

INCH-POUND

MIL-H-53095 (ME)  
7 February 1990

## MILITARY SPECIFICATION

HOSE ASSEMBLIES, RUBBER, SYNTHETIC, LIQUID

PETROLEUM FUELS, DISPENSING, COLLAPSIBLE,

LOW TEMPERATURE

This specification is approved for use within the USA Belvoir Research, Development and Engineering Center, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers collapsible, synthetic rubber, discharge hose assemblies for use in all ambient temperatures between -60 and +95 °F.

1.2 Classification. The collapsible discharge hose assemblies shall be of the following types, classes, and sizes, as specified (see 6.2):

Type I - Hose assembly, gasoline dispensing pump.

Class 1 - Coupling halves, quick-disconnect, cam-locking type, hose shank; female both ends.

Class 2 - Coupling halves, quick-disconnect, cam-locking type, hose shank; male both ends.

Class 3 - Coupling halves, quick-disconnect, cam-locking type, hose shank; female one end, male other end.

Type II - Hose assembly, fuel trailers and carts.

Class 1 - Coupling halves, quick-disconnect, cam-locking type, hose shank; female both ends.

Class 2 - Coupling halves, quick-disconnect, cam-locking type, hose shank; male both ends.

Class 3 - Coupling halves, quick-disconnect, cam-locking type, hose shank; female one end, male other end.

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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Type III - Hose assembly, fuel handling system.

Class 1 - Coupling halves, quick-disconnect, cam-locking type, hose shank; female one end, male other end.

Type IV - Hose assembly, aircraft refueling.

Class 1 - Couplings, replaceable compression type, internal pipe threads both ends.

Class 2 - Couplings, replaceable compression type, external pipe threads both ends.

Class 3 - Couplings, replaceable compression type, internal pipe threads one end, external pipe threads other end.

### Sizes

1-inch	2-1/2-inch
1-1/4-inch	3-inch
1-1/2-inch	4-inch
2-inch	

1.3 Length. The length of hose assemblies shall be as specified (see 6.2) and shall be specified  $\pm 2$  percent, exclusive of fittings, and will be in feet with last number expressed in tenths of a foot.

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS), and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

### FEDERAL

QQ-S-766	- Steel Plates, Sheets, and Strip - Corrosion-Resisting.
WW-C-440	- Clamps, Hose (Low-Pressure).

### MILITARY

MIL-H-775	- Hose, Hose Assemblies; Rubber, Plastic, Fabric, or Metal (Including Tubing) and Associated Hardware: Packaging of.
MIL-C-16173	- Corrosion Preventive Compound, Solvent Outback, Cold-Application.
MIL-C-27487	- Coupling Halves, Quick-Disconnect, Cam-Locking Type.
MIL-C-38404	- Couplings, Hose, Reattachable Screw-on.

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## STANDARDS

## MILITARY

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

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other Government drawings. The following other Government drawings form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

## DRAWING

## ME

- |            |   |
|------------|---|
| 13228E1768 | - Gasket, Coupling Half, Quick Disconnect: Cam-Locking Type for Arctic Use. |
|------------|---|

(Copies of drawings required by contractors in connection with specific acquisition functions should be obtained from the USA Belvoir Research, Development and Engineering Center, ATTN: STRBE-FS, Fort Belvoir, VA 22060-5606.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- |        |  |
|--------|--|
| D 380  | - Rubber Hose.   |
| D 381  | - Existent Gum in Fuels by Jet Evaporation.  |
| D 412  | - Rubber, Properties in Tension.   |
| D 413  | - Rubber Property - Adhesion to Flexible Substrate.  |
| D 471  | - Rubber Property - Effect of Liquids.   |
| D 746  | - Brittleness Temperature of Plastics and Elastomers by Impact.                                    |
| D 790  | - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials. |
| D 2137 | - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics.                     |

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

(Non-Government standards and other publications are normally available from the organizations that 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 document and the references cited herein, (except for related associated detail specifications, specification sheets or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Description. The hose assemblies shall consist of collapsible, reinforced synthetic rubber hose with attached couplings/coupling halves, and fittings.

