X		X	Existent gum.	3.5.7	4.5.2.8
X		X	Crush resistance.	3.5.8	4.5.2.9
X		X	Ozone resistance.	3.5.9	4.5.2.10

4.4 Quality conformance inspection.

4.4.1 Lot size. A bulk hose lot shall consist of not more than 10,000 feet (3048 m) of hose produced over a period not to exceed 30 days. A hose assembly lot shall contain not more than 10,000 feet (3048 m) of hose. Each lot shall contain hose or hose assemblies as applicable, of one nominal size, manufactured under essentially the same conditions by the same manufacturer.

4.4.2 Sampling. Sampling of hose and hose assemblies for examination and tests shall be in accordance with MIL-STD-105. Test sections shall be cut from the hose or hose assembly and shall be of sufficient length for the performance of the required tests.

4.4.2.1 Bulk hose samples. Bulk hose samples shall be selected at random at the time of manufacture at the rate of three samples per lot. Each sample shall consist of sufficient hose to conduct the specified tests.

4.4.2.2 Hose assembly samples. Hose assembly samples shall be made from hose selected at random, at the time of assembly of fittings and hose, at the rate of three samples per lot. Each sample shall consist of sufficient hose assemblies to conduct the specified tests.

4.4.3 Examination. Samples selected in accordance with 4.4.2 shall be examined as specified in 4.5.1. AQL shall be 1.0 percent defective.

4.4.4 Tests.

4.4.4.1 Individual. Each length of hose or each hose assembly shall be tested as specified table VII. Failure of the test shall be cause for rejection.

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4.4.4.2 Samples. Samples selected in accordance with 4.4.2 shall be tested as specified in table VII. Crush resistance test (see 4.5.2.9) is to be performed only on type II hose. AQL shall be 1.0 percent defective.

4.5 Inspection procedure.

4.5.1 Examination. The hose and hose assembly shall be examined as specified herein for the following defects:

Major

101. Dimensions not as specified.
102. Materials not as specified.
103. Hose not as specified.
104. Materials not resistant to corrosion or deterioration or treated to be made resistant to corrosion or deterioration for the applicable storage and operating environment as specified.
105. Dissimilar metals, as defined in MIL-STD-889, are not effectively insulated from each other as specified.
106. Contractor does not have documentation available for identification of material, material finishes, or treatments.
107. Hose cut or damaged by fitting assembly.
108. Hose cover scuffed or bruised, so that braid is exposed.
109. Hose cover not clean and smooth.
110. Coupling halves not as specified.
111. Clamps not as specified.
112. Identification marking missing, illegible, or not as specified.
113. Workmanship not as specified.
114. Hose cover color not as specified.

4.5.2 Tests.

4.5.2.1 Hydrostatic. Each length of hose or hose assembly shall be subjected to the hydrostatic tests of ASTM D 380 for elongation, twist, and proof pressure, using water as the test fluid. The test pressures shall be as specified in table VI. The electric bond (see 6.4) shall be determined while full test pressure is applied. Nonconformance to 3.4.1.3.1, 3.4.1.3.2, 3.4.2.1, or 3.5.1.1 shall constitute failure of this test.

4.5.2.2 Burst pressure. The hose or hose assembly shall be subjected to the straight bursting test specified in ASTM D 380. Nonconformance to 3.5.1.2 shall constitute failure of this test.

4.5.2.3 Tensile strength and ultimate elongation. The tensile strength and ultimate elongation of the rubber cover and the rubber tube of the hose or hose assemblies shall be determined in accordance with ASTM D 412. Nonconformance to 3.5.2 and 3.5.3 shall constitute failure of these tests.

4.5.2.4 Tensile strength, ultimate elongation, and volume change after fuel immersion. After fuel immersion, the changes in tensile strength, ultimate elongation, and volume change of the rubber cover and rubber tube of hose or

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hose assemblies selected in accordance with 4.4.2, shall be determined in accordance with ASTM D 471. The temperature of immersion shall be 23 °C, ± 1.1 °C. The immersion time shall be 70 hours. The immersion fuel shall be ASTM D 471, reference fuel B. The immediate deteriorated properties method shall be used in determining changes in tensile strength and ultimate elongation. Nonconformance to 3.5.2, 3.5.3, or 3.5.5 shall constitute failure of this test.

4.5.2.5 Original adhesion. From hose or hose assemblies selected under 4.4.2, prepare ring or strip specimens as described in ASTM D 380. The adhesion shall be determined in accordance with the machine method of ASTM D 413. Nonconformance to 3.5.4.1 shall constitute failure of this test.

4.5.2.6 Adhesion after immersion in fuel. Specimens prepared as described in 4.5.2.5 shall be immersed in fluid as specified in 4.5.2.4 for 70 hours at 23 °C, ± 1.1 °C. Within 15 minutes after removal of the specimens from the fluid, the adhesion shall be determined in accordance with machine method of ASTM D 413. Nonconformance to 3.5.4.2 shall constitute failure of this test.

4.5.2.7 Low temperature flexibility.

4.5.2.7.1 Hose, all sizes. A test for low temperature flexibility shall be made in accordance with routine inspection and acceptance procedures specified in ASTM D 1053, except that a gaseous media (section 8) will be used. The test temperature for the cover and tube shall be -32 °C ± 2 °C. The exposure time shall be 7 days. Nonconformance to 3.5.6.1 shall constitute failure of this test.

