

METRIC

MIL-PRF-53063B(AT)

17 January 1996

SUPERSEDING

MIL-H-53063A(ME)

12 February 1992

## PERFORMANCE SPECIFICATION

### HOSE ASSEMBLY, ELASTOMER, LIGHTWEIGHT, NONCOLLAPSIBLE, FUEL (METRIC)

This specification is approved for use by the U.S. Army Tank-automotive and Armaments Command, 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 lightweight, noncollapsible, elastomer fuel hose assemblies.

1.2 Classification. Hose assemblies shall be of the following sizes and classes, as specified (see 6.2):

Sizes I.D. (Inside diameters):

1 - 51 millimeters (mm) (2 inches (in.))

2 - 76 mm (3 in.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4720

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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## Classes:

- 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;  
~~Female Both Ends~~ Male Both Ends
- Class 3 - Coupling Halves, Quick-Disconnect, Cam-Locking Type, Hose Shank;  
Female One End, Male Other End

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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 supplements thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

A-A-52506 - Clamps, Hose.

## DEPARTMENT OF DEFENSE

MIL-C-27487 - Coupling Halves, Quick-Disconnect, Cam-Locking Type.  
MIL-T-83133 - Turbine Fuels, Aviation, Kerosene Types, NATO F-34  
(JP-8) and NATO F-35.

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## STANDARDS

## FEDERAL

FED-STD-595 - Colors Used in Government Procurement.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Printing Service Detachment Office, Bldg. 4D (Customer Service), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 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)

D380	- Rubber Hose (DoD adopted).
D381	- Existent Gum in Fuels by Jet Evaporation (DoD adopted).
D412	- Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers -Tension (DoD adopted).
D413	- Rubber Property - Adhesion to Flexible Substrate (DoD adopted).
D471	- Rubber Property - Effect of Liquids (DoD adopted).
D518	- Rubber Deterioration - Surface Cracking (DoD adopted).
D1149	- Rubber Deterioration - Surface Ozone Cracking in a Chamber (DoD adopted).

(Copies of ASTM publications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 First article. When specified (see 6.2), a first article sample shall be subjected to first article inspection in accordance with 4.2.

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3.2 Materials. Materials used shall be in accordance with the manufacturer's materials specifications for hose and coupling halves. The metals shall be capable of meeting all of the operational and environmental requirements specified herein (see 4.5.1). Recovered materials shall be used to the maximum extent practicable.

3.2.1 Material deterioration prevention and control. The 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 operating and storage environments to which hose assemblies may be exposed.

3.2.2 Metals. The use of dissimilar metals in intimate metal to metal contact, shall be avoided.

3.2.3 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 Design and construction.

3.3.1 Hose. The hose shall be constructed of an elastomer which is resistant to liquid hydrocarbon fuels, and shall not have any deleterious effects upon any type and grade of fuel conforming to MIL-T-83133 (JP-8). The inside wall of the hose shall be smooth and free from pits. The hose shall be of uniform thickness. The hose shall not leak. The color of the hose shall be tan 686A in accordance with FED-STD-595, color chip 33446.

3.3.1.1 Color lay-line. A longitudinal color lay-line shall be marked on the outer cover of the hose. It shall be not less than 3.2 mm (0.13 in.) wide and shall be continuous the full length of the hose. Handling, bending, fuel, or environmental effects shall not adversely affect the lay-line. The identification marking label (see 3.5) may substitute for the lay-line provided it is continuous and extends the full length of the hose and is black in color. The lay-line shall remain clear, distinct and legible for the life of the hose.

3.3.1.2 Diameter and weight. Length shall be as specified (see 6.2). Hose inside diameter and weight shall be as specified in table I.

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TABLE I. Diameters and weight.

Hose Diameter (Inner diameter) +2.5 mm -0.8 mm (+0.10 in. -0.03 in.)	Weight per linear meter (max)
51 mm (2 in.) 76 mm (3 in.)	0.45 kg (1.00 pound (lb)) 0.57 kg (1.25 lbs)

3.3.1.3 Static wire. If static wire is used as a reinforcement for the hose, the resistance between couplings shall not exceed 4.9 ohms per linear meter (1.5 ohms per linear foot) of hose.