3.1.1 Drawing. The drawing forming a part of this specification is an end product drawing. No deviation from the prescribed dimensions or tolerances is permissible without prior approval of the contracting officer. Where tolerances could cumulatively result in incorrect fits, the contractor shall provide tolerances within those prescribed on the drawing to insure correct fit, assembly, and operation of the hose assembly. Any data (e.g., shop drawings, layouts, flow sheets, processing procedures, etc.) prepared by the contractor or obtained from a vendor to support fabrication and manufacture of the production item shall be made available, upon request, for inspection by the contracting officer or the designated representative.

3.2 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.3 Process data. Within the time span specified (see 6.2), the contractor shall make available to the Government, on the site of manufacture, a description of materials and a documented inspection instruction which will be used by the contractor to assure that each production hose assembly is a duplicate of the first article hose assembly. Change of materials, procedures, or sources of supply from those initially selected shall be subject to the approval of the contracting officer (see 6.3).

3.4 Materials. Materials shall be as specified herein and on the drawing. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this document.

3.4.1 Material deterioration prevention and control. The hose assembly 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 storage and operating environments to which the hose assembly may be exposed.

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3.4.1.1 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.

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

3.4.2 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to provide a source of raw materials, as distinguished from virgin raw materials. The components, pieces, and parts incorporated in the hose assembly may be newly fabricated from recovered materials to the maximum extent practicable, provided the hose assembly produced meets all other requirements of this specification. Used, rebuilt, or remanufactured components, pieces, and parts shall not be incorporated in the hose assembly.

3.5 Hose assembly. The hose assembly shall consist of a hose section with couplings at each end firmly banded to the hose with hose clamps.

3.5.1 Hose. The hose shall be constructed of a compound inner tube, synthetic fiber reinforcement, and a compounded cover.

3.5.1.1 Tube. The basic material for the tube shall be a low temperature elastomer. The tube shall be smooth, free from pits, and shall be of uniform thickness. The thickness of the tube shall be not less than 5/64-inch. <sup>1/</sup>

3.5.1.2 Reinforcement.

3.5.1.2.1 Sizes 1-inch through 2-1/2-inch hoses. The reinforcement material for the sizes 1-inch through 2-1/2-inch inside diameter (ID) hoses shall be one or more plies of low temperature synthetic cord which shall be evenly and firmly fabricated and thoroughly impregnated with a low temperature elastomeric compound which shall cause the plies to adhere firmly to each other and to the tube and cover. The reinforcement material shall be free from defects, dirt, knots, lumps, and irregularities of twist so that the completed hose shall comply with all the applicable requirements of this specification.

3.5.1.2.2 Sizes 3-inch and 4-inch hoses. The reinforcement material for the sizes 3-inch and 4-inch ID hoses shall be a fabric of two or more even-number layers of low temperature synthetic cord embedded in low temperature elastomeric

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<sup>1/</sup> NOTE: Suggested materials and procedures for hose fabrication may be found in Report No. 5495410486, published by Goodyear Tire and Rubber Company, 1144 East Market Street, Akron, OH 44316, and Report No. ES-83-C125-1, published by Uniroyal Incorporated, 312 North Hill Street, Mishawaka, IN 46544, and are available under Reports No. AD-B113563L and AD-A139329, respectively, from the Defense Technical Information Center, Cameron Station, Alexandria, VA 22304-6145.

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compound, wound or plied in contradirection, and arranged so that there is a rubber bond through the space between each cord which will provide a continuous rubber bond from the inner tube through the reinforcement to the outer cover. The reinforcement shall be evenly and firmly fabricated and shall be free from defects, dirt, knots, lumps, and irregularities of twist so that the completed hose shall comply with all of the applicable requirements of this specification.

