

MIL-H-26894C(USAF)  
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 SUPERSEDING  
 MIL-H-26894B(USAF)  
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# MILITARY SPECIFICATION

## HOSE ASSEMBLY, RUBBER, GASOLINE. REFUELING, LOW TEMPERATURE

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

### 1. SCOPE

1.1 The specification covers a low-temperature refueling gasoline rubber hose assembly.

### 2. APPLICABLE DOCUMENTS

- \* 2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of the specification to the extent specified herein.

#### SPECIFICATIONS

##### Federal

QQ-P-416  
 TT-T-548

Plating, Cadmium (Electro-Deposited)  
 Toluene; Technical

##### Military

MIL-H-775

Hose, Rubber Or Fabric (Including Tubing), And Fittings, Nozzles And Strainers, Packaging Of Drawings, Engineering And Associated Lists

MIL-D-1000

MIL-J-5624

Jet Fuel, Grades JP-4 And JP-5

MIL-R-6855

Rubber, Synthetic, Sheeted, Molded, And Extruded

MIL-A-8625

Anodic Coatings, For Aluminum And Aluminum Alloys

MIL-C-11796

Corrosion Preventive, Petrolatum, Hot Application

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: San Antonio Air Logistics Center, Service Engineering Division, ATTN: MMEDO, Kelly AFB TX 78241 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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# STANDARDS

## Federal

FED-STD-601

Rubber, Sampling And Testing

## Military

MIL-STD-105

Sampling Procedures And Tables For

MIL-STD-129

Inspection By Attributes

MIL-STD-831

Marking For Shipment And Storage

Test Reports, Preparation Of

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

2.2.1 Other publications: The following document forms a part of this specification to the extent specified herein: Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing Materials, Manual

American Society for Testing Materials Manual

Engine Test Methods for Rating Fuels

Engine Test Methods for Rating Fuels

(Application for copies should be addressed to the American Society for

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Testing and Materials; 1916 Race Street, Philadelphia PA 19103.)

National Motor Freight Traffic Association, Inc. Agent

National Motor Freight Traffic Association, Inc. Agent

National Motor Freight Classification

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking

(Application for copies should be addressed to the American Trucking

Association, Inc.; Tariff Order Section; 1616 P Street, N.W.; Washington DC

20036.)

Uniform Classification Committee, Agent

Uniform Classification Committee, Agent

Uniform Freight Classification

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification

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Committee, Room 1106, 222 South Riverside Plaza; Chicago IL 60606.)

(Technical Society and Technical Association specifications and standards are

(Technical Society and Technical Association specifications and standards are

generally available for reference from libraries.) They are also distributed

among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1. PREPRODUCTION. This specification makes provisions for preproduction

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testing.

3.2. Materials. Materials shall be as specified herein. If not specifically designated, materials shall be of the best quality and entirely suitable for their intended use.

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**3.3 Design and construction.** The hose assembly shall consist of a compounded inner tube; braided-, loomed-, or plied-type reinforcement; a helix of round wire embedded in synthetic rubber between reinforcing members; and a compounded cover.

**3.3.1 Hose.**

**3.3.1.1 Tube.** The tube shall be either a calendered or continuously extruded synthetic rubber compound resistant to high aromatic aviation fuel and capable of meeting the requirements of this specification. The bore of the tube shall be smooth, free from pitting, objectionable cuttings, borings or cements, and of uniform diameter within  $\pm 1/32$  inch. The tube shall have a minimum thickness of  $3/32$  inch.

**3.3.1.1.1 Cover.** The cover shall be constructed of polychloroprene rubber compounded to meet the requirements of this specification. The cover shall be smooth, free from pitting, and a uniform thickness of not less than  $1/16$  inch.

**3.3.1.1.2 Reinforcement.** The reinforcement shall be evenly and firmly braided, loomed, or plied, and free from defects, dirt, knots, lumps, and irregularities of twist.

**3.3.1.1.3 Age.** Hose shall be no more than 4 quarters old from the date of manufacture to the date of delivery to manufacturers of hose couplers and other accessory equipment or when delivered to the procuring activity. Hose installed in such equipment shall be no more than 8 quarters old upon the date of delivery of that equipment to the procuring activity.