### 3.3.2 Fittings and couplings.

3.3.2.1 Coupling halves (cam-locking type). Couplings halves shall be in accordance with MIL-C-27487, type II or VI, class 1 or 2, as applicable (see 1.2). The cam-lock couplings described herein are illustrated in figure 1.

3.3.2.2 Band fittings. Each coupling shall be banded to the hose in conformance with A-A-52506. Bands shall be non-vivid and non-reflective.

3.3.2.3 Coupling caps. Coupling halves conforming to MIL-C-27487 shall be provided with type IX dust cap and the type X dust plug conforming to MIL-C-27487. The caps and plugs shall be made captive to the couplings by means of a chain or similar attachment.

### 3.4 Physical and chemical properties.

#### 3.4.1 Hydrostatic pressure.

3.4.1.1 Hose assembly. When tested as specified in 4.5.5, at the proof pressure from table II, the hose assembly shall not leak. There shall be no evident imperfection in the hose, or couplings while under pressure. There shall be no indication of slippage or pull-out of the fitting or coupling. The length of the hose shall not change more than  $\pm 2$  percent.

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TABLE II. Pressure for hose assembly.

Size I.D. mm (in.)	Operating pressure kPa (psi) 1/	Proof pressure kPa (psi) minimum	Burst pressure kPa (psi) minimum
51 (2)	517 (75)	1379 (200)	2068 (300)
76 (3)	517 (75)	1379 (200)	2068 (300)

1/ psi - pounds per square inch.

3.4.1.2 Minimum burst. When tested as specified in 4.5.5.1, each size hose assembly shall have a minimum burst pressure as specified in table II.

3.4.2 Tensile strength. When tested as specified in 4.5.6, the tensile strength of the hose shall be not less than 8618 kPa (1250 psi). When tested as specified in 4.5.7, the tensile strength of the tube and cover after immersion shall be not less than 40 percent of the tensile strength before immersion or less than 4137 kPa (600 psi) (whichever is greater).

3.4.3 Ultimate elongation. When tested as specified in 4.5.6, the ultimate elongation of the hose shall be not less than 200 percent, and when tested as specified in 4.5.7, the elongation after immersion shall be not less than 100 percent.

3.4.4 Adhesion. If a tube, ply, and cover configuration is used for the hose assembly, the adhesion shall comply with 3.4.4.1 and 3.4.4.2.

3.4.4.1 Original adhesion. When tested as specified in 4.5.8, the original adhesion between the tube and plies, between the plies and between the cover and plies shall be not less than 4.5 kg (10 lbs).

3.4.4.2 Adhesion after fuel immersion. When tested as specified in 4.5.9, adhesion between the tube and plies, between the plies, and between the cover and plies shall be not less than 2.7 kg (6 lbs).

3.4.5 Low temperature flexibility. When the hose assembly is tested as specified in 4.5.10, there shall be no evidence of cracking, or lack of flexibility; and the hose shall not show any failure when tested at appropriate proof pressure as indicated in table II.

3.4.6 Existent and heptane-washed gum content. When tested as specified in 4.5.11, the existent gum content shall not be more than 20 milligrams per 100 milliliters of test fluid. When

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further tested as specified in 4.5.11, the heptane-washed gum content shall not be more than 5 milligrams per 100 milliliters.

3.4.7 Crush resistance. During crush resistance test as specified in 4.5.12, the smallest outside diameter of the hose shall be not less than 80 percent of the original outside diameter. After release of the load, the smallest outside diameter shall be not less than 90 percent of the original outside diameter.

3.4.8 Ozone resistance. Ozone resistance of the hose assembly shall comply with ASTM D1149. When tested as specified in 4.5.13, at the end of the exposure time, there shall be no evidence of cracking, checking or irregularity in the cover when viewed with 7X magnification.

3.5 Identification marking label. Each hose assembly shall be marked with the following information:

Date of manufacture (quarter and year).  
Contract or order number.  
Manufacturer's name and trademark.  
Hose Assembly, Elastomer, Lightweight, Noncollapsible, Fuel.  
Working pressure 517 kPa (75 psi).  
PIN number.