3.5.1.2.3 End reinforcement. For types III and IV assemblies, each length of hose shall be constructed with an end reinforcement on each end not less than 14 inches long. The end reinforcement shall consist of one or more plies of fabric specified in 3.5.1.2.1.

3.5.1.3 Cover. The basic material for the cover shall be a low temperature elastomer. The cover shall be uniform in thickness and shall be not less than 3/16-inch thick for types I, II and IV hose assemblies. The cover thickness of the type III hose assembly shall be not less than 5/64-inch. 1/

3.5.1.4 Diameters and weights. The hose shall be furnished in the diameters and weights shown in table I.

TABLE I. Diameters and weights.

Size (ID) inches ( $\pm 1/32$ inch)	Outside diameter (inches at ends)	Pounds per foot (maximum)
<u>TYPES I AND II</u>		
1	1-1/2 $\pm 1/16$	5/8
1-1/4	1-3/4 $\pm 1/16$	7/8
1-1/2	2 $\pm 1/16$	1
2	2-1/2, $+1/8$ or $-1/16$	1-1/8
2-1/2	3, $+1/8$ or $-1/16$	1-7/16
3	3-1/2, $+1/8$ or $-1/16$	1-3/4
4	4-1/2, $+1/8$ or $-1/16$	2-1/2
<u>TYPES III AND IV</u>		
1	1-9/16 $\pm 1/16$	3/4
1-1/4	1-13/16 $\pm 1/16$	1
1-1/2	2-1/16 $\pm 1/16$	1-1/8
2	2-9/16, $+1/8$ or $-1/16$	1-1/4
2-1/2	3-1/16, $+1/8$ or $-1/16$	1-9/16
3	3-5/8, $+1/8$ or $-1/16$	1-7/8
4	4-3/4, $+1/8$ or $-1/16$	2-5/8

3.5.1.5 Electric bond. The hose shall have a continuous steel wire to effect an electric bond (see 6.4.1) between both ends of the hose when tested in accordance with 4.5.2.1.

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3.5.2 Couplings. Couplings shall be securely attached to the hose to form a permanent electric bond with the steel wire.

3.5.2.1 Coupling halves (cam-locking type). Coupling halves for types I, II and III hose shall be in accordance with type II or VI, class 1 or 2 of MIL-C-27487, as applicable (see 1.2).

3.5.2.2 Coupling, reattachable, screw-on. Couplings for type IV hose shall be in accordance with class 1, type I or II of MIL-C-38404, as applicable (see 1.2).

3.5.2.3 Coupling caps. Couplings used on type IV hose assemblies shall be provided with protective, closed-end, reusable, threaded metal or plastic caps of suitable thickness and composition that will not be chemically affected by grade 1 corrosion-preventive compound conforming to MIL-C-16173. Coupling halves conforming to MIL-C-27487 shall be provided with the type IX dust cap or the type X dust plug conforming to MIL-C-27487. The caps and plugs shall be captively retained to the couplings.

3.5.2.4 Gaskets. Elastomeric gaskets, normally supplied with quick-disconnect couplings, shall be replaced with fluorosilicone gaskets conforming to Drawing 13228E1768.

3.5.3 Hose clamps. Each cam-locking type coupling half shall be banded to the hose with two hose clamps. The clamps shall conform to WW-C-440, type H, except the clamps shall be fabricated from corrosion-resistant steel conforming to QQ-S-766, class 201, condition A. When installed and locked, the clamps shall have no protruding ends. The 1-inch, 1-1/4-inch, and 1-1/2-inch size couplings shall be banded to the hose with band clamps 1/2-inch in width; the 2-inch and (2-1/2-inch) sizes with band clamps 5/8- or 3/4-inch in width; and the 3-inch and (4-inch) sizes with band clamps 3/4-inch in width.

### 3.6 Physical and chemical requirements.

3.6.1 Hydrostatic pressure. When tested as specified in 4.5.2.1, the hose with couplings attached shall not leak nor show any imperfections in either the hose or couplings.