**3.3.1.1.4 Helix wire.** The helix wire shall be steel having a minimum tensile strength of 180,000 pounds per square inch (psi) and a minimum diameter of 0.0781 inch. The wire shall be free of corrosion. The wire shall extend at least to under the middle coupling strap.

**3.3.1.1.5 Hose ends.** The cut hose ends shall be sealed with a cement or sealant.

- \* **3.3.2 Couplings.** Unless otherwise specified (see 6.2), couplings shall not be provided. When couplings are provided, they shall be of the male or female type as specified by the procuring activity (see 6.2). The bore shall be smooth. The female coupling nut shall swivel freely by hand and be leaktight by means of an appropriate gasket. The shank of the body shall have a rounded outer edge to prevent cutting of the hose during installation or upon sharp bending during usage. The body shall be attached to the hose by means of a sleeve (ferrule), a sleeve and grip (wire coil), or at least three straps. Reattachability is not a requirement. There shall be no protruding clamps or fasteners. If a sleeve is used, the sleeve shall extend beyond the end of the body when installed. If straps are used, the body shank shall have a minimum length of 5 inches and have a minimum of two barbs separated by a strap.

**3.3.2.1 Coupling threads.** Male- and female-type couplings shall be threaded with 4-inch American-National pipe threads.

- \* **3.3.2.2 Chemical composition.** Body, nut and sleeve shall be of high grade brass composition containing at least 58 percent copper, 300 series stainless steel, or MIL-A-8625 anodized high tensile strength aluminum Type B214 or 354 casting alloy or wrought other than 2000, 4000 and 7000 series. Grip wire

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shall be steel plated in accordance with QQ-P-416, Type II, Class 2. Straps shall be 300 series stainless steel. The gasket shall be of rubber conforming to MIL-R-6855.

- \* 3.3.2.3 Coupling caps. Each coupling shall be provided with a protective closed-end, reusable, threaded, metal cap having a thickness of 0.025 to 0.031 inch. The cap shall not be chemically affected by class 1 corrosion-preventive compound conforming to MIL-C-11796.

3.4 Performance. The hose assembly shall be capable of withstanding the following conditions:

3.4.1 Adhesion between tube and adjacent parts. On hose of 4-inch Inside Diameter (ID) size, the adhesion between tube and plies, between plies, and between cover and plies shall be such that the rate of separation after immersion in the specified hydrocarbon fluid maintained at a temperature of  $75^{\circ} \pm 5^{\circ}$  Fahrenheit (F) for 72 hours shall not exceed 1 inch per minute under a minimum load of 5 pounds per inch.

3.4.2 Low temperature flexibility. It shall be possible to open a concave length of 4-inch ID hose to an angle of approximately 90 degrees by application of a force not greater than 125 pounds after the U-shape has been subjected to a temperature of  $-67^{\circ} \pm 2^{\circ}$ F for not less than 72 hours.

3.4.3 Low temperature bend. Specimens of the tube and cover shall not crack when bent into a concave shape and maintained in this shape for not less than 72 hours at a temperature of  $-67^{\circ} \pm 2^{\circ}$ F nor shall they crack upon sudden further bending into a U-shape.

3.4.4 Volume increase. The volume increase of the tube and cover specimens after 24 hours of immersion in the specified hydrocarbon fluid at  $75^{\circ} \pm 5^{\circ}$ F shall not exceed 30 and 60 percent, respectively.

3.4.5 Tensile strength. The tensile strength of the tube and cover after a 48-hour immersion in the specified hydrocarbon fluid at  $75^{\circ} \pm 5^{\circ}$ F shall be not less than 600 and 400 psi, respectively.

3.4.6 Ultimate elongation. The ultimate elongation of the tube and cover shall be not less than 200 percent. After a 48-hour immersion in the specified hydrocarbon fluid at  $75^{\circ} \pm 5^{\circ}$ F, the ultimate elongation of the tube and cover shall be not less than 100 percent.