The letters used for marking shall be not less than 4.6 mm (0.18 in.) high, and such that handling, bending, water, oil, or environmental effects shall not affect the markings. The letters shall be in contrast to the hose background color. The letters may be within the longitudinal lay-line, provided the width of the lay-line is not less than 5.1 mm (0.20 in.) greater than the height of the letters and the letters are in contrast to the color of the lay-line. The hose shall be branded at intervals of not less than 3m (10 feet (ft)). The label shall remain clear, distinct and legible for the life of the hose (see 4.5.2).

3.6 Workmanship. The 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 (see 4.5.2).

#### 4. VERIFICATION

4.1 Classification of inspection. The inspection conditions specified herein are classified as follows:

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

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4.2 First article inspection. Unless otherwise specified (see 6.2), first article inspection shall be performed in accordance with the examinations of 4.4 (table III), and the tests of 4.5.3 through 4.5.13 (table IV).

4.3 Conformance inspection. Conformance inspection shall include the examinations of 4.4 (table III) and the tests of 4.5.3 through 4.5.13 (table IV).

4.4 Examination.

4.4.1 Sampling. Samples from an inspection lot for conformance inspection shall be selected in accordance with ANSI/ASQC Z1.4. Any redesign or modification of the contractor's standard to comply with specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements of requirements as listed in table III. Noncompliance with any specified requirement or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4.2 Elastomer. Four test slabs, each 152 mm (6 in.) by 152 mm (6 in.) by 1.91 mm (0.075 in.),  $\pm 0.25$  mm ( $\pm 0.010$  in.) thick, for each elastomer used to fabricate the hose assemblies, shall be supplied with each lot. Test slabs shall be fabricated under the same conditions of time, temperature and pressure as used in hose production.

4.5 Method of inspection.

4.5.1 Materials. Conformance to 3.2 shall be determined by inspection of contractor records providing proof or certification that materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.5.2 Defects. Conformance to 3.3, 3.5 and 3.6 shall be determined by examination for the defects listed in table III. Examination shall be visual, tactile, or by measurement with SIE.

4.5.3 Individual tests. Each hose assembly shall be subjected to the test marked "X" in column 2 of table IV. Failure of the test shall be cause for rejection.

4.5.4 Sample tests. Samples selected in accordance with 4.4.1 and 4.4.2 shall be subjected to the tests marked "X" in column 3 of table IV. Failure of any test shall be cause for rejection of the hose assemblies represented by the samples.



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4.5.5 Hydrostatic. Each length of hose shall be subjected to the hydrostatic tests of ASTM D380 for elongation, and proof pressure, using water as a test fluid. The test pressure shall be as specified in table II. The electric bond shall be determined while full test pressure is applied. Nonconformance to 3.3.1.3 and 3.4.1.1 shall constitute failure of this test.

TABLE III. Classification of defects.

Category	Defect	Method of examination
101	Materials not as specified (see 3.2)	SIE 1/ SIE
102	Materials not resistant to corrosion and deterioration or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments (see 3.2.1).	
103	Dissimilar metals not effectively insulated from each other (3.2.2).	SIE
104	Contractor does not have documentation available for identification of identification of material, material finishes, or treatment (see 3.2.3).	SIE/Visual
105	Hose not as specified (see 3.3.1).	SIE/Visual
106	Hose not clean and smooth (see 3.3.1).	Visual
107	Color not as specified (see 3.3.1).	Visual
108	Hose lay-line not as specified (see 3.3.1.1).	Visual
109	Dimensions and weight not as specified (see 3.3.1.2).	SIE
110	Fittings and couplings not as specified (see 3.3.2).	Visual
111	Dust caps and plugs not made captive (see 3.3.2.3).	Visual
112	Identification plate not as specified (see 3.5).	Visual
113	Workmanship not as specified (see 3.6).	Visual

1/ SIE = Standard Inspection Equipment.

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TABLE IV. Classification of inspection.