3.6.1.1 Length change and twist. When tested as specified in 4.5.2.2, the length of hose shall not change more than  $\pm 3$  percent and shall not twist either clockwise or counterclockwise more than one-half turn (180 degrees) in 25 feet.

3.6.1.2 Minimum burst. When tested as specified in 4.5.2.3, each type of hose shall have a minimum burst pressure as specified in table II.

3.6.2 Tensile strength. The tensile strength of the tube shall be not less than 1250 pounds per square inch (psi) and the tensile strength of the cover shall be not less than 1000 psi when tested as specified in 4.5.2.4. The tensile strength of the tube and cover after immersion, when tested as specified in 4.5.2.5, shall be not less than 40 percent or less than 600 psi (whichever is greater) of the tensile strength obtained before immersion.



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3.6.3 Ultimate elongation. When tested as specified in 4.5.2.4, the ultimate elongation of the tube and cover shall be not less than 200 percent or, when tested as specified in 4.5.2.5, shall be not less than 40 percent of the original elongation obtained before immersion.

TABLE II. Burst and working pressures.

Hose Assembly Type	Size ID (inches)	Psig (min.) Burst Pressure	Psig Working Pressure
I	All	200	50
II	All	350	88
III	1 thru 2-1/2	400	100
III	3	500	125
III	4	600	150
IV	1 thru 2-1/2	400	80
IV	3	500	100
IV	4	600	120

3.6.4 Adhesion.

3.6.4.1 Original. When tested as specified in 4.5.2.6, the original adhesion between tube and plies, between the plies, and between the cover and the plies shall be not less than 10 pounds.

3.6.4.2 After fill test. When tested as specified in 4.5.2.7, the adhesion between the tube and plies, between the plies, and between the cover and the plies shall be not less than 6 pounds.

3.6.5 Volume increase. When tested as specified in 4.5.2.5, the volume increase of the tube specimen after immersion in test fluid shall not exceed 40 percent, and the volume increase of the cover specimen shall not exceed 70 percent.

3.6.6 Low temperature flexibility.

3.6.6.1 Brittleness. Low temperature brittleness shall be determined for tube and cover material after fuel extraction in accordance with ASTM D 746 at -60 °F. There shall be no evidence of cracking of the tube or cover material when tested in accordance with 4.5.2.8.1.

3.6.6.2 Modulus of elasticity. The modulus of elasticity at -60 °F for the tube and cover materials as determined in accordance with 4.5.2.8.2 shall be less than  $1 \times 10^5$  psi for the tube and less than  $0.05 \times 10^5$  psi for the cover.

3.6.7 Existent gum content. When tested as specified in 4.5.2.9, the remainder shall be not more than 20 milligrams per 100 milliliters of test fuel.

3.7 Identification marking. Each length of hose shall be branded with the contractor's name or trademark, the quarter and year of manufacture, the type, the working pressure, the words "Liquid Petroleum Fuel, Collapsible, Low



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Temperature," and the part or identifying number (see 6.5). The hoses shall be branded with the manufacturer's standard working pressures for the specific type and size hose supplied, but shall not be rated less than the working pressures indicated in table II. In addition to the brand, the type II hose assembly shall be marked with a longitudinal yellow stripe not less than 1/8-inch wide and extending the full length of the hose. The stripe shall be fabricated from the same basic material as the cover. The letters shall be molded either recessed or in relief and shall be not less than 1/2-inch high. Hoses shall be branded at 10-foot intervals or by continuous-impression branding, provided the pattern will be repeated every 5 feet or less. Label color shall contrast with the background color of the hose.

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

#### 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 (examinations and tests) 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 ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet the requirements of section 3 and 5. The inspection set forth in this specification shall become 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 ensuring that all products or supplies submitted to the Government for acceptance comply with all the requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. The contractor is responsible for insuring that components and materials used 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).
- d. Inspection comparison (see 4.7).