3.4.7 Pull resistance. The hose assembly shall not break nor shall its couplings disconnect from the hose when subjected to a load of 2,000 pounds directed along the longitudinal axis.

- \* 3.4.8 Burst resistance. The hose or hose assembly shall not burst or develop a permanent blister when subjected to a hydrostatic pressure of 700 psi.

3.4.9 Proof pressure. The hose with couplings attached, shall not leak nor show any imperfections in either hose or couplings when subjected to a hydrostatic pressure of 350 psi for not less than 30 seconds.

3.4.10 Length change. The length of the hose shall not change more than 7 percent when subjected to the test specified in 4.5.2.

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3.4.11 Nonobstructing requirement. The hose shall be as flexible as practicable, but when a 50-pound weight is attached to the unsupported end of a 4-foot section of which 2 feet are rigidly supported on a horizontal plane, the hose shall not bend in such a manner as would obstruct the flow of gases or liquids.

\* 3.4.12 Surge pressure cycling. The hose assembly shall be capable of withstanding surge pressures to 350 psig from 100 psig for 500 cycles. The cycles shall consist of a rise from 100  $\pm$ 10 psig to 350  $\pm$ 10 psig within 0.8 second, a drop to 100  $\pm$ 10 psig within 0.8 second and hold at 100  $\pm$ 10 psig for 10 seconds minimum.

\* 3.5 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirements of MIL-D-1000 shall govern the manufacturer's part numbers and changes thereto.

### 3.6 Dimensions

3.6.1 Diameter. The hose assembly shall have an inside diameter of 4  $\pm$ 1/32 inch and an outside diameter of 4-7/8  $\pm$ 1/16 inch.

\* 3.6.2 Length. The length of the hose assembly shall be as specified by the procuring activity (see 6.2) with a tolerance of  $\pm$ 1 percent. The length measurement shall not include the couplings.

\* 3.7 Weight. The weight of the hose shall not exceed 4 pounds per foot.

3.8 Identification of product. The hose assembly shall be legibly marked along its longitudinal axis with a yellow stripe of a fuel-resistant nature. The stripe shall be broken at intervals of approximately 2 inches.

\* 3.8.1 Label. Each length of hose shall also have a label inlaid approximately in the center and vulcanized thereto. The label shall contain the following information:

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Date of Manufacture (quarter and year)  
Contract or Order No.  
Manufacturer's Name or Trademark

3.9 Workmanship. Workmanship shall be of the quality necessary to produce hose and couplings free from defects which would adversely affect service performance.

## 4. QUALITY ASSURANCE PROVISIONS

\* 4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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- \* 4.2 Classification of tests. The inspection and testing of the hose assembly shall be classified as follows:

- a. Preproduction inspection See 4.3
- b. Quality conformance inspection See 4.4

#### 4.3 Preproduction inspection.

- \* 4.3.1 Samples. The following samples shall be subjected to the preproduction inspection methods specified in 4.3.3 and 4.3.4.

- a. A 10-foot length of uncoupled hose.
- b. A 3-foot length of hose with couplings and caps attached.
- c. A 15-inch length of hose to which couplings have been attached.

4.3.2 Test report. Upon completion of the preproduction inspection, a preproduction test report shall be prepared according to MIL-STD-831 and three complete copies of the report furnished to the procuring activity.

- \* 4.3.3 Examination. The sample hose assemblies shall be tested as specified in 4.5.1. Presence of one or more defects in any sample shall be cause for rejection.

- \* 4.3.4 Tests. The preproduction tests shall consist of all the tests specified in 4.5.2.

4.4 Quality conformance inspection. The quality conformance inspection tests shall consist of the following:

- a. Individual tests See 4.4.1
- b. Sampling plan and tests See 4.4.2

- \* 4.4.1 Individual tests. Each hose assembly shall be subjected to the following tests as described under 4.5. Any defects or failures of any sample shall be cause for rejection.