First article	Quality conformance		Test	Test paragraph	Requirements paragraph
	individual	sample			
X	X		Hydrostatic pressure.	4.5.3 and 4.5.5	3.3.1.3 and 3.4.1.1
X		X	Burst pressure.	4.5.5.1	3.4.1.2
X		X	Tensile strength.	4.5.6	3.4.2
X		X	Ultimate elongation.	4.5.6	3.4.3
X		X	Tensile strength after immersion.	4.5.7	3.4.2
X		X	Ultimate elongation after immersion.	4.5.7	3.4.3
X		X	Original adhesion.	4.5.8	3.4.4.1
X		X	Adhesion after fuel immersion.	4.5.9	3.4.4.2
X		X	Low temperature flexibility.	4.5.10	3.4.5
X		X	Existent and heptane-washed gum content.	4.5.11	3.4.6
X		X	Crush resistance.	4.5.12	3.4.7
X		X	Ozone resistance.	4.5.13	3.4.8

4.5.5.1 Minimum burst. A sample of not less than 0.9 m (3 ft) nor more than 1.8 m (6 ft) shall be cut from hose selected in accordance with 4.4.1. The hose shall be subjected to the hydrostatic pressure test of ASTM D380 for burst pressure, using water as a test fluid. The test pressure shall be the burst pressure as specified in table II. Nonconformance to 3.4.1.2 shall constitute failure of this test.

4.5.6 Tensile strength and ultimate elongation. The tensile strength and ultimate elongation of the hose cover and tube shall be determined in accordance with ASTM D412. Nonconformance to 3.4.2 or 3.4.3 shall constitute failure of this test.

4.5.7 Tensile strength and ultimate elongation after immersion. The tensile strength and ultimate elongation of cover and tube after immersion shall be determined in accordance with ASTM D471. Test temperature shall be  $23 \pm 2$  degrees Celsius ( $^{\circ}\text{C}$ ) ( $73 \pm 4$  degrees Fahrenheit ( $^{\circ}\text{F}$ )); immersion period shall be 70 hours; immersion fluid shall be reference fuel D. Nonconformance to 3.4.2 or 3.4.3 shall constitute failure of this test.

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4.5.8 Original adhesion. Adhesion shall be determined in accordance with the machine method of ASTM D413. Nonconformance to 3.4.4.1 shall constitute a failure of this test.

4.5.9 Adhesion after fuel immersion. Adhesion after fuel immersion shall be determined in accordance with ASTM D413 - machine method. Test specimens shall have been immersed in reference fuel D of ASTM D471 for 70 hours at  $23 \pm 2$  °C ( $73 \pm 4$  °F). Adhesion shall be determined within 15 minutes after removal of specimens from test fluid. Nonconformance to 3.4.4.2 shall constitute failure of this test.

4.5.10 Low temperature flexibility. Low temperature flexibility shall be determined in accordance with the Mandrel Bend test procedure of ASTM D380. Temperature shall be  $-32 \pm 1$  °C ( $-25 \pm 2$  °F). Nonconformance to 3.4.5 shall constitute failure of this test.

4.5.11 Existent and heptane-washed gum content. A test specimen of hose not less than 356 mm (14 in.) long shall be stoppered with a noncorrosive plug, and clamped to prevent fluid loss. The sample shall then be filled to 51 mm (2 in.) from the top with reference fuel D of ASTM D471, the top shall be stoppered and clamped as above, and the specimen shall be stored in a vertical position for 7 days at an ambient temperature of 38 °C (100 °F). At the end of each 24 hour period, the fuel shall be agitated for 5 minutes by moving the hose back and forth from vertical to horizontal at a rate of 2 cycles per minute. At the end of the seven day storage period, the fuel shall be agitated in the same manner as indicated above for 5 minutes and then immediately removed from the hose. The removed fuel shall be tested for existent gum content in accordance with the air-jet solvent wash method of ASTM D381. A control sample of reference Fuel D shall also be tested for existent gum content in accordance with the air-jet method of ASTM D381. The value of existent gum of the control shall be subtracted from that of the test fluid to give existent gum content. The beakers containing the residue from the existent gum determination shall then be used to determine heptane-washed gum in accordance with ASTM D381, procedures 10.8 through 10.12. A minimum of three specimens shall be used to report the average existent and heptane-washed gum content. Nonconformance to 3.4.6 shall constitute a failure of this test.