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### 4.3 First article inspection.

4.3.1 Examination. The first article hose assembly shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The first article hose assembly shall be tested as specified in 4.5.2.1 through 4.5.2.9, inclusive. Failure of any test shall be cause for rejection of the hose assembly.

### 4.4 Quality conformance inspection.

4.4.1 Lot. Each lot shall consist of all units of hose assemblies of the same type, class, and size manufactured under the same conditions and at the same time, and offered to the Government at one time.

4.4.2 Sampling. Sampling of hose and hose assemblies for examination and tests shall be in accordance with MIL-STD-105. Sample size shall be determined by using MIL-STD-105, table I and table IIa. A lot shall be accepted when zero defects are found and rejected when one or more defects are found.

4.4.3 Examination. Samples selected in accordance with 4.4.2 shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

#### 4.4.4 Tests.

4.4.4.1 Individual. Each hose assembly shall be tested as specified in 4.5.2.1. Failure of the test shall be cause for rejection.

4.4.4.2 Samples. Samples selected in accordance with 4.4.2 shall be tested as specified in 4.5.2.2, 4.5.2.4 and 4.5.2.6. Failure of any test shall be cause for rejection.

### 4.5 Inspection procedure.

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

101. Materials not as specified.
102. Materials not resistant to corrosion and deterioration, or treated to be resistant to corrosion and deterioration in the applicable storage and operating environments.
103. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.
104. Contractor does not have documentation available for identification of materials, material finishes, or treatment.
105. Used, rebuilt, or remanufactured components, pieces, or parts incorporated in the hose assemblies.
106. Diameters and weights not as specified.
107. Length of hose not as specified.
108. Design and construction not as specified.

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109. Identification marking missing, illegible, or not as specified.  
 110. Workmanship not as specified.

4.5.2 Tests.

4.5.2.1 Hydrostatic. Each length of hose, with fittings such as couplings and adapters attached, shall be subjected to a hydrostatic pressure test as specified in table III. The electric bond (6.4.1) shall be determined while full test pressure is applied. Nonconformance to 3.6.1 and 3.5.1.5 shall constitute failure of the test.

TABLE III. Hydrostatic test.

Hose Assembly Type	Inch Size	Psig Hydrostatic Test Pressure <sup>1/</sup>
I	All	100
II	All	175
III	1 thru 2-1/2	200
III	3	250
III	4	250
IV	1 thru 2-1/2	200
IV	3	250
IV	4	250

1/ The pressure on each hose shall be maintained for 30 seconds.

4.5.2.2 Length change and twist. A measurement of the original length of each length of hose shall be made, with the hose laid out in a straight horizontal position, after a pressure of 10 psig is applied and maintained. With a crayon or soft pencil, make a mark on the top surface of the hose cover at each end adjacent to the coupling. These marks are used as a means of measuring the amount of twist during the test. The pressure shall then be increased to 100 psig and held for 30 seconds. With the pressure still maintained, the final length measurement and the final twist measurement shall be taken. The percent change in length shall be calculated as plus for increase and minus for decrease in length. Nonconformance to 3.6.1.1 shall constitute failure of the test.

4.5.2.3 Minimum burst. A sample of not less than 3 feet nor more than 6 feet shall be cut from the one length selected from each 100 lengths for burst and physical tests. The hose shall be subjected to a hydrostatic test pressure in accordance with table II listed in 3.6.1.2. The pressure shall be supplied at a uniform rate sufficient to develop the test pressure in 10 seconds  $\pm$  2 seconds. Nonconformance to 3.6.1.2 shall constitute failure of the test. The remaining section of hose from which the test sample has been taken shall be accepted as a full length, provided the sample meets all the requirements of the specification.

4.5.2.4 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 3.6.2 and 3.6.3 shall constitute failure of these tests.