- a. Examination of product See 4.5.1
- b. Proof pressure test See 4.5.2.1

#### 4.4.2 Sampling plan and tests.

- \* 4.4.2.1 Sampling. Sampling of hose and hose assemblies for tests shall be in accordance with MIL-STD-105, inspection level S-2. Test section shall be cut from the hose assembly and shall be of sufficient length for the performance of the required tests.

- \* 4.4.2.2 Tests. Samples selected in accordance with 4.4.2.1 shall be tested as specified in 4.5.2.2 through 4.5.2.7. Failure of any test shall be cause for rejection of the hose assemblies represented by the samples.

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- \* 4.4.2.3 Rejection and retest. When an item selected from a production run fails to meet the specification, items still on hand or produced later, shall not be accepted until the extent and cause of failure have been determined.

- \* 4.4.2.3.1 Individual tests may continue. For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. But final acceptance of items on hand or items produced later shall not be made until it is determined that all items meet all the requirements of the specification.

- \* 4.4.2.3.2 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all the defects likely to be found and the method of correcting them.

- \* 4.5 Inspection methods.

- \* 4.5.1 Examination. The hose assembly shall be examined for the following defects:

- 101 Dimensions not as specified
- 102 Materials not as specified
- 103 Hose not as specified
- 104 Coupling halves not as specified, (if provided)
- 105 Identification marking missing, illegible, or not as specified
- 106 Exterior color of hose lay-line, not as specified
- 107 Workmanship not as specified
- 108 Hose not packed in flaking box as specified

- \* 4.5.2 Tests.

- \* 4.5.2.1 Proof pressure test. The proof pressure test shall be conducted in accordance with method 10211 of FED-STD-601. Each length of hose, with couplings attached, shall satisfactorily withstand the proof pressures specified in 3.4.9. In addition, the length of the hose shall not change more than 7 percent while the hose is being subjected to the proof pressure test.

- \* 4.5.2.2 Adhesion between tube and adjacent parts. Ring specimens shall be tested for friction in accordance with method 8021 of FED-STD-601. Post-immersion friction tests shall be conducted on a 12-inch length of hose after it has been stoppered with leakproof plugs and filled with the mixed hydrocarbon fluid specified in Table I at a temperature of  $75^{\circ} \pm 5^{\circ}\text{F}$  for 72 hours. Specimens used to determine adhesion shall be cut from the center of the length and tested within 15 minutes after removal from the fluid.

- \* 4.5.2.3 Low temperature bend test. Buffed specimens of the tube and cover, 4 inches long and 1/4 inch wide, shall be clamped in a concave shape between plates 2-1/2 inches apart and at least 2 inches wide in such a manner that the bend in the test piece does not protrude beyond the edges when the plates are brought together and the ends are not held for more than 1-1/4 inches. After exposure to a temperature of  $-67^{\circ} \pm 2^{\circ}\text{F}$  for 72 hours, the plates shall be moved rapidly together until the ends of the specimens are not more than 1 inch apart. Any evidence of cracking shall be cause for rejection.



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TABLE I

## Hydrocarbon Fluid Composition

Ingredient	Percent by Volume at 60°F
Iso-octane (2, 2, 4 trimethylpentane)	70
Toluene	30