4.5.2.8 Existent gum. A test specimen of not less than 14 inches long shall be cut from the hose selected in accordance with 4.4.2. The bottom end of the specimen shall be stoppered with a clean noncorrosive plug, 2 inches long, secured in the end of the specimen with a suitable clamp. The specimen shall then be filled to within 2 inches from top with fluid as specified in 4.5.2.4, and plugged in a manner similar to the bottom. This specimen shall then be stored in a vertical position for 7 days at an ambient temperature of 38 °C, ± 2 °C. At the end of each 24-hour period, the fuel shall be agitated for 5 minutes by moving the hose from the vertical to the horizontal position at a rate of 2 cycles per minute. At the completion of the 7-day storage period, fuel shall again be agitated in the specimen for 5 minutes and immediately removed from the hose. The removed fuel shall be tested for existent gum in accordance with the air-jet solvent wash method of ASTM D 381. A sample of test fuel before entering hose shall be tested at the same time and by the same method. The existent gum of this sample shall be subtracted from the existent gum obtained from the fuel removed from the test hose. Nonconformance to 3.5.7 shall constitute failure of this test.

4.5.2.9 Crush resistance. Crush resistance shall be determined by centering a 12-inch length of hose between 3-inch wide, parallel metal plates in such a way that a 3-inch length of hose is being compressed. The plates shall be brought together at a rate of 2 inches per minute until the applicable crush resistance load specified in table VI has been applied. The distance between plates shall be measured with a steel rule and expressed in percent of the original outside diameter. The load shall be released and the minimum outside

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diameter of the hose at the center of the compressed area shall be measured and reported in percent of original outside diameter. Nonconformance to 3.4.1.3.2 or 3.5.8 shall constitute failure of this test.

4.5.2.10 Ozone resistance. Specimens of the cover, prepared as described in procedure A of ASTM D 518, shall be mounted in a 20 percent elongated position and tested in accordance with ASTM D 1149. After conditioning for 24 hours in an ozone-free atmosphere, the mounted specimens shall be exposed for 72 hours at 40 °C, ± 1 °C, to an atmosphere containing 50 parts, ± 10 parts, per hundred million (pphm) of ozone. Upon completion of the test, the specimens shall be examined. Nonconformance to 3.5.9 shall constitute failure of this test.

4.6 Inspection of packaging. The preservation, packing, and marking of the hoses and hose assemblies shall be examined to determine compliance with the requirements of section 5.

5. PACKAGING

5.1 Preservation. The degree of preservation shall be level A or commercial, as specified (see 6.2).

5.1.1 Level A. Each hose and hose assembly shall be preserved in accordance with the level A preservation requirements of MIL-P-775.

5.1.2 Commercial. Commercial preservation shall be in accordance with ASTM D 3951.

5.2 Packing. The degree of packing shall be level A, level B, or commercial, as specified (see 6.2).

5.2.1 Level A. The hose and hose assemblies shall be packed in accordance with the level A packing requirements of MIL-P-775.

5.2.2 Level B. The hose and hose assemblies shall be packed in accordance with the level B packing requirements of MIL-P-775.

5.2.3 Commercial. Commercial packing shall be in accordance with ASTM D 3951.

5.3 Marking. Marking for levels A and B shall be in accordance with MIL-STD-129. Commercial marking shall be in accordance with ASTM D 3951; in addition, weight and cube data shall be marked on all shipping containers.

6. NOTES

6.1 Intended use. The hose and hose assemblies covered by this specification are for suction and discharge of liquid fuels such as high aromatic gasoline, JP-4, and diesel fuels. The hose shall be operable throughout the temperature range 52 °C to -32 °C.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Specification part number required (see 1.2, 1.3, and 6.6).

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- c. Time frame required for submission of first article and number of articles required (see 3.2).
- d. Fittings required if other than specified (see 3.3.4.3).
- e. Type thread required if other than specified (see 3.3.5).
- f. Degree of preservation and degree of packing required (see 5.1 and 5.2).
- g. Color of hose cover (see 3.4.1.2).

6.3 First article. When a first article inspection is required, the items should be a initial production sample. The first article should consist of several units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests, and approval of the first article test results and disposition of the first article.

6.4 Electrical bond. An electrical bond eliminates a difference in potential between objects.

6.5 Subject (key word) listing.

Fuel, liquid hydrocarbon
Hose
Hose, fuel
Non-collapsible
Rubber

6.6 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ME
Navy - YD
Air Force - 99

Preparing activity:

Army - ME

Project 4720-0686

Review activities:

Navy - SH, MC
Air Force - 82
DLA - CS

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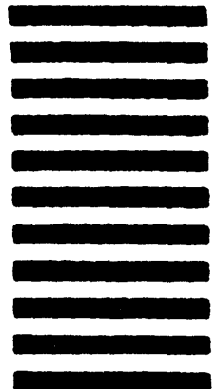


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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL*(See Instructions - Reverse Side)***1. DOCUMENT NUMBER**

MIL-H-370F

2. DOCUMENT TITLE

Hoses and Hose Assemblies, Nonmetallic: Rubber, Liquid Fuel

3a. NAME OF SUBMITTING ORGANIZATION**4. TYPE OF ORGANIZATION (Mark one)** VENDOR USER MANUFACTURER OTHER (Specify): _____**b. ADDRESS (Street, City, State, ZIP Code)****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****d. DATE OF SUBMISSION (YYMMDD)**

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