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**4.5.2.5 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 hose assemblies selected in accordance with 4.4.2 shall be determined in accordance with ASTM D 471. The temperature of immersion shall be  $23 \pm 1.1$  °C. The immersion time shall be 48 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 3.6.2, 3.6.3, or 3.6.5 shall constitute failure of these tests.

**4.5.2.6 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 3.6.4.1 shall constitute failure of this test.

**4.5.2.7 Adhesion after immersion in fuel.** Specimens prepared as specified in 4.5.2.6 shall be immersed in fluid as specified in 4.5.2.5 for 48 hours at  $23 \pm 1.1$  °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 3.6.4.2 shall constitute failure of this test.

**4.5.2.8 Low temperature flexibility.**

**4.5.2.8.1 Brittleness.** Fabricate ASTM slabs of tube and cover material (6 inches X 6 inches X .080-inch) per ASTM D 2137. Condition samples in ASTM D 471, reference fuel B, at 73 °F for 4 days. Remove the samples from the fuel and air dry them for 2 days at 73 °F. Then oven-age the samples for 24 hours at 130 °F. Test the samples after oven-aging in accordance with ASTM D 746. Nonconformance to 3.6.6.1 shall constitute failure of this test.

**4.5.2.8.2 Modulus of elasticity.** Determine the modulus of elasticity at -60 °F per ASTM D 790, method II, procedure B, on samples of tube and cover compounds after they have been conditioned in ASTM D 471, reference fuel B, for 4 days, then air dried and oven aged as specified in 4.5.2.8.1. Nonconformance to 3.6.6.2 shall constitute failure of this test.

**4.5.2.9 Existent gum.** A test sample of hose, not less than 14 inches long, shall be selected and the bottom plugged with a clean corrosion-resisting steel cylinder 2 inches long secured in place with a clamp. The sample shall be filled to within 2 inches of the top with test fluid conforming to ASTM D 471, reference fuel B. The top end of the hose shall be plugged in a manner similar to the bottom. The sample shall then be stored in a vertical position for 7 days at an ambient temperature of +38 °C (100 °F). At the end of each 24 hours, the fuel in the sample shall be agitated for 5 minutes by moving the hose back and forth from a vertical to a horizontal position at a rate of 2 cycles per minute. At the end of the 7-day storage period, the fuel shall again be agitated in the sample 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 blank shall be run on the test fluid at the same time and by the same method. The existent gum of the blank fluid shall be subtracted from the existent gum obtained from the test fluid removed from the hose. Nonconformance to 3.6.7 shall constitute failure of the test.

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4.6 Inspection of packaging. The preservation, packing, and marking shall be examined to determine compliance with the applicable referenced documents in section 5 of this specification.

4.7 Inspection comparison. The Government may select hose assemblies at any time during the contract production period and subject these hose assemblies to the examination specified in 4.5.1 and the tests specified in 4.5.2 to determine conformance to the requirements of this specification. The inspection will be performed by the Government, at a site selected by the Government, on units selected at random from those which have been accepted by the Government and will not include the previously inspected first article hose assemblies. In addition to any test specified as part of the inspection comparison, the Government reserves the right to conduct any and all other tests contained in this specification as part of the inspection comparison and failure of such additional tests shall have the same effect as failure of those tests specified as inspection comparison.

4.7.1 Inspection failure. Failure of any hose assembly to meet any requirement specified herein, during, and as a result of the examination and tests specified in 4.7, shall be cause for rejection of the hose assembly and shall be cause for refusal by the Government to continue acceptance of production hose assemblies until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiencies. Correction of such deficiencies shall be accomplished by the contractor at no cost to the Government on hose assemblies produced and accepted prior to completion of inspection comparison are similarly deficient unless evidence to the contrary is furnished by the contractor and such evidence is acceptable to the contracting officer.

## 5. PACKAGING

5.1 Preservation. Preservation shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Hose assemblies shall be preserved in accordance with the level A preservation requirements of MIL-H-775.