- \* 4.5.2.4 Volume increase. The weight of water displaced by each of three 1- by 2-inch buffed specimens for the tube and cover shall be determined before and after 24 hours of immersion at 75° ±5°F in the hydrocarbon fluid specified in Table I, the ingredients of which shall conform to TT-T-548, for toluene, and ASTM Manual of Engine Test Methods for Rating Fuels for iso-octane, except that the ASTM octane rating test for iso-octane need not be conducted.
- \* 4.5.2.5 Tensile strength and ultimate elongation test. The tube and cover test specimens used for obtaining these properties shall be cut from die No. III of FED-STD-601, method 4111. Tube specimens shall be buffed to a thickness of not less than 0.050 inch. Immersion shall be for 48 hours at 75° ±5°F in the mixed hydrocarbon fluid specified in Table I. Tests shall be conducted within 5 minutes after removal from the fluid. The tensile strength and elongation of the tube and cover shall be as specified in 3.4.5 and 3.4.6.
- \* 4.5.2.6 Pull resistance test. One coupling of the 15-inch hose assembly shall be held securely in a vise while a pull is applied to the other coupling by any convenient means. The rate of jaw separation exerted by the test apparatus between the couplings shall be 1 inch per minute. The coupling shall not disconnect from the hose when a pull of 2,000 pounds is applied.
- \* 4.5.2.7 Burst resistance test. The burst resistance test shall be conducted in accordance with method 10011 of FED-STD-601. The hose or hose assembly shall not burst nor develop a permanent blister when a hydraulic pressure of 700 psi is applied.
- \* 4.5.2.8 Nonobstruction test. A 50-pound weight shall be attached to the unsupported end of a 4-foot section of hose of which 2 feet are rigidly supported on a horizontal plane. The hose shall not bend in a manner that would obstruct flow of gases or liquids.
- \* 4.5.2.9 Pressure cycling. The hose assembly shall be completely filled with hydrocarbon fluid as specified in Table I or grade JP-4 fuel in accordance with MIL-J-5624 and held at atmospheric pressure and normal room ambient temperature for 7 days. At the end of this period, the hose assembly shall be subjected to the following tests. Upon completion of the tests, evidence of an imperfection or a failure shall be cause for rejection.
  - a. Increase the fluid pressure from 100 ±10 psig to 350 ±10 psig within 0.8 second and immediately drop to 100 ±10 psig with 0.8 second.



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b. Hold at 100  $\pm$ 10 psig for 10 second minimum.

c. Repeat a and b above. The number of cycles recorded shall be cumulative and tests may be run continuously or intermittently until 500 cycles have been accomplished.

- \* 4.5.2.10 Low temperature flexibility. An uncoupled, 5-foot length of hose shall be bent into a concave shape so that the ends of the hose are approximately 40 inches apart, or a longer length may be coiled into a 40-inch diameter circle. The hose shall be tied to retain the U or circular shape and exposed to a temperature of  $-67^{\circ} \pm 2^{\circ}\text{F}$  for not less than 72 hours. The force required to open the hose to an angle of approximately 90 degrees shall not exceed 125 pounds. The temperature shall be held at  $-67^{\circ} \pm 2^{\circ}\text{F}$  during the test.

4.6 Inspection of the preservation, packaging, packing and marking for shipment and storage. Sample items or packs and the inspection of the preservation, packaging, packing, and marking for shipment and storage shall be in accordance with the requirements of Section 5, or the documents specified therein.

## 5. PACKAGING

- \* 5.1 Preservation-packaging. Preservation-packaging shall be level A or C, as specified (see 6d).
- \* 5.1.1 Level A and C. The hose and hose assembly shall be preserved and packaged level A or C, as specified (see 6.2) in accordance with MIL-H-775.
- \* 5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).
- \* 5.2.1 Levels A and B. Unless otherwise specified (see 6.d), the hose assembly shall be packed in accordance with MIL-H-775. The unit container shall be the shipping container.
- 5.2.2 Level C. Packages which require overpacking for acceptance by the carrier shall be packed in exterior shipping containers in a manner that will insure safe transportation, at the lowest rate, to the point of delivery. Containers shall meet Consolidated Freight Classification Rules or regulations of other common carriers as applicable to the mode of transportation.
- 5.3 Marking. Interior and exterior containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be:

Hose Assembly, Rubber Gasoline, Refueling, Low Temperature,  
Size \_\_\_\_, Length \_\_\_\_, Quantity \_\_\_\_. (\* as applicable)

## 6. NOTES AND CONCLUDING MATERIAL

6.1 Intended use. The hose assembly covered by this specification is intended for use as an integral part of a gasoline or jet fuel-dispensing system. for installation on a Type MH-2 refueling trailer conforming to MIL-T-26887.

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\* 6.2 Ordering data. Procurement documents should specify the following:

- a. Whether male or female couplings are required (see 3.3.2).
- b. Required level of preservation, packaging, and packing (see Section 5).
- c. Required length and quantities of hose (see 3.6.2).

6.3 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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