4.5.12 Crush resistance. Crush resistance shall be determined by centering a 305 mm (12 in.) length of hose between 76 mm (3 in.) wide, paralleled metal plates in such a way that a 76 mm (3 in.) length of the hose is put under compression. The plates shall be brought together at a rate of 51 mm (2 in.) per minute until 147 kg (325 lbs) of load is applied. The distance between inner surface of plates shall be measured with a steel rule and expressed in percent of the original hose outside diameter. The load shall be released and the minimum outside diameter of the hose at the center of the previously compressed area shall be measured and reported in percent of original outside diameter. Nonconformance to 3.4.7 shall constitute failure of this test.

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4.5.13 Ozone resistance. Specimens of the cover material used for the hose, prepared in accordance with ASTM D518, procedure A, shall be mounted in a 20 percent elongated position and tested in accordance with ASTM D1149. After conditioning for 24 hours in an ozone - free atmosphere, the mounted specimens shall be exposed for 72 hours at  $40 \pm 1$  °C ( $104 \pm 2$  °F), to an atmosphere containing  $50 \pm 10$  parts per hundred million (pphm) of ozone. Upon completion of the test, the specimens shall be examined. Nonconformance to 3.4.8 shall constitute failure of this test.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

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

6.1 Intended use. This lightweight, noncollapsible hose is intended for use with forward area refueling systems for suction of gasoline, aviation fuel, and diesel fuel.

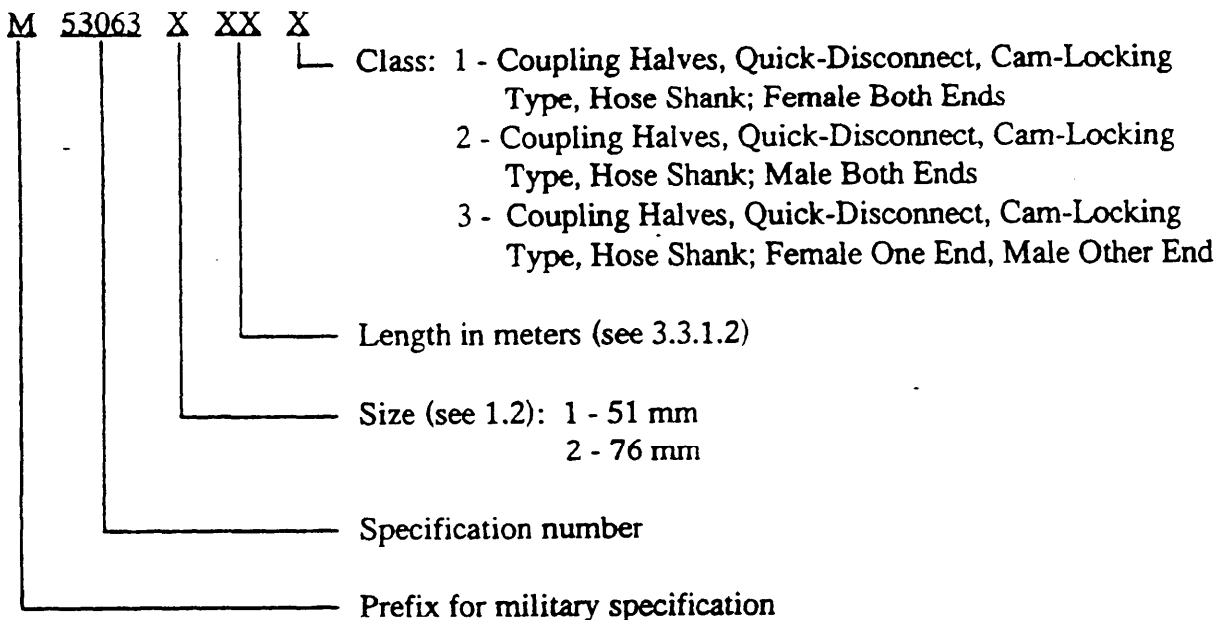
6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Size and class of hose assembly required (see 1.2).
- c. Coupling required (see 1.2).
- d. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- e. When a first article is required for inspection and approval (see 3.1).
- f. Length of hose required (see 3.3.1.2).
- g. PIN number (see 3.5 and 6.4).
- h. Packaging requirements (see 5.1).