5.1.2 Level C. Hose assemblies shall be preserved in accordance with level C preservation requirements of MIL-H-775.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.2.1 Level A. Hose assemblies shall be packed in accordance with the level A packing requirements of MIL-H-775.

5.2.2 Level B. Hose assemblies shall be packed in accordance with the level B packing requirements of MIL-H-775.

5.2.3 Level C. Hose assemblies shall be packed in accordance with level C packing requirements of MIL-H-775.

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5.3 Marking. Marking for level A, B, and C shall be in accordance with MIL-STD-129.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The hose assemblies covered by this specification are intended for use in connection with dispensing liquid petroleum fuels at low temperature (-60 °F) environment as follows:

- Type I - Primarily for use with gasoline dispensing pumps.
- Type II - Primarily for use on fuel trailers and carts.
- Type III - Primarily for use with Marine Corps amphibious assault fuel handling systems capable of handling light petroleum fuels.
- Type IV - Primarily for use with aircraft refuelers.

6.2 Acquisition requirements. Acquisition documents shall specify the following:

- a. Title, number, and date of the specification.
- b. Type, class, and size of hose assembly required (see 1.2).
- c. Length of hose required (see 1.3).
- d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- e. Part or identifying number required (see 3.7 and 6.5).
- f. When a first article is not required (see 3.2 and 6.3), and process data time frame specified (see 3.3).
- g. When the Government will conduct any or all of the first article examination and tests. When the Government will conduct some but not all of the first article examination and tests, the contracting officer should specify which examination and tests shall be conducted by the contractor (see 3.2).
- h. Level of preservation and packing required (see 5.1 and 5.2).

6.3 First article. When a first article inspection is required, the items should be preproduction models. The first article should consist of three or more units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of the first article test results and disposition of the first articles. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidder 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. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Definitions.



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

6.5 Part or identifying number (PIN). The PIN to be used for hose assemblies covered by this specification are designed as follows (see 3.7 and 6.2):

Part or identifying number	M53095	-	XX	X	XXX
Prefix	_____				
Military specification number	_____				
Type and class designator (table I)	_____				
Size designator (table II)	_____				
Length designator (see 1.3)	_____				

Example: M53095-01A500 - Hose assembly in accordance with MIL-H-53095, type I (gasoline dispensing pump), class 1 (coupling halves, quick-disconnect, cam-locking type, hose shank; female both ends), size 1 inch, length 50.0 feet.

6.5.1 Type and class. The hose assembly type and class are identified by a 2-digit code number as shown in table IV.

TABLE IV. Type and class designator.

Type				Class
I	II	III	IV	
01	02	03	04	1
05	06	-	08	2
09	10	-	12	3

6.5.2 Size. The hose assembly size is identified by a 1-letter symbol as shown in table V.

TABLE V. Size designator.

Symbol	Size (inside diameter)
A	1 inch
B	1-1/4 inch
C	1-1/2 inch
D	2 inch
E	2-1/2 inch
F	3 inch
G	4 inch



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6.6 Subject term (key word) listing.

Arctic  
Coupling halves  
Coupling halves, cam-locking type  
Couplings  
Cover  
Elastomer  
Hose  
Pumps, gasoline dispensing  
Refuelers, aircraft  
Synthetic cord  
Trailers and carts, fuel  
Tubes

Custodian:  
Army - ME

Preparing activity:  
Army - ME

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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. 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.

<b>I RECOMMEND A CHANGE</b>		1. DOCUMENT NUMBER MIL-H-53095 (ME)	2. DOCUMENT DATE (YYMMDD) 900207
3. DOCUMENT TITLE Hose Assemblies, Rubber, Synthetic, Liquid Petroleum Fuels, Dispensing, Collapsible, Low Temperature			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	e. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME		b. TELEPHONE (Include Area Code) (1) Commercial (703) 664-5717 (2) AUTOVON 354-5717	
c. ADDRESS (Include Zip Code) US Army Belvoir RDE Center ATTN: STRBE-TSE Ft. Belvoir, VA 22060-5606		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	