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6.3 First article. When a first article inspection is required, the items should be a initial production model. The first article should consist of one 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 article. 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 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. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Part or Identifying Number (PIN). The PIN to be used for hose assemblies aquired to this specification are created as follows (see 3.5 and 6.2):



Example of part number: M53063-1-2-3 for a 51 mm diameter, 2 m long hose assembly with quick disconnect, cam-locking type couplings, hole shank; female one end, and male other end, in accordance with this specification.

#### 6.5 Subject term (key-word) listing.

##### Couplings

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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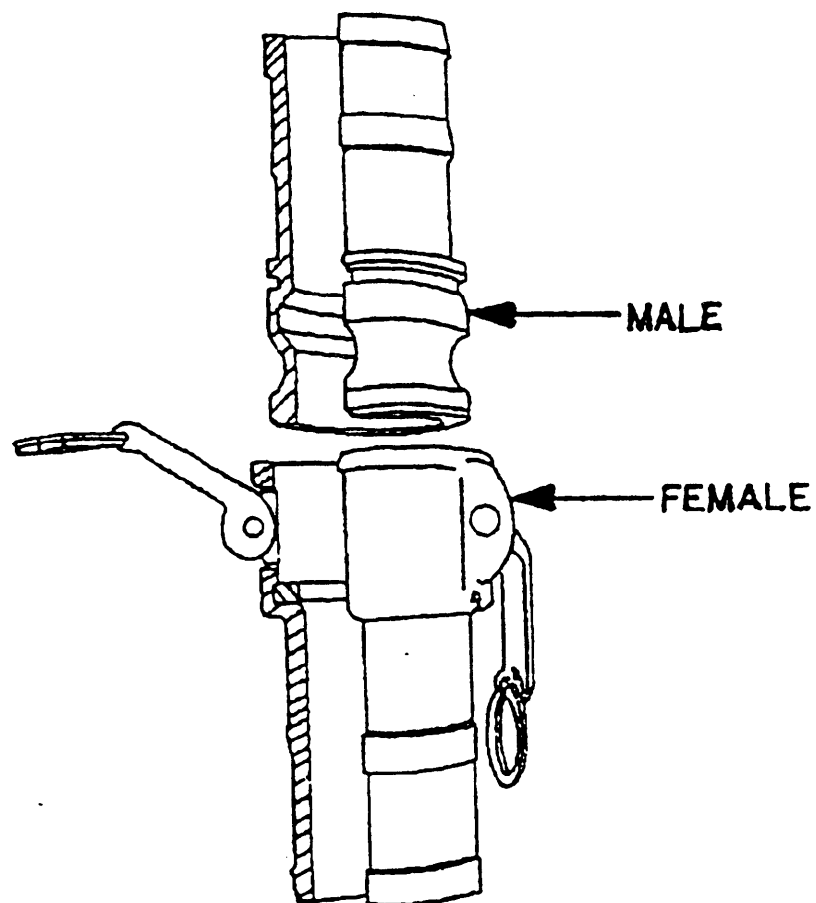


FIGURE 1: Coupling Halves, Quick Disconnect,  
Cam-Locking Type, Hose Shank.

Custodian:  
Army - AT

Review activity:  
DLA - CS

Preparing activity:  
Army - AT

(Project 4720-0087)

## 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 number 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. FSC 4720

<b>RECOMMEND A CHANGE:</b>	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-PRF-53063B(AT)	960117

## DOCUMENT TITLE

Hose Assembly, Elastomer, Lightweight, Noncollapsible, Fuel (Metric)

NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

## REASON FOR RECOMMENDATION

## SUBMITTER

NAME (Last, First, Middle Initial)

b. ORGANIZATION

ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)

(1) Commercial

(2) AUTOVON

(If applicable)

7. DATE SUBMITTED  
(YYMMDD)

## PREPARING ACTIVITY

NAME

b. TELEPHONE (Include Area Code)

(1) Commercial

(810) 574-8745

(2) AUTOVON

786-8745

ADDRESS (Include Zip Code)

Commander

U.S. Army Tank-automotive and Armaments

Command, ATTN: AMSTA-TR-E/BLUE,

Warren, MI 48097-5000

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Defense Quality and Standardization Office

5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